2013 ESPR
ANNUAL MEETING

PROGRAM GUIDE

Philadelphia, PA ~ March 22-24

THE EASTERN SOCIETY FOR PEDIATRIC RESEARCH

25th ANNIVERSARY

Founded in 1988

Jointly Sponsored By:The Center for Continuing Education, Tulane University Health Sciences Center

Eastern SPR
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Contents

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Display Tables

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Cornerstone Therapeutics
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Pediatrix Medical Group

Support our exhibitors by visiting their booths.

Friday	6:00 pm - 7:30 pm
Saturday	7:30 am - 8:30 am
	9:30 am - 9:45 am
	3:00 pm - 3:15 pm
	6:00 pm - 7:30 pm
Sunday	7:45 am - 8:45 am
	9:30 am - 9:45 am

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THE EASTERN SOCIETY FOR PEDIATRIC RESEARCH
25th ANNIVERSARY
Founded in 1988

Dear Colleagues,

Welcome to the 25th Annual Meeting of the Eastern Society for Pediatric Research (ESPR) and to our host city of Philadelphia, the Cradle of Liberty!

The Eastern Society for Pediatric Research Council and Planning Committee are confident that you will enjoy our exciting program. Highlights include State-of-the-Art Plenary Talks, the highly popular Lunch with the Professor educational program for trainees, and the brand new Fellow's Clinical Case Presentation Competition. High-quality original research is presented in subspecialty platform sessions with leading clinical and scientific authorities moderating the presentations and in two poster sessions.

The goals of the Eastern SPR Annual Meeting are to create a forum where: i) young investigators can present their research in a structured yet relaxed atmosphere, ii) regional clinicians can be exposed to cutting edge clinical and basic science, iii) timely educational programs addressing important topics in Pediatrics are presented and iv) trainees are able to interact with senior investigators and clinicians in an informal setting.

The continued success of our previous meetings has enabled an entirely web-based system for membership, registration and payments, in making timely announcements, in enhanced room booking services, and for the improvement in the overall ease of running the meeting. In addition, we again have centralized informatics enabling presenters to load their slide-show in advance at a speaker-ready station.

ACKNOWLEDGEMENTS: The organization of this meeting would not have been possible without the help of the administrative offices of the American Pediatric Society (APS) and the Society for Pediatric Research (SPR). We are especially grateful to: Debbie Anagnostelis (Executive Director), Kathy Cannon, Belinda Thomas, Jesse Osman and Lisa Thompson. We also recognize the energetic efforts of the Eastern SPR Planning Committee and Council Members for their guidance and vision in selecting this new venue and the efforts of Tulane University in New Orleans as our 2013 sponsor for the CME program. In addition, we thank various members of the regional pediatric community for reviewing the submitted abstracts and for moderating our platform sessions. Lastly, our corporate and leading academic sponsors were instrumental in making this meeting possible.

Most of all, we want to thank you for attending and for contributing your wisdom and experience in the pursuit of excellence. We hope that you enjoy and profit from the meeting, and look forward to your continued participation in future meetings!

Vineet Bhandari, MD, DM
President

Michael Posencheg, MD
Secretary

Sharon Smith, MD
Chair, Planning Committee

RECOGNITION OF NEW MEMBERS

The Council of the Eastern Society for Pediatric Research would like to recognize the following new members who have joined the society within the last year.

Membership in the Society reflects not only peer recognition of research achievements in pediatrics, but continuing commitment to pediatric research and fostering the career development the next generation of pediatric researchers. The Council and Society members welcome active participation in the organization. Like our parent organization, the Eastern SPR seeks to promote the generation of new knowledge, the professional growth of the current and next generation of academic pediatricians, and the translation of research discoveries into treatments that will benefit children worldwide. We believe that membership and active participation in the Eastern Society for Pediatric Research can meaningfully contribute to professional success as an academic pediatrician.

To celebrate this achievement, new members will be recognized at the Opening Reception on Friday, March 22, 2013. Once again, congratulations and welcome to the Eastern Society for Pediatric Research.

Anne Ades, M.D., Children's Hospital of Philadelphia
Andrew Adesman, M.D., Cohen Children's Medical Center of New York
Anita Bhandari, M.D., Connecticut Children's Medical Center
Andrew Blaufox, M.D., Cohen Children's Medical Center of New York
Kathleen Gibbs, M.D., Mount Sinai School of Medicine
Shadi Malaeb, M.D., St. Christopher's Hospital for Children
Upender Munshi, M.D., Albany Medical Center
Ursula Nawab, M.D., Thomas Jefferson University
Rakesh Sahni, M.D., Columbia University
Shetal Shah, M.D., SUNY Stony Brook
Nancy Spector, M.D., St. Christopher's Hospital for Children/Drexel University College of Medicine
Dawn Wetzel, M.D., Yale University School of Medicine

AAP CREDITS

This continuing medical education activity has been reviewed by the American Academy of Pediatrics and is acceptable for a maximum of **11.25** AAP credits. These credits can be applied toward the AAP CME/CPD Award available to Fellows and Candidate Members of the American Academy of Pediatrics.

Process for Attendees to Receive AAP Credit:

AAP Credit for attendees is recorded only when an attendee submits a copy of his/her certificate of attendance (pick up at the registration desk), **with AAP ID number,** to the American Academy of Pediatrics. The address to mail the certificate is:

American Academy of Pediatrics
Attn: Transcript Coordinator
141 Northwest Point Blvd.
Elk Grove, IL 60007-1098
Fax: 847-434-8387

2013 ESPR Press Guidelines

Thank you for your interest in covering pediatric topics offered at the annual meeting of the Eastern Society for Pediatric Research (ESPR). The annual meeting is a private meeting of the ESPR. The granting of media credentials for the meeting is at the sole discretion of the ESPR program committee.

Please note the following ESPR Press guidelines and media credentialing policies for the meeting.

Press Badges
Only individuals who are working for and representing a recognized news organization may register as press. To receive a press badge, working journalists must provide identification such as a business card, letter of assignment and published samples of bylined work, preferably stories relating to pediatric health. All freelance journalists must provide a letter of assignment on company letterhead from an editor of a recognized news organization certifying you are covering the ESPR annual meeting for the organization. Press badges are available only to working journalists who can show evidence that their attendance will result in coverage of the ESPR meeting. You may register at the ESPR Registration Desk at the Doubletree Hilton Philadelphia beginning Friday, March 22 at 4:00 pm.

Based on space requirements, ESPR retains the right to limit the number of press badges issued to a single media organization. ESPR does not issue press badges to: publishers or a publication's advertising, marketing, public relations or sales representatives; publishers, editors or reporters from manufacturers' house organs or promotional publications; public relations staff of exhibitors or educational institutions; or other individuals or their representatives who are not actually reporting on the meeting. Any Press badge holder who sells, markets or represents a company or organization for the purpose of obtaining advertising or subscriptions from any meeting registrant or exhibitor immediately forfeits press credentials.

A press badge allows media to attend all ESPR sessions being held during the dates of March 22 – 24, 2013. It must be worn at all times and obtained before attending and session. A press badge is not to be shared.

Registration fees for working press are waived. ESPR considers working press to be editorial staff of newspapers or magazines, medical or health care publications and broadcast or Web-based media.

Photography and Video
Television crews, documentary film crews, video crews and photographers covering the meeting are required to check in immediately at the ESPR Registration Desk each day, and must be accompanied at all times by a ESPR Officer or staff member when shooting inside the hotel. Shooting schedules and on-camera interview requests must be provided in writing in advance to ensure staff availability. As a courtesy to presenters, television and video crews, photographers, and radio reporters must obtain permission from the speaker and moderator *before* recording or filming an interview. Media may not photograph or videotape an exhibit booth or other display without the permission of the exhibitor and ESPR. This includes use of camera phones, personal digital cameras and other handheld devices.

Scientific Papers
In order to help maintain their eligibility for peer-reviewed journal publication, some researchers may not want to make themselves available for media interviews. Journalists who want to use slides, graphs and other visuals to illustrate coverage must have the presenter's permission.

ESPR appreciates your interest in child health issues. We hope that you have an instructive and enjoyable time at our meeting and encourage you to join us at future meetings. Please let us know if we can help you in any way.

Meeting Services & CME Accreditation

Registration and CME Desk Hours

Registration will be held on the 3rd floor. Registration hours are as follows:

Friday, March 22	4:00pm – 7:30pm
Saturday, March 23	7:00am – 7:30pm
Sunday, March 24	7:30am – 12:00pm

Abstract Publication

All abstracts being presented at the 2013 Eastern SPR Annual Meeting are printed in this Program Guide, beginning on page 18.

Audio/Visual Information

All oral presentations must be made using PowerPoint. Computers and LCD projectors will be provided. Presenters that have submitted their presentations in advance, are still required to check in at Speaker Ready.

Speaker Ready (Chamber Board Room-4th floor)

Presentations will be loaded onto a central computer prior to the session in which the presentation is to be made (i.e., Friday evening for Saturday morning presentations, Saturday morning for Saturday afternoon presentations, and Saturday afternoon for Sunday morning presentations). Please also bring your CD-ROM, ZIP drive or flash memory.

The speaker ready room hours are as as follows:

Friday, March 22	4:00pm – 7:30pm
Saturday, March 23	7:00am – 7:30pm
Sunday, March 24	7:30am – 12:00pm

Statement Of Need

Research and technology are changing rapidly in medicine and it is important for physicians and healthcare professionals to critically evaluate the emerging developments. Physicians and healthcare professionals in pediatrics need to increase their competence in discerning which of the emerging research and technologies are applicable to their patient populations. Discussions and debates on these emerging data stimulate the development of new guidelines, appropriateness criteria and evidence-based changes in medical practice.

The ESPR annual meeting provides a forum for young investigators to share their translational and clinical research with mentors and senior investigators. This gives the junior investigators important feedback in a non-threatening environment, provides for critiques and opportunities to improve the presentation before presenting on a national stage, and fosters mentoring from senior investigators.

The senior investigators benefit from this educational format by engaging in discussions on how to translate the research into practice, debates on how the new information supports or discredits the "old" information, and assists in the design of possible new research options and extensions.

The Eastern Society for Pediatric Research Annual Meeting addresses a three-fold need:

1. Young investigators need to increase their competence and performance in presenting their research in a structured yet relaxed atmosphere.
2. Regional clinicians need to increase their competence in evaluating and designing strategies to incorporate cutting edge clinical and basic science into practice.
3. Trainees need to increase their competence and performance in establishing collaborative relationships with mentors to address the barriers which may be interfering with research development.

Target Audience

Physicians within the pediatric specialties, internal medicine and family medicine. Non-physicians: Scientific researchers in both translational and clinical research in pediatrics. Healthcare professionals engaged with the pediatric population.

Overview And Objectives

The overall goal of this meeting is to improve patient care by increasing learner competence in evaluating the emerging translational and clinical research in pediatrics and determining parameters for expansion and modification of promising research developments.

Learner Objectives: At the conclusion of this activity, participants should be better able to:

- Critically evaluate the emerging translational and clinical research.
- Discuss new developments in pathophysiology of human disease with colleagues.
- Identify new areas of investigation which will inform research and improve patient care.
- Develop optimal strategies for clinical investigation and transmission of clinical research results.
- Develop relationships with mentors and peers to address the barriers which interfere with research development.

Predicted Outcomes

Predicted Changes in Practice as a result of participating in this activity include the ability to:

- Determine whether appropriate changes need to be recommended in patient protocols as indicated in the emerging research data.
- Implement new tools for teaching, research and medical practice.
- Apply appropriate evidence based recommendations in my research, teaching and/or medical practice.
- Present research in a national forum.
- Establish collaborations to expand or address barriers which are identified

Accreditation:

This activity has been planned and implemented in accordance with the Essentials Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of Tulane University Health Sciences Center and the Eastern Society for Pediatric Research. Tulane University Health Sciences Center is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Designation

Tulane University Health Sciences Center designates this live activity for a maximum of *11.25 AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Tulane University Health Sciences Center presents this activity for educational purposes only and does not endorse any product, content of presentation or exhibit. Participants are expected to use their own expertise and judgment while engaged in the practice of medicine. The content of the presentations is provided solely by presenters, who have been selected because of their recognized expertise.

Tulane Disclosure Policy

It is the policy of the Center for Continuing Education at Tulane University Health Sciences Center to plan and implement all of its educational activities in accordance with the ACCME's Essential Areas and Policies to ensure balance, independence, objectivity and scientific rigor. In accordance with the ACCME's Standards for Commercial Support, everyone who is in a position to control the content of an educational activity certified for *AMA PRA Category 1 Credit™* is required to disclose all financial relationships with any commercial interests within the past 12 months that creates a real or apparent conflict of interest. Individuals who do not disclose are disqualified from participating in a CME activity. Individuals with potential for influence or control of CME content include planners and planning committee members, authors, teachers, educational activity directors, educational partners, and others who participate, e.g. facilitators and moderators. This disclosure pertains to relationships with pharmaceutical companies, biomedical device manufacturers or other corporations whose products or services are related to the subject matter of the presentation topic. Any real or apparent conflicts of interest related to the content of the presentations must be resolved prior to the educational activity. Disclosure of off-label, experimental or investigational use of drugs or devices must also be made known to the audience.

How To Obtain Your *AMA PRA Category 1 Credits™*

Tulane and the Eastern Society for Pediatric Research are now using a secure electronic format for evaluation and credit verification. The evaluation remains anonymous but the link does allow you to give us your contact information which will be incorporated into the Certificate of Credit.

At the conclusion of the conference on Sunday, you will be sent a link to an electronic evaluation and credit verification form from Tulane.edu. If you do not receive this in your inbox on Sunday afternoon, check your spam/junk mailbox. You can contact cme@tulane.edu if you did not receive it and Tulane will send you another link for claiming your credits.

You will receive your certificate of credit by Wednesday, May 1, 2013. If you do not receive it by then, please notify Tulane University at cme@tulane.edu.

Faculty

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Eastern SPR Schedule-at-a Glance

Friday, March 22

6:00pm–7:30pm

Poster Session I & Reception
— Symphony Ballroom - 3rd Floor —

Saturday, March 23

7:00am–8:00am

Continental Breakfast
— Symphony Ballroom - 3rd Floor —

8:00am–9:30am

Cardiopulmonary Development
— Aria A - 3rd Floor —

Developmental & Behavorial Pediatrics
— Maestro A - 4thFloor —"

General Pediatrics I - Obesity
— Concerto A/B - 3rd Floor —

General Pediatrics II - Underserved
— Maestro B - 4thFloor —

Infectious Diseases & Immunology
— Minuet - 4th Floor —

Neonatology I
— Overture - 3rd Floor —

9:30am–9:45am

Coffee Break
— Symphony Ballroom - 3rd Floor —

9:45am–10:45am

Adolescent Medicine
— Concerto A/B - 3rd Floor —

Cardiology
— Aria A - 3rd Floor —

Fetal Nutrition
— Minuet - 4th Floor —

Medical Education
— Overture - 3rd Floor —

Neonatal Pharmacology
— Maestro B - 4thFloor —

Neonatal Resuscitation
— Maestro A - 4thFloor —

10:50am–11:50am

Plenary Session I

PLENARY LECTURE
Joel Hirschhorn, MD, PhD
"Genetics of Height, Obesity and Other Human Complex Traits"
— Overture - 3rd Floor —

12:00pm–1:00pm

Meet the Professor Lunch
Nancy Messonnier, MD
Public Health Careers at CDC after Residency
— Concerto A/B - 3rd Floor —

Fellow's Clinical Case Presentation Competition
— Aria A - 3rd Floor —

Eastern SPR Business Meeting
— Rhapsody - 4th Floor —

1:15pm–4:00pm

Plenary Session II

MENTOR OF THE YEAR
Phyllis Dennery, MD
Turning a Jaundiced Eye on Basic Research in Neonatology
— Overture - 3rd Floor —

TRAINEE YOUNG INVESTIGATOR PRESENTATIONS: (2:15pm–3:00pm)

Coffee Break (3:00pm–3:15pm)
— Symphony Ballroom - 3rd Floor —

FACULTY YOUNG INVESTIGATOR PRESENTATIONS: (3:15pm–4:00pm)

4:15pm–5:45pm

Breast & Infant Feeding
— Concerto A/B - 3rd Floor —

Emergency Medicine I
— Aria A - 3rd Floor —

General Pediatrics III - Prevention
— Maestro B - 4thFloor —

Hematology/Oncology
— Maestro A - 4thFloor —

Neonatal Neurology
— Minuet - 4th Floor —

Neonatology II
— Overture - 3rd Floor —

6:00pm-7:30pm

Poster Session II & Reception
— Symphony Ballroom - 3rd Floor —

Sunday, March 24

7:45am–8:45am

Continental Breakfast
— Symphony Ballroom - 3rd Floor —

8:30am–9:30am

Plenary Session III

PRESENTATION OF THE YOUNG INVESTIGATOR AWARDS

PLENARY LECTURE

— Overture - 3rd Floor —
Nancy Messonnier, MD
Why are we Not Controlling Pertussis in the United States?

9:45am–12:00pm

Emergency Medicine II
— Concerto A/B - 3rd Floor —

Endocrinology
— Minuet - 4th Floor —

General Pediatrics IV
— Maestro A - 4th Floor —

General Pediatrics V
— Aria A - 3rd Floor —

Neonatal Pulmonary
— Maestro B - 4th Floor —

Neonatology III
— Overture - 3rd Floor —

Poster Session Facilitators

General Pediatrics I, Developmental Pediatrics and Medical Education

Melissa Langhan, Ralynne Maitland and Matt Laurich

Neonatal General, Neonatal Epidemiology, Neonatal Infectious Diseases and Neonatal Fetal Nutrition

Zubair Aghai, Kathleen Gibbs and Naveed Hussain

Endocrinology, Neurology, General Pediatrics II and Infectious Diseases

Ingrid Walker-Descartes, Hans Kersten and Andrew Blaufox

Neonatal General II, Neonatal Pulmonology and Nephrology

Jeff Shenberger, James Padbury and Alexander Agthe

Friday, March 22, 2013
Poster Session I

General Pediatrics I

6:00pm–7:30pm **Symphony Ballroom**

1 **Priapism as a Complication of Herbal Supplement Use: A Case Report**
Subha Battu, Caterina Tiozzo, Steven Katz, David Fagan.
– Abstract 1

2 **Sexual Risk Taking Behavior among US Teens: Update 2011**
Karen Ginsburg, Andrew Adesman.
– Abstract 2

3 **Disordered Eating in Inner City Adolescent Males**
Rashmi S. Bhopi, Paulo Pina, David H. Rubin.
– Abstract 3

4 **Latino Caregiver Experiences with Asthma Health Communications: A Qualitative Evaluation**
Antonio Riera, Agueda Ocasio, Gunjan Kamdar, Lauren Krumeich, Kyle Ragins, Sandra Trevino, Federico E. Vaca.
– Abstract 4

5 **Intravenous Magnesium Sulfate in the Treatment of Acute Asthma**
Chiarina Galvez, Paulo Pina, Kathleen Asas.
– Abstract 5

6 **Seasonal Variation in Viral Bronchiolitis Severity**
Kelly N.F. Fradin, Gabriella Azzarone, Nora Esteban-Cruciani, Joanne Nazif.
– Abstract 6

7 **Enhancing the Patient Centered Medical Home for Children with Asthma through Quality Improvement (QI)**
Melissa Donohue, Sara R. Slovin, Iman Sharif.
– Abstract 7

8 **Prevalence and Correlates of Left Ventricular Hypertrophy in the Pediatric Hypertensive Population**
Diana E. Drogalis, Anna Tsirka, Jennifer Friderici.
– Abstract 8

9 **Diminished Exercise Response of Tissue Doppler Velocities in Pediatric Patients with Aortic Stenosis**
Ashish Pal Saini, John Roberts, Matt Dean, Stephen E. Cyran, Linda B. Pauliks.
– Abstract 9

10 **Central Venous Catheter Use and Thromboprophylaxis in Critically Ill Children**
E. Vincent S. Faustino.
– Abstract 10

11 **Hospital-Acquired Hyponatremia in Children Following Hypotonic Versus Isotonic Intravenous Fluids Infusion: A Single Center Experience**
Panagiotis Kratimenos, Ioannis Koutroulis, Dante Marconi, Joseph Jaeger, Andrew McInnes.
– Abstract 11

Developmental Pediatrics

6:00pm–7:30pm **Symphony Ballroom**

12 **Clinical Criteria for Pharmacotherapy in Preschool Children with ADHD**
Jaeah Chung, Suzanne Sunday, David Meryash, Andrew Adesman.
– Abstract 12

13 **Performance on the NICU Network Neurobehavioral Scale (NNNS) by Preterm Twins**
Jennifer J. Bragg, Robert Green, Annemarie Stroustrup.
– Abstract 13

14 **Effects of Intraventricular Hemorrhage (IVH), Bronchopulmonary Dysyplasia (BPD) and Sepsis on Neurobehavioral Functioning as Measured by System Scoring of the Assessment of Preterm Infants' Behavior (APIB) at 41-43 Weeks Post Conceptual Age (PCA)**
Gretchen Lawhon, Olayemi Ola, Jaime Jump, Krystal Hunter, Nicole Kemble, Vishwanath Bhat, Gary E. Stahl.
– Abstract 14

15 **Evaluation of a Sibling Support Group for Families of Children with Autism Spectrum Disorders**
Elaine Lin, Patricia Hametz, Maureen McSwiggan-Hardin, Katherine Sullivan, Mary McCord.
– Abstract 15

16 **Autism Spectrum Disorders and Age of Diagnosis in an Urban Inner-City Pediatric Clinic**
Indu Sivaraman, Kome Oseghale, Gina Exantus Bernard, Ellis Arnstein, Stefan Hagmann, Ayoade Adeniyi, Richard Neugebauer, Ram Kairam.
– Abstract 16

17 **Distractibility, Vigilance and Delay in Children Attending the Pediatric Rheumatology Clinic**
Lakshmi N. Moorthy, Muffaddal Dahodwala, Margaret Peterson, Thomas Lehman, Barbara M. Ostfeld.
– Abstract 17

Medical Education

6:00pm–7:30pm **Symphony Ballroom**

18 **Inter-Professional Training Program for Health Professional Learners in Southern Belize**
Denise A. Soltis, Susan M. Leib.
– Abstract 18

19 **Barriers to Patient- and Family-Centered Care in the Era of Resident Work Hours Restrictions**
Matthew P. Kusulas, Joanne Nazif.
– Abstract 19

20 **A Learner-Based Evaluation of Varied Formats of Chief Resident Led Educational Sessions**
Blair Dickinson, Darshita Bhatia, Elizabeth Maxwell, Matthew B. McDonald.
– Abstract 20

21 **Somebody Tell the Students: Dichotomy between Standardized Patients' and Medical Students' Assessments of Professionalism**
Hai Jung H. Rhim, Ilir Agalliu, Miriam Schechter.
– Abstract 21

22 **Evaluating and Implementing a Residency Training Program on Breaking Bad News**
Anthony Orsini, Patricia Eaton, Maryann LoFrumento.
– Abstract 22

23 **Impact of a Novel Training Curriculum for Pediatric Residents in the Prevention of Intimate Partner Violence among Adolescents**
Anil Kumar Swayampakula, Cynthia Lewis, Alexandra Smith, Christina Alex, Richard Neugebauer, Ayoade Adeniyi, Stefan Hagmann, Ram Kairam.
– Abstract 23

24 **Giving Bad News: Pediatric Resident Opinions Regarding Communication Skills**
Gail S. Cameron, Alexander Agthe, Pamela Donohue, Brenda Hussey-Gardner, Alison J. Falck.
– Abstract 24

25 **Objective Assessment of a Formal Handoff Curriculum for Pediatric Residents**
Lawrence E. Fried, David Rappaport.
– Abstract 25

Neonatal - General

6:00pm–7:30pm **Symphony Ballroom**

26 **Histologic Chorioamnionitis and Severe Intraventricular Hemorrhage in Very Low Birthweight Infants**
Jennifer L. Maher, Robert Locke, Amy Mackley, David A. Paul.
– Abstract 26

27 **Interindividual Expression of BCRP/ABCG2 Efflux Transporter mRNA in Term Human Placentas**
Naureen Memon, Kristin M. Bircsak, Faith Archer, Barry Weinberger, Anna Vetrano, Lauren M. Aleksunes.
– Abstract 27

28 **Are Routine Cord IgM and Urine CMV Cultures Warranted in the Initial Evaluation of Small-for-Gestational Age Neonates?**
Samuel Ajayi, Teena Sebastian, Ramesh Matam, David Schutzman, Allan Arbeter.
– Abstract 28

29 **Hemodynamic and Echocardiographic Variables Influencing SVC Flow in the VLBW Infants**
Jagdish Desai, Laya Weichbrod, Riddhiben Patel, Roger Kim, Sarita Dhuper.
– Abstract 29

30 **Concurrent Administration of Apoptotic Inhibitors and Hypothermia Attenuates Further Hypoxic Cerebral Injury in Newborn Piglets**
Shadi Malaeb, Endla Anday, Anli Zhu, Maria Delivoria-Papadopoulos.
– Abstract 30

31 **Assessing the Cardioprotective Properties of Controlled Hypothermia in Neonates with Moderate to Severe Hypoxic Ischemic Encephalopathy Utilizing Cardiac Troponin I**
Ogechukwu R. Menkiti, Jennifer P. Alexander, Jenni Wallace, Nicholas Obiri.
– Abstract 31

32 **Multi-Institution Report of Transfusion Related Acute Gut Injury (TRAGI) from an Online Registry: www.tragiregistry.com: Feasibility of Collaboration**
Jonathan Blau, Edmund F. La Gamma.
– Abstract 32

33 **Getting to Zero: Development of a NEC QI Initiative To Decrease Progression in NEC Severity**
Jenny R. Fox, Tazuddin A. Mohammed, Russell R. Moores, Jr., Archana Jayaram, Sharon A. Cone, Karen D. Hendricks-Munoz.
– Abstract 33

34 **Does Vitamin D Deficiency at Birth Affect the Risk and or Severity of Bronchopulmonary Dysplasia (BPD) among VLBW Infants**
Sreenivas Karnati, Subhash Puthuraya, Marwan Zidan, Nitin Chouthai, S. Nadya J. Kazzi.
– Abstract 34

35 **Long Term Effect of Hypoxia on the Eya3 (Eyes Absent Homolog 3) Protein Expression in the Cerebral Cortex of Newborn Piglets**
Margaret Nguyen, Angelica Penninti, Anli Zhu, Maria Delivoria-Papadopoulos.
– Abstract 35

36 **Is Pulse Oximetry (SpO_2) Screening for Critical Congenital Heart Disease (CCHD) Applicable among Low Birth Weight (LBW) Infants in a NICU Setting?**
Devaraj Sambalingam, Peter Beshay, Satyan Lakshminrusimha, Vivien Carrion.
– Abstract 36

37 **Long Term Effect of Src Kinase Inhibition on Caspase-1 Activity Following Hypoxia in the Cerebral Cortex of Newborn Piglets**
Dimitrios Angelis, Tania D. Fontanez-Nieves, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
– Abstract 37

38 **Mechanism of Caspase-8 Activation Following Hypoxia in the Newborn Piglet Brain**
Tania D. Fontanez-Nieves, Dimitrios Angelis, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
– Abstract 38

39 **Postnatal Growth in Infants with Neonatal Abstinence Syndrome**
Jennifer Hesler, Janet Larson.
– Abstract 39

40 **The Use of the Laryngeal Mask Airway in the Difficult Neonatal Airway**
Ulysses Mustaki, Helen M. Towers, Rakesh Sahni, Jen-Tien Wung.
– Abstract 40

Neonatal Epidemiology

6:00pm–7:30pm **Symphony Ballroom**

41 **MCHAT Screen for Autism in Preterm Infants…Take the Next Step**
Jordan S. Kase, Semsa Gogcu, Paul F. Visintainer, Rajeswari Senguttuvan.
– Abstract 41

42 **Improved Survival of Extremely Preterm Infants Is Dependent on the Level of Birth Hospital and the Timing of Transfer to the Regional Perinatal Center**
Y. Malhotra, D. Aboudi, E.F. LaGamma, H.L. Brumberg.
– Abstract 42

43 **Health Illiteracy in the NICU**
Michael Winter, Robert Locke, Amy Mackley, Rachel Joseph, David A. Paul, Ursula Guillen.
– Abstract 43

44 **Outborn Very Low Birth Weight Infants Have Higher Rates of Early Intervention Enrollment Than Inborns**
Semsa Gogcu, David Aboudi, Jordan Kase, Edmund LaGamma, Heather Brumberg.
– Abstract 44

45 **Perinatal Factors Associated with Increased Length of NICU Stay in Late Preterm Infants**
Jessica M. McGovern, Amy B. Mackley, Robert G. Locke, David A. Paul.
– Abstract 45

46 **Assessment of Perinatal Regionalization: Antenatal Transfer of Mothers between 23 and 32 Weeks Gestation**
Misty Melendi, Michelle Macheras, Scott Lorch.
– Abstract 46

47 **Early Introduction of Solid Foods to Premature Infants and Impact on Feeding Behaviors**
Jaeah Chung, Regina Spinazzola, Janet Lee, Rithika Ramakrishnan, Karen Ginsburg, Ruth Milanaik.
– Abstract 47

48 **Failure To Adjust for Gestational Age When Plotting Premature Infant Growth and Its Impact on Parental Satisfaction**
Jaeah Chung, Regina Spinazzola, Janet Lee, Anna Krevskaya, Maria Mendoza, Ruth Milanaik.
– Abstract 48

49 **Correlation of Growth Trajectory between Appropriate and Small for Gestational Age Infants to Their Neuro-Cognitive Outcome**
Sri Narayana, Semsa Gogcu, Jordan Kase.
– Abstract 49

50 **Cost-Effectiveness of Interventions To Improve Neonatal Mortality in Ghana**
Tawia Apenteng, Scott Lorch.
– Abstract 50

51 **Clustering and Periodicity of Necrotizing Enterocolitis in a Single NICU over Two Decades**
Naveed Hussain, Elizabeth Brownell.
– Abstract 51

Neonatal Infectious Diseases

6:00pm–7:30pm **Symphony Ballroom**

52 **Role of Perinatal Factors and Genital Mycoplasmas (GM) in Necrotizing Enterocolitis (NEC)**
Naveed Hussain, Lulu Rahman, Elizabeth Brownell.
– Abstract 52

53 **Reduced Neonatal Anti-Viral CD8⁺ T Cell Responses Are Due to Intrinsic Defects of Neonatal CD8⁺ T Cells**
Alison J. Carey, Donald Gracias, Yvonne Mueller, Peter D. Katsikis.
– Abstract 53

54 **Salivary Cytokine Analysis in Preterm Infants: Relationship to Early Delivery and Levels in the Well Full Term Infant**
Truc Hoang, Pradeep V. Mally, Jie Xu, Karen D. Hendricks-Munoz.
– Abstract 54

55 **T-Cells Are Preferentially Expressed Following Neonatal Hyperoxia in Adult Mice**
Vasanth H.S. Kumar, Huamei Wang, Lori Nielsen.
– Abstract 55

56 **Outcomes Associated with Different Antibiotic Regimens for Necrotizing Enterocolitis**
Sandhya S. Brachio, Lisa Saiman, Patricia DelaMora, Kelly Gray, Luis Alba, Jennifer Wong-McLoughlin, David A. Paul, Theoklis Zaoutis, Jennifer Duchon.
– Abstract 56

57 **Predictors of Infections with Gram-Negative Bacilli in Neonatal Intensive Care Units and Antibiotic Susceptibility Patterns**
Nicole Green, Sarah A. Clock, David Paul, Jeffrey Perlman, Theoklis Zaoutis, Yu-hui Ferng, Luis Alba, Elaine Larson, Lisa Saiman, Sameer Patel.
– Abstract 57

58 **Effect of Hyperoxia Exposure on T-Lymphocyte Maturation, Differentiation and Function in Neonate Mice**
Angela Leon-Hernandez, Hardik Patel, Michelle Bodgan, Lyndsey Manoff, Sharif Younis, Barbara Sherry, Mohamed Ahmed.
– Abstract 58

59 **Central Line Associated Blood Stream Infections (CLABSIs) in Neonates: A Comparison of Tunneled, Peripherally Inserted and Umbilical Lines**
Mojgan Ghazirad, Lamia Soghier, Khodayar Rais Bahrami, Xiaoyan Song.
– Abstract 59

60 **A Mouse Model for Adhesion of *Candida Parapsilosis* to Endothelial Cells**
Diana P. Vargas, Sonia S. Laforce-Nesbitt, Sunil S. Shaw, Joseph M. Bliss.
– Abstract 60

61 **Decreased Central Line Associated Blood Stream Infection Rate after Addition of a Disinfecting IV Access Port Cap to a Central Line Bundle**
Erik Brandsma, Linda Wicker, Judy Saslow, Jacqueline George, Joanne Fox, Robyn Harvey, Gary Stahl.
– Abstract 61

Neonatal Fetal Nutrition

6:00pm–7:30pm **Symphony Ballroom**

62 **Methicillin Resistant *Staphylococcus Aureus* (MRSA) and the Individual Room Neonatal Intensive Care Unit**
Tazuddin A. Mohammed, Jose L. Munoz, Russell R. Moores, Jr., Jie Xu, Sharon A. Cone, Janis Faye Ober, Susan Collins Lewis, Michael B. Edmond, Karen D. Hendricks-Munoz.
– Abstract 62

63 **Growth Patterns in Extremely Low Birth Weight Infants Fed Donor Breast Milk: A Single-Center Study**
Laura Madore, Tina Jumani, Sarbattama Sen.
– Abstract 63

64 **Metabolic Bone Disease Remains Common in Infants with Moderate to Severe BPD**
Peihui Liu, Keolamau Yee, Brenda B. Waber, Erik A. Jensen, Kevin C. Dysart, Huayan Zhang.
– Abstract 64

65 **Analysis of Expressed Breast Milk (EBM) Protein Content Predicts Accumulated Protein Debt after Preterm Birth**
Sharmeel Khaira, Antoinette Maraglino, Karen Harvey-Wilkes, MaryAnn Volpe.
– Abstract 65

66 **Initiating 20 cal/oz vs 24 cal/oz Preterm Formula Feeds in Very Low Birth Weight Infants: Impact on Feeding Tolerance and Necrotizing Enterocolitis**
Ursula Nawab, Sharon Kirkby, Linda Genen, Jay S. Greenspan, Zubair H. Aghai.
– Abstract 66

Saturday, March 23, 2013 Platform Session

Cardiopulmonary Development

8:00am–9:30am **Aria A**

Moderator: Andrew Blaufox

8:00am **TBX1 Interacts with JUN and a Dominant Negative JUN Missense Mutation Is Associated with Congenital Heart Disease**
Hua Pan, Tao Zhang, Cary A. Kraft, Indu Subbaraj, Julie De Mesmaeker, Brande C. Latney, Elizabeth Goldmuntz, Shoumo Bhattacharya, Jason Z. Stoller.
– Abstract 67

8:15am **The Matricellular Protein CCN5 Is Coordinately Regulated with Proliferation of Murine Alveolar Epithelial Cells during Development and in Response to Hyperoxic Injury**
Najla A. Fiaturi, Heber C. Nielsen, John J. Castellot.
– Abstract 68

8:30am **Pigment Epithelium Derived Factor (PEDF) Regulates Inhibition of Vascularization and Alveolarization in Neonatal Oxygen Injury**
Michelle Bennett, Linh Dang, Sana Mujahid, MaryAnn Volpe, Anne Chetty, Heber Nielsen.
– Abstract 69

8:45am **ErbB4 JmaCyt1 Isoform Drives Fetal Mouse Lung Type II Cell Proliferation and Differentiation**
Arlene E. Reyna, Dorothea Wiegel, Heber C. Nielsen, Christiane E.L. Dammann.
– Abstract 70

9:00am **Regulation of Alternative Splicing of ErbB4 during Fetal Mouse Type II (T2) Cell Differentiation**
Dorothea Wiegel, Arlene Reyna, Christiane E.L. Dammann, Heber C. Nielsen.
– Abstract 71

9:15am **TTF1 Signals Negative Feedback to ErbB4 in Mouse Type II Epithelial Cells**
Dorothea Wiegel, Elger Marten, Heber C. Nielsen, Christiane E.L. Dammann.
– Abstract 72

Developmental & Behavioral Pediatrics

8:00am–9:30am **Maestro A**

Moderator: Ruth Milanaik

8:00am **Predictors of Completed Early Intervention Evaluation**
Manuel Jimenez, James Guevara, Marsha Gerdes, Susmita Pati, Alexander Fiks.
– Abstract 73

8:15am **Docosahexaenoic Acid Can Mitigate Some Ethanol-Induced Behavioral Changes**
Finney George, Kristen A. Wellmann, Sandra M. Mooney.
– Abstract 74

8:30am **Childhood Predictive Factors of Young Adult Employment in Low-SES Inner-City African Americans**
Kehvon Clark, Laura M. Betancourt, Nancy L. Brodsky, Hallam Hurt.
– Abstract 75

8:45am **Medication Management of Preschool ADHD by Pediatric Sub-Specialists: Non-Compliance with AAP Clinical Guidelines**
Jaeah Chung, Suzanne Sunday, David Meryash, Alyson Gutman, Andrew Adesman.
– Abstract 76

9:00am **Implications of MRI in Children with Autism Spectrum Disorder**
Alison S. Gurtman, Eron Friedlaender, Susan E. Levy, Cynthia Mollen, Karuna V. Shekdar, Andrea L. Bennett.
– Abstract 77

9:15am **Assessment of Preterm Infants with the NICU Network Neurobehavioral Scale**
Jennifer J. Bragg, Robert Green, Annemarie Stroustrup.
– Abstract 78

General Pediatrics I: Obesity

8:00am–9:30am **Concerto A/B**

Moderator: Cathy Wiley

8:00am **Obesity Is a Risk Factor for Symptomatic Cholelithiasis in Childhood**
Kelly N.F. Fradin, Andrew D. Racine, Peter F. Belamarich.
– Abstract 79

8:15am **Measuring Fatness *and* Fitness: The 6 Minute Walk Test in a Pediatric Setting**
Jennilyn N. Weber, Lauren M. Daley, Gary A. Emmett.
– Abstract 80

8:30am **Effect of a School Based Intervention on Parents' Nutrition and Exercise Attitudes and Behaviors**
John C. Rausch, Evelyn Berger-Jenkins, Andres Nieto, Mary McCord, Dodi Meyer.
– Abstract 81

8:45am **Association between Neighborhood Physical Activity Resources en Route to School and Time Outdoors in Inner-City Minority Children**
Leigh Goldstein, Maida P. Galvez, Kathleen McGovern, Susan Teitelbaum, Barbara Brenner, Mary Wolff.
– Abstract 82

9:00am **Modifiable Cardiovascular Risk Factors in Middle and High School Students in Quito-Ecuador**
Ramiro W. Lizano Santamaria, Marco Fornasini, Ivan Sisa.
– Abstract 83

9:15am **To Assess the Correlation between Obesity and Risk for Urinary Tract Infections in the Pediatric Population**
Richard A. Jack, Fernanda Kupferman, Kelly Cervellione, Susana Rapaport, Sonia Patel, Shirley Pinero.
– Abstract 84

General Pediatrics II: Underserved

8:00am–9:30am **Maestro B**

Moderator: Hans Kersten

8:00am **The Effect of Regular Exercise on Exposure to Violence in Inner City Youth**
Noe D. Romo, Melissa Dupont-Reyes, Deborah Fry, Leslie Davidson.
– Abstract 85

8:15am **Socioeconomic Status and Hospitalization Costs for Common Pediatric Conditions**
E. Fieldston, I. Zaniletti, M. Hall, J. Colvin, L. Gottlieb, M. Macy, E. Alpern, R. Morse, P. Hain, M. Sills, G. Frank, S. Shah.
– Abstract 86

8:30am **Pediatric Readmission within 1 Month of Discharge: An Insight from an Inner City Community Hospital in New York**
R. Basak, U. Mahat, I. Sivaraman, L. Kin.
– Abstract 87

8:45am **Disparities in Functional Outcomes by Race, Ethnicity, and Insurance Status Following Injury-Related Inpatient Rehabilitation**
Jennifer N. Fishe, Margaret G. Stineman, Mark R. Zonfrillo.
– Abstract 88

9:00am **Infant Sleeping Practices at Nap and Night Time in an Inner City Population**
Barbara A. Kelly, Matilde Irigoyen, Monique M. Mondesir, Natalia Isaza Brando.
– Abstract 89

9:15am **Can You Fill This out? Caregiver, Clinician and Staff Perspectives on Pre-Visit Questionnaires Prior to Well-Child Care**
Sara R. Slovin, Tashi L. Rowe, Kristin Mmari, Ashish Joshi, Cynthia S. Minkovitz.
– Abstract 90

Infectious Diseases & Immunology

8:00am–9:30am **Minuet**

Moderator: Elijah Paintsil

8:00am **Hepatitis B Vaccination Practices in the NICU for Term and Late Preterm Short-Stay Infants**
Erica Kehler, Shreya Patel, Erin Rescoe, Ben H. Lee.
– Abstract 91

8:15am **National Trends and Resource Utilization in the Management of Infants with Urinary Tract Infections**
Katherine O'Connor, Alyssa H. Silver, Lindsey C. Douglas, Joanne Nazif, Nora Esteban-Cruciani, Sage R. Myers.
– Abstract 92

8:30am **The Incidence and Clinical Characteristics of Acute Bronchiolitis with Urinary Tract Co-Infection among Children under 2 Years of Age Admitted to Urban Inner City Community Hospital**
Stanka Madhu Kankipati, Chukwuma Mmuo, Nkiruka Ezenwa, Stefan Hagmann, Ayoade Adeniyi, Richard Neugebauer, Savita Manwani.
– Abstract 93

8:45am **Frequency of *APOL1* Risk Alleles among a US Cohort of Children with Perinatal HIV-1 Infection and Associations with Renal Phenotypes**
Murli U. Purswani, Kunjal Patel, Jeffrey B. Kopp, Cheryl Winkler, Stephen A. Spector, Rohan Hazra, George R. Seage III, George K. Siberry, Lynne M. Mofenson, Gwendolyn B. Scott, Russell B. Van Dyke.
– Abstract 94

9:00am **Assessing Current Physician Practices in the Management of Children Hospitalized for Community-Acquired Pneumonia**
Zunaira Choudhary, Russell J. McCulloh, Crystal-Rose Cuellar, Michael Koster, Brian K. Alverson.
– Abstract 95

9:15am **Does Viral Coinfection Impact Bronchiolitis Severity?**
Kelly N.F. Fradin, Gabriella Azzarone, Nora Esteban-Cruciani, Joanne Nazif.
– Abstract 96

Neonatology I

8:00am–9:30am **Overture**

Moderator: Alexander Aghte

8:00am **Trials of Persistent Pulmonary Hypertension of the Newborn Are Heterogeneous and Often Stopped Early**
Annie Giaccone, Elizabeth Foglia, Haresh Kirpalani.
– Abstract 97

8:15am **Natural History of Pulmonary Artery Pressure (PAP) Changes in Preterm Infants**
Hussnain Mirza, James Ziegler, Sara Ford, Richard Tucker, James Padbury, Abbot R. Laptook.
– Abstract 98

8:30am **Pulmonary Hypertension in Preterm Infants: Prevalence and Associations with BPD**
Hussnain Mirza, James Ziegler, Sara Ford, Richard Tucker, James Padbury, Abbot Laptook.
– Abstract 99

8:45am **Near-Infrared Spectroscopy (NIRS) Evaluation of Sodium Bicarbonate ($NaHCO_3$) Corrections in Very Low Birth Weight (VLBW) Neonates**
Jonathan P. Mintzer, Boriana Parvez, Michael Chelala, Gad Alpan, Edmund F. La Gamma.
– Abstract 100

9:00am **Toluene Disruption of L1-Mediated Neurite Outgrowth**
Kimberly M.R. White, Penny Bamford, Min He, Ningfeng Tang, Cynthia F. Bearer.
– Abstract 101

9:15am **Alteration of Nitric Oxide Pathway in Preterm Ovine Fetal Mesenteric Arteries with Antenatal Betamethasone, Enteral Feeds and Packed Red Cell Transfusions**
Jayasree Nair, Sylvia F. Gugino, Lori Nielsen, Bobby Mathew, Satyan Lakshminrusimha.
– Abstract 102

9:30am **Break**

Adolescent Medicine

9:45am–10:45am **Concerto A/B**

Moderator: Danielle Laraque

9:45am **Nutritional Knowledge, Attitude towards Weight and Dietary Practice (KAP) in Adolescents and Their Association with Body Habitus**
M. Yu, Y. Hu, F. Kupferman, K. Cervellione, J. Eng, S. Rapaport, L.Q. Lew.
– Abstract 103

10:00am **Early Sexual Debut in the United States: Longitudinal Analysis of National Data from the Youth Risk Behavior Surveillance System from 1991 – 2011**
Karen Ginsburg, Suzanne Sunday, Andrew Adesman.
– Abstract 104

10:15am **Exploring Medical Homes and Social Needs of Pregnant and Parenting Teens in Northern Virginia**
Kristine H. Schmitz, Carmen M. Gill Bailey, Sanda S. Chelliah, Natalie G. McKnight, Riva Kamat.
– Abstract 105

10:30am **Electronic Bullying and Recreational Video/Computer Time in U.S. High School Students**
Karen Ginsburg, Andrew Adesman.
– Abstract 106

Cardiology

9:45am–10:45am **Aria A**

Moderator: Andrew Blaufox

9:45am **Impact of Adolescent Age on Graft Survival in Patients with Congenital Heart Disease Versus Myocarditis**
Jill J. Savla, Kimberly Y. Lin, Debra S. Lefkowitz, Stephen M. Paridon, William Gaynor, Rachel Hammond, Robert E. Shaddy, Joseph W. Rossano.
– Abstract 107

10:00am **Care for Infants with Hypoplastic Left Heart Syndrome: A Shift in Provider Attitudes between 1995 and 2012**
Erin A. Paul, Kristina Orfali, Thomas J. Starc.
– Abstract 108

10:15am **Doppler Parameters of Pulmonary Vascular Resistance in the Mid and Third Trimester Fetus: A Study of 51 Prospectively Studied Pregnancies**
Yuka Yamamoto, Akiko Hirose, Winnie Savard, Venu Jain, Lisa K. Hornberger.
– Abstract 109

10:30am **The Effect of Modified Ultrafiltration on Angiopoietins in Pediatric Cardiothoracic Surgery**
Sean M. Lang, Mansoor Syed, James Dziura, Vineet Bhandari, John Giuliano, Jr..
– Abstract 110

Fetal Nutrition

9:45am–10:45am **Minuet**

Moderator: Naveed Hussain

9:45am **Intravenous Fat Emulsion (IFE) for the Prevention of Parenteral Nutrition Associated Liver Disease (PNALD) in Preterm Neonates**
Orly L. Levit, Kara L. Calkins, Lorraine I. Kelley-Quon, Leena C. Gibson, Daniel T. Robinson, David A. Elashoff, Tristan R. Grogan, Matthew J. Bizzarro, Richard A. Ehrenkranz.
– Abstract 111

10:00am **Early Parenteral to Enteral Nutritional Transition Does Not Affect Weight Growth Velocity or Length of Hospitalization in Very Low Birth Weight Infants**
Eleanor Estebanez, Lakshmi Vaithilingam, Inga Gukhman, Lisa Saiman, Rakesh Sahni.
– Abstract 112

10:15am **Quality of Diet and Central Nervous System Activity in Low Birth Weight Infants**
Jacquelyn Piraquive, Philip Grieve, Kashyap Sudha, Michael Myers, Raymond Stark, Rakesh Sahni.
– Abstract 113

10:30am **Resting Energy Expenditure in Survivors of Congenital Diaphragmatic Hernia**
Heather B. Howell, Christiana Farkouh-Karoleski, Rakesh Sahni.
– Abstract 114

Medical Education

9:45am–10:45am **Overture**

Moderator: Marcia VanVleet

9:45am **Helping Medical Students Use Their HEADDSS: Improving Encounters with Adolescent Patients Using OSCEs**
Hai Jung H. Rhim, Ilir Agalliu, Miriam Schechter.
– Abstract 115

10:00am **An Educational Intervention on Patient Handoffs**
Hannah Stinson, Catherine Skae.
– Abstract 116

10:15am **Communication Skills Utilized by Pediatric Residents When Conducting a Difficult Conversation**
Gail S. Cameron, Alexander Agthe, Brenda Hussey-Gardner, Pamela Donohue, Alison J. Falck.
– Abstract 117

10:30am **Using Technology To Study the Art of Medicine**
Heather M. French, Katherine A. Durrwachter, Leonard J. Levine, Edward J. Gracely, Keri N. Fugarolas.
– Abstract 118

Neonatal Pharmacology

9:45am–10:45am **Maestro B**

Moderator: Annemarie Stroustrup

9:45am **Long-Term Effect of Src Kinase Inhibition on Caspase-8 Activity Following Hypoxia in the Newborn Piglet Brain**
Tania D. Fontanez-Nieves, Dimitris Angelis, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
– Abstract 119

10:00am **Mechanism of Caspase-2 Expression during Hypoxia in Cerebral Cortex of Newborn Piglets**
Bhavi Patel, Dimitrios Angelis, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
– Abstract 120

10:15am **Long Term Effect of Hypoxia on Caspase-1 Activation in the Newborn Piglet Brain**
Dimitrios Angelis, Tania D. Fontanez-Nieves, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
– Abstract 121

10:30am **Long Term Effect of Src Kinase Inhibition on Phosphorylation of CaM Kinase IV Folowing Hypoxia in the Cerebral Cortex of Newborn Piglets**
Matthew Furst, Olha Lynch, Anli Zhu, Maria Delivoria-Papadopoulos.
– Abstract 122

Neonatal Resuscitation

9:45am–10:45am **Maestro A**

Moderator: Kathleen Gibbs

9:45am **Umbilical Catheter Placement without Formulas**
Ashish O. Gupta, Morarjee Peesay, Jayashree Ramasethu.
– Abstract 123

10:00am **Quality of Neonatal Chest Compressions in a Simulated Environment**
Elizabeth E. Foglia, Jay Patel, Dana Niles, Per Helge Aasland, Anne Ades.
– Abstract 124

10:15am **In-Hospital Outcomes after Implementation of Evidence-Based Guidelines for the Delivery Room Management of Very Preterm Infants**
Sara B. DeMauro, Kelley Karp, Michael Posencheg.
– Abstract 125

10:30am **National Variability in Neonatal Resuscitation Practices at the Limit of Viability**
Bonnie H. Arzuaga, William Meadow.
– Abstract 126

Plenary Session I

10:50am–11:50am **Overture**

10:50am **Plenary Lecture - Genetics of Height, Obesity and Other Human Complex Traits**
Joel Hirschhorn, MD, PhD, Children's Hospital of Boston, Harvard Medical School, Boston, MA

Lunch with the Professor

12:00pm–1:00pm **Concerto A/B**

Public Health Careers at CDC after Residency
Nancy Messonnier, MD, Centers for Disease Control, Atlanta, GA

Fellows' Clinical Case Presentation Competition

12:00pm–1:00pm **Aria A**

Fellows' Clinical Case Presentation Competition: In honor of the 25th anniversary of ESPR, we have introduced the Fellows' Clinical Case Presentation Competition, in which a pediatric fellow will present an interesting and complex clinical case as an unknown, and then a second fellow will discuss the differential and most likely diagnosis. A total of 3 unknown cases will be presented, and an award for the best case presentation and best case discussion will be announced Sunday morning.

Moderators: Kirsten Bechtel and Raylynn Maitland

The fellows presenting the unknown cases are:
Heather Becker, Yale-New Haven Children's Hospital
Kirti Sivakoti, Albert Einstein Medical Center
Hasan Merali, Harvard University

The fellows presenting the case discussions:
Beth Emerson, Yale-New Haven Children's Hospital
Russell McCulloh, Hasbro Children's Hospital
Henry Chicaiza, Connecticut Children's Medical Center

Plenary Session II Mentor of the Year

1:15pm–4:00pm **Overture**

1:15pm **Mentor of the Year Presentation**
Turning a Jaundiced Eye on Basic Research in Neonatology
Phyllis Dennery, MD, Children's Hospital of Philadelphia, University of Pennsylvania, PA

Plenary Session II Trainee Young Investigators

2:15pm–3:00pm **Overture**

Moderator: Vineet Bhandari

2:15pm **Potential Applications of Multiplex Amplification Respiratory Viral Panel (RVP) Testing in Antimicrobial Stewardship: A Retrospective Analysis**
Russell J. McCulloh, Sarah Andrea, Steven Reinert, Kimberle Chapin.
– Abstract 127

2:30pm **Novel Non-Animal Simulation Trainer for Chest Tube Insertion in Infants**
Ashish O. Gupta, Jayashree Ramasethu.
– Abstract 128

2:45pm **Neutralizing IL-4 Rescues Inflammation in Neonatal Islets and Prevents β-Cell Failure in Adult IUGR Rats**
Lane J. Jaeckle Santos, Rebecca A. Simmons.
– Abstract 129

3:00pm **Break**

Plenary Session II Faculty Young Investigators

3:15pm–4:00m **Overture**

Moderator: Vineet Bhandari

3:15pm **Can Capnography Improve Pediatric Sedation Safety in the Emergency Department?**
Melissa L. Langhan, Veronika Shabanova.
– Abstract 130

3:30pm **Identification of RNA Biosignatures in Adolescent Girls with Pelvic Inflammatory Disease Presenting to a Pediatric Emergency Department: A Pilot Study**
Fran Balamuth, Zhe Zhang, Eric Rappaport, Katie Hayes, Cynthia Mollen, Kathleen Sullivan.
– Abstract 131

3:45pm **Optimal Heart Rate Cut-Off for Initiation of Chest Compressions during Neonatal Resuscitation**
Bobby Mathew, Jayasree Nair, Daniel D. Swartz, Changxing Ma, Vinay Sharma, Sylvia F. Gugino, Carmon Koenigsknecht, Satyan Lakshminrusimha.
– Abstract 132

Platform Session

Breast & Infant Feeding

4:15pm–5:45pm **Concerto A/B**

Moderator: Dawn Wetzel

4:15pm **Impact of Natural Breast Milk Oligosaccharides on the Premature Infant Microbiota and Adaptive Immunity**
M. Susan Latuga, J. Christopher Ellis, Lars Bode, C. Micheal Cotten, Ronald Goldberg, Yiting Yu, Robert B. Jackson, Patrick C. Seed.
– Abstract 133

4:30pm **Do Thawing and Warming Affect the Integrity of Human Milk?**
Deepali Handa, Ali Faraghi Ahrabi, Champa N. Codipilly, Syed A. Shah, Samantha Ruff, Debra Potak, Richard J. Schanler.
– Abstract 134

4:45pm **Prevalence and Duration of Breastfeeding in ADHD vs. Non-ADHD Children Ages 3-5: Analysis of 2007 National Health Survey Data**
Rachel M. Goldberg, Suzanne Sunday, Andrew Adesman.
– Abstract 135

5:00pm **Infant Formula: A Descriptive Study of National Sales Data**
Peter F. Belamarich.
– Abstract 136

5:15pm **Barriers to Breastfeeding in an Urban Inner-City Population**
Lindsay B. DeVries, Vaneet K. Kalra, Jeannette Prentice, Girija Natarajan, Sanjay Chawla.
– Abstract 137

5:30pm **Formula Supplementation in Breast Feeding (BF) Mothers and Suggestions for Intervention by the Pediatric Community**
Joanna Pierro, Virteeka Sinha, Bdair Abulaimoun, Philip Roth, Jonathan Blau.
– Abstract 138

Emergency Medicine I

4:15pm–5:45pm **Aria A**

Moderator: Matt Laurich

4:15pm **Usage Characteristics of a Children's Hospital Safety Center**
Sadiqa A. Edmonds, Kristy B. Arbogast, Gina P. Duchossois, Mark R. Zonfrillo.
– Abstract 139

4:30pm **Sick or Not Sick: Using I-PASS To Identify Patients at Risk for Clinical Deterioration**
Genevieve London, Mutiat T. Onigbanjo, Kathleen Brennan, Steve Paik.
– Abstract 140

4:45pm **Measles Vaccination Rates in Pediatric Emergency Department Patients**
Philip Zachariah, Amanda Posner, Melissa S. Stockwell, Peter S. Dayan, Florence M. Sonnett, Philip L. Graham, Lisa Saiman.
– Abstract 141

5:00pm **Postpartum Depression Screening in a Pediatric Emergency Department**
Beth L. Emerson, Ellen R. Bradley, Antonio Riera, Linda Mayes, Kirsten Bechtel.
– Abstract 142

5:15pm **Simulated Disasters To Assess the Accuracy of Three Pediatric Disaster Triage Strategies**
Mark X. Cicero, Frank Overly, Linda Brown, Jorge Yarzebski, Barbara Walsh, Veronika Shabanova, Marc Auerbach, Antonio Riera, Garth Meckler, Carl R. Baum.
– Abstract 143

5:30pm **Abdominal CTs Do Not Improve Outcomes for Children with Suspected Acute Appendicitis**
Danielle I. Miano, Renee M. Silvis, Jill Popp, Marvin C. Culbertson, Brendan Campbell, Sharon R. Smith.
– Abstract 144

General Pediatrics III: Prevention

4:15pm–5:45pm **Maestro B**

Moderator: Ingrid Walker-Descartes

4:15pm **Impact of an Intensified Anticipatory Guidance Program in the Nursery on Non-Urgent Emergency Department Use in the First Month of Life: A Randomized Controlled Trial**
Kelly Kamimura-Nishimura, Vikram Chaudhary, Folake Olaosebikan, Ayoade Adeniyi, Richard Neugebauer, Mamta Reddy, Sneha Galiveeti, Maryam Azizi, Stefan Hagmann.
– Abstract 145

4:30pm **Post-Discharge Follow-Up of Newborn Infants: Impediments to Compliance with American Academy of Pediatrics Guidelines**
Vaneet K. Kalra, Lindsay B. DeVries, Girija Natarajan, Sanjay Chawla.
– Abstract 146

4:45pm **Comparative Management of Neonatal Hyperbilirubinemia Using Transcutaneous and Serum Bilirubin-Specific Nomograms**
Imeline Troncales, Alfred Troncales, Anoop Rao, Monique Mondesir, Cynthia DeLago.
– Abstract 147

5:00pm **Usefulness of Universal Pre-Discharge Serum Bilirubin Risk Stratification as a Predictor of Admission for Phototherapy**
Dennise Chriselle C. Amado, Paulo R. Pina, David H. Rubin, Bianca A. Noronha, Maria L. Bautista, Ronald P. Arevalo.
– Abstract 148

5:15pm **Making "Meaningful Use" Meaningful: The Readability of Electronic Health Record Visit Summaries**
Shareen F. Kelly, Bruce A. Berstein, Lorri L. Collins, Lee M. Pachter.
– Abstract 149

5:30pm **Psychopharmacology in Pediatric Primary Care: An ePROS Study of Electronic Health Records**
Alexander G. Fiks, Robert W. Grundmeier, Lihai Song, Jennifer M. Steffes, Banita McCarn, Stephanie Mayne, Benyamin Margolis, Russell Localio, Richard C. Wasserman.
– Abstract 150

Hematology/Oncology

4:15pm–5:45pm **Maestro A**

Moderator: Carolyn Felix

4:15pm **Obinutuzumab (GA101) Significantly Enhances Cell Death and ADCC Compared to Rituximab Against CD20$^+$ Rituximab-Sensitive and -Resistant B-Cell Non-Hodgkin Lymphoma (NHL) and Lymphoblastic Leukemia (BLL)**
Anthony Sabulski, Aradhana Awasthi, Janet Ayello, Carmella van de Ven, Matthew J. Barth, Mitchell S. Cairo.
– Abstract 151

4:30pm **Transcription Activator-Like Effector Nucleases Mediated DLEU1 Gene Knockdown Suppresses Apoptosis in Burkitt's Lymphoma**
Brandon Madris, Changhong Yin, Janet Ayello, Carmella van de Ven, Sanghoon Lee, Mitchell S. Cairo.
– Abstract 152

4:45pm **Natural Killer (NK) Cells Successfully Transduced with an Anti-CD20 Chimeric Antigen Receptor (CAR) by mRNA Nucleofection Have Significant Cytotoxicity Against Poor Risk B-Cell (CD20$^+$) Leukemia/Lymphoma (B-L/L)**
Ashlin Yahr, Yaya Chu, Janet Ayello, Lowrence Lo, Jared Katz, Mitchell S. Cairo.
– Abstract 153

5:00pm **Low Day 100 Transplant-Related Mortality (TRM) and Relapse Rate Following Clofarabine (CLO) in Combination with Cytarabine, Total Body Irradiation (tbi) and Allogenic Stem Cell Transplantation (ALLSCT) in Children, Adolescents and Young Adults (CAYA) with Poor-Risk Acute Leukemia**
Nan Chen, Kavita Radhakrishnan, Jennifer Krajewski, Angela M. Ricci, Lauren Harrison, M. Fevzi Ozkaynak, Prakash Satwani, Alexandra C. Cheerva, Julie Talano, Mark B. Geyer, Theodore B. Moore, Alfred Gillio, Lee-Ann Baxter-Lowe, Mitchell S. Cairo.
– Abstract 154

5:15pm **Elevated Cotinine Levels Are Associated with More Frequent Hospitalizations in Children with Sickle Cell Disease**
Sara C. Sadreameli, Kayin T. Robinson, John J. Strouse.
– Abstract 155

5:30pm **Hyperuricemia: An Unappreciated Risk Factor for Acute Hypertension in Pediatric Tumor Lysis Syndrome**
Lydia Pecker, Shulamit Kulak, Mimi Kim, Adam Levy, Beatrice Goilav.
– Abstract 156

Neonatal Neurology

4:15pm–5:45pm **Minuet**

Moderator: Noah Cook

4:15pm **Effects of Post Hypoxic-Ischemic Hypothermia on Hemispheric Preference in the Immature Rat**
Leslie M. Pierce, Jeffrey Perlman, Holly Moore, Susan Vannucci.
– Abstract 157

4:30pm **Seizure vs Non-Seizure Behaviors in Hypoxic and Hypoxic-Ischemic Neonatal Rat Pups**
Aimee M. Parow, Murray Engel, Jeffery Perlman, Susan J. Vannucci.
– Abstract 158

4:45pm **Origins of Interneurons in the Cerebral Cortex of Fetuses and Premature Infants**
Arslan Arshad, Praveen Ballabh.
– Abstract 159

5:00pm **Neurofunctional Tests in Neonatal Rats after Focal Cerebral Ischemia**
Gregory L. Gedman, Shuang Xu, Javier Pacheco-Quinto, Elizabeth A. Eckman, Ben H. Lee.
– Abstract 160

5:15pm **Indomethacin Prophylaxis (IP) for Intraventricular Hemorrhage (IVH) in Extremely Low Birth Weight (ELBW) Infants: Effects of Time of Administration**
Hussnain Mirza, Abbot R. Laptook, Sarah Kandefer, William Oh, Betty R. Vohr, Barbara Stoll, Barbara S. Stonestreet, Generic Database Subcommittee.
– Abstract 161

5:30pm **Choline Prevents Bilirubin Induced Neuronal Injury through a Lipid Raft Dependent Mechanism**
Gail S. Cameron, Ningfeng Tang, He Min, Cynthia F. Bearer.
– Abstract 162

Neonatology II

4:15pm–5:45pm **Overture**

Moderator: James Padbury

4:15pm **Impact of Postnatal Antibiotics on Diversity of the Preterm Intestinal Microbiota**
Majd Dardas, Steven Gill, Gloria Pryhuber, Yi-Horng Lee, Ann Gill, Ronnie Guillet.
– Abstract 163

4:30pm **Risk of Lead Exposure in Preterm Infants Receiving Red Blood Cell Transfusions**
Hijab Zubairi, Paul Visintainer, Jennie Fleming, Matthew Richardson, Rachana Singh.
– Abstract 164

4:45pm **Buccal Swabs: A Non-Invasive Method for Genetic Analysis in Premature Neonates**
Mariam Said, Clint Cappiello, Zohreh Tatari-Calderone, Joseph M. Devaney, Stanislav Vukmanovic, Khodayar Rais-Bahrami, Naomi Luban, Anthony Sandler.
– Abstract 165

5:00pm **Extent of High Oxygen Saturations in VLBW Neonates with Respiratory Distress Syndrome and Associated Factors**
Jenda M. Arawiran, Jeanne M. Curry, Lorna Welde, Gad Alpan.
– Abstract 166

5:15pm **Laser Therapy for Retinopathy of Prematurity in Extremely Premature Infants: Frequency after the Revised Guidelines**
Elizabeth O'Donnell, Sharon Kirkby, Ursula Nawab, Kevin C. Dysart, Linda Genen, Jay S. Greenspan, Zubair H. Aghai.
– Abstract 167

5:30pm **Do the Signs and Symptoms of Gastroesophageal Reflux (GER) Correlate with the Reflux Episodes as Detected by Multiple Intraluminal Impedance (MII) Study?**
Apryle Y. Funderburk, Ursula Nawab, Zubair H. Aghai.
– Abstract 168

Poster Session II

Endocrine

6:00pm–7:30pm **Symphony Ballroom**

1 **Obesity, Unsustained Early Puberty, and Hypothyroidism: A Variant of VanWyk-Grumbach Syndrome?**
Evan Graber, Dennis Chia, Robert Rapaport.
– Abstract 169

2 **Arginine and Levo-Dopa Stimulation in Children: Association of Peak Growth Hormone Response with Body Fat Percentage**
Elizabeth Chacko, Molly Regelmann, Rachel Annunziato, Evan Graber, Amy Buono, Elizabeth Wallach, Michelle Klein, Dennis Chia, Robert Rapaport.
– Abstract 170

3 **Endocrine Dysfunction in Diamond Blackfan Anemia**
Amit Lahoti, Adrianna Vlachos, Jeffrey M. Lipton, Yael T. Harris, Phyllis W. Speiser.
– Abstract 171

4 **Mechanisms of Islet Dysregulation in Beckwith-Wiedemann Syndrome Resulting in Hyperinsulinism**
Jennifer Kelley, Puja Patel, Changhong Li, Diva De Leon.
– Abstract 172

5 **Cystic Fibrosis Related Diabetes: Unique Challenges in Identifying Glucose Intolerance**
Christine T. Ferrara, Ronald C. Rubenstein, Andrea Kelly.
– Abstract 173

6 **Glucometer Manipulation in Adolescents with Type 1 Diabetes Mellitus**
Holley Allen, Stacey Dipalma, Alexander Knee.
– Abstract 174

7 **Calcitriol Treatment in Infants with Metabolic Bone Disease of Prematurity**
Stacy E. Dodt, Andrew C. Calabria, Andrea Kelly.
– Abstract 175

Neurology

6:00pm–7:30pm **Symphony Ballroom**

8 **Clinical Characteristics and Factors Predictive of Progression of Neonatal Encephalopathy and Adverse Outcome Post-Cooling**
Hannaise Cruz, Elena Wachtel.
– Abstract 176

9 **Comparison of Clonidine Versus Phenobarbital as an Adjunct Therapy for Neonatal Abstinence Syndrome. A Prospective Randomized Clinical Trial**
Brooke Surran, Paul Visintainer, Susan Chamberlain, Kathleen Kopcza, Bhavesh Shah, Rachana Singh.
– Abstract 177

10 **Can Administration of DHA Ameliorate Alterations in Brain Chemistry Caused by Prenatal Exposure to Ethanol?**
Fares Brnouti, Nathan Nguyen, Mary C. McKenna, Sandra M. Mooney.
– Abstract 178

11 **Neurotherapeutic Potential of Placenta-Derived Adherent Cells (PDAC) in a Neonatal Rat Model of Focal Cerebral Ischemia (FCI)**
Ben H. Lee, Shuang Xu, Aimee Herdt, Gregory Gedman, Javier Pacheco-Quinto, Kristen Labazzo, Julio Guerra, Elizabeth Eckman.
– Abstract 179

12 **Long Term Effect of Src Kinase Inhibition on Eya1 Protein Expression during Hypoxia in the Cerebral Cortex of Newborn Piglets**
Jennifer P. Alexander, Lynn Zeitz, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
– Abstract 180

13 **Deep Gray Matter Involvement on MRI in Children with Acute Demyelinating Disease**
Sreenath Thati Ganganna, Soji Varghese, Riddhiben Patel, Jagdish Desai.
– Abstract 181

General Pediatrics II

6:00pm–7:30pm **Symphony Ballroom**

14 **Parental Preference of Educational Handouts in an Urban Academic Pediatric Clinic**
Aarti Patel, Jennifer P. Alexander, Kristel Tafoya, Danielle Mercurio, Alan Salas, Thomas J. Killeen, Bruce A. Bernstein, Daniel Taylor.
– Abstract 182

15 **Effect of Chronic Constipation on Children's Quality of Life**
Keshawadhana Balakrishnan, Hanh Vo, Upendra Mahat, Peter Kant Sandipagu, Richard Neugebauer, Laura Debrot, Bolanle Akinsola, Ronald Bainbridge, Stefan Hagmann, Ayoade Adeniyi.
– Abstract 183

16 **Practical Parenting: A Reproducible Curricular Module for Pediatric Residents on Infant Consumer Products**
Kristel Tafoya, Shruti Roy, Ada Davidoff, Mario Cruz.
– Abstract 184

17 **Evaluation of the Utility of a Sleep Screener in the Primary Care Setting**
Michelle S. King, Stefan A. Mandakovic, Hilda K. Kabali, Casandra M. Arevalo, Matilde M. Irigoyen.
– Abstract 185

18 **Provider's Experience with a Self-Administered Written Screening Tool for Intimate Partner Violence**
Cynthia DeLago, Matilde Irigoyen.
– Abstract 186

19 **Care Transitions: Communication Challenges between a Hospitalist Service and a Primary Care Pediatric Network**
Ishminder Kaur, Anna Marie Carr, Cynthia W. DeLago, Matilde Irigoyen.
– Abstract 187

20 **Integration of Domestic Violence Screening in a Resident Continuity Clinic**
Malgorzata Skarzynska, Cynthia DeLago, India Azzinaro.
– Abstract 188

21 **Predictors of New Inhaled Corticosteroid Prescription to Children Hospitalized for Status Asthmaticus**
Meera S. Meerkov, Jessica M. Gold, Gabriella Azzarone, Alyssa H. Silver, Katherine O'Connor.
– Abstract 189

22 **Pediatric Hospitalist Preoperative Evaluation of Children with Neuromuscular Scoliosis**
Samantha Cerra, David I. Rappaport, Iman Sharif, David M. Pressel.
– Abstract 190

23 **Specialist-Hospitalist in Pediatric Endocrinology: Qualitative Assessment and Resource Utilization**
Adam Stoller, Andrew Palladino, Sarah Brewer, Oludolapo Fakeye, Evan Fieldston.
– Abstract 191

24 **Parent and Caregiver Education on Management of Choking in Infants and Children**
Yaron Ivan, John Snyder, Jane L. Garb.
– Abstract 192

25 **Use of Focus Groups To Inform a New Youth Diabetes Prevention Program**
Nita Vangeepuram, Jane Carmona, Guedy Arniella, Deborah L. Burnet, Carol R. Horowitz.
– Abstract 193

26 **Clinical Versus Community-Based Recruitment for an Adolescent Diabetes Prevention Study**
Nita Vangeepuram, Kenya Townsend, Guedy Arniella, Carol R. Horowitz.
– Abstract 194

27 **Does Dietician Diversity Impact Outcomes in Pediatric Weight Management?**
Thao-Ly T. Phan, George A. Datto.
– Abstract 195

28 **The Family Safe Zone: A Needs Assessment for a Multi-Level Parenting Intervention in the Pediatric Setting**
Maria McColgan, Sally Kuykendall, Martha Davis, Stephen Sandelich, Stacy Ellen.
– Abstract 196

29 **Needs Assessment of Parents in a Multi-Level Parenting Intervention in the Pediatric Setting**
Maria D. McColgan, Sally Kuykendall, Martha Davis, Stephen Sandelich, Stacy Ellen.
– Abstract 197

30 **Community Acquired MRSA: Does Anatomical Location Matter?**
Catalina Ruiz Mesa, Jonathan Arciniegas, David Listman, Uri Belkind, David Perlstein.
– Abstract 198

31 **Clinical Information Gleaned from Written Domestic Violence Screeners in a Primary Care Setting**
Cynthia DeLago, India Azzinaro, Matilde Irigoyen.
– Abstract 199

32 **Pilot Methodological Study on Defining Adolescent Menstrual Regularity**
Eliza W. Gardiner, Kathleen McGovern, Jessica Montana, Nancy Mervish, Barbara Brenner, Susan L. Teitelbaum, Mary S. Wolff, Maida P. Galvez.
– Abstract 200

33 **Do Parents Read the Label? An Assessment of Parents' Use and Understanding of Nutrition Labels**
Chloe Turner, Kathryn Scharbach, Sandra F. Braganza.
– Abstract 201

34 **The Feasibility and Utility of Using a Brief Dietary Screener in the Pediatric ED**
Meaghan Roy-O'Reilly, Danielle Miano, Renee Silvis, Carly Heynes, Valerie B. Duffy, Sharon R. Smith.
– Abstract 202

35 **Diagnostic Utility of Neuroimaging in Evaluation of Headache in Children Presenting to the Emergency Department**
S. Shah, R. Basak, A. Swayampakula, D. Garipalli, S. Kankipati, R. Neugebauer, R. Vega, R. Kairam.
– Abstract 203

Infectious Diseases

6:00pm–7:30pm **Symphony Ballroom**

36 **Reduction in New York State Infant Influenza Rates Associated with Passage of the 2009 Neonatal Influenza Protection Act (NIPA)**
Shetal Shah, Catherine Messina.
– Abstract 204

37 **Continuous Versus Intermittent Pulse Oximetry Monitoring of Children Hospitalized for Bronchiolitis**
Russell J. McCulloh, Brian K. Alverson, Kristin L. Koehn.
– Abstract 205

38 **Clinical Screening for HAART Induced Mitochondrial Toxicity in HIV-Infected Children in Ghana**
Allison Langs-Barlow, Lorna Renner, Karol Katz, Veronika Northrup, Paintsil Elijah.
– Abstract 206

39 **Prescriber Perceptions of an Antimicrobial Stewardship Program (ASP)**
Dustin Flannery, Sanjeev Swami, Shannon Chan, Stephen Eppes.
– Abstract 207

Neonatal - General II

6:00pm–7:30pm **Symphony Ballroom**

40 **Enteral Feeding Tube Design and Differential Bacterial Overgrowth: An In Vitro Comparison**
Amy Presti, Ruth Snyder.
– Abstract 208

41 **Comparison of Multiple Combination Methods of Analgesia for Neonatal Circumcision**
Sammir Perez, Fernanda Kupferman, Susana Rapaport, Kelly Cervellione, Lourdes Cohen.
– Abstract 209

42 **Abstract Withdrawn**
– Abstract 210

43 **Initiation and Attainment of Full Nipple Feeding (FNF) Is Influenced by Post Menstrual Age (PMA) and Gestational Age (GA)**
Abigail C. Wellington, Jeffrey M. Perlman.
– Abstract 211

44 **Management of Patient Ductus Arteriosus (PDA) with Two Different Protocols: A 10-Year Retrospective Study of Outcomes in Premature Babies with Birth Weight (BW) ≤ 1250 grams**
Arpit Agarwal, Sathish Chikkabyrappa, Alok Bhutada, Prema Ramaswamy, Marina Osmolovsky, Mary Rojas, Hemalatha Murugan, Panayot Filipov.
– Abstract 212

45 **Wielding Technology To Transform NICU Model of Care: Large Scale Operations Testing Is Feasible with Little Prior Simulation Experience**
Jesse Bender, Robin Shields, James Maryman, James Padbury.
– Abstract 213

46 **Communication Intervention in the NICU: Can It Backfire?**
J.P. Clarke-Pounder, R.D. Boss, D. Roter, S. Larson, P.K. Donohue.
– Abstract 214

47 **Early Caffeine Therapy for Prevention of Bronchopulmonary Dysplasia in Preterm Infants**
Dalal Taha, Sharon Kirkby, Ursula Nawab, Kevin C. Dysart, Linda Genen, Jay S. Greenspan, Zubair H. Aghai.
– Abstract 215

48 **Ear Drainage and the Role of Sepsis Evaluations in the Neonatal Intensive Care Unit**
Mona Khattab, Matthew Bizzarro.
– Abstract 216

49 **Cumulative Diagnostic Imaging Radiation Exposure in Premature Neonates**
Mona Khattab, Thomas R. Goodman.
– Abstract 217

50 **Utilization of Photographic Images during Prenatal Consultation to Potentially Alleviate Parental Stress and Anxiety Associated with Infants' Admission to a Neonatal Intensive Care Unit (NICU)**
Mona Khattab, Lindsay Johnston.
– Abstract 218

51 **Factors and Outcomes Associated with the Speed of Rewarming Hypothermic VLBW Infants**
Alexander M. Feldman, Brian C. De Benedictis, Jordan S. Kase.
– Abstract 219

52 **Respiratory Morbidity in Infants with Myelomeningocele**
Maria Victoria Fraga, Annie Giaccone.
– Abstract 220

53 **Defining Successful Extubation in Very Preterm Infants: What Is the Evidence?**
Annie Giaccone, Erik Jensen, Peter Davis, Barbara Schmidt.
– Abstract 221

54 **Does Extremely Preterm Infants Needs Screening for Retinopathy of Prematurity Earlier Than 31 Weeks Post Menstrual Age?**
Elizabeth O'Donnell, Ursula Nawab, Kathryn A. Ziegler, Zubair H. Aghai.
– Abstract 222

Neonatal Pulmonary

6:00pm–7:30pm **Symphony Ballroom**

55 **Abstract Withdrawn**
– Abstract 223

56 **Acute Effects of Hyperoxia on Gene Expression in Lipopolysaccharide-Treated Newborn Rat Lung**
Jagadish Elumalai, Esther Speer, Avinash Chander.
– Abstract 224

57 **Expression Profiling of microRNAs Related to Heme Oxygenase-1 in a Mouse Model of Hyperoxic Lung Injury**
Hayato Go, Fumihiko Namba, Ping La, Guang Yang, Phyllis A. Dennery.
– Abstract 225

58 **Correlates of Term and Preterm Infants Undergoing Unattended Sleep Studies**
Marisa J. Pacella, Danna Tauber, Suzanne M. Touch.
– Abstract 226

59 **LPS Induced Chorioamnionitis Decreases Sirtuin1 and HDAC2 in Fetal Membranes and Lungs of Neonatal Rats**
Suhita Gayen nee Betal, Dalal Taha, Ursula Nawab, Janet Larson, Zubair H. Aghai.
– Abstract 227

60 **Hyperoxia Regulates the Circadian Rhythm Gene Rev-ERBa in the Neonatal Lung**
Shaon Sengupta, Guang Yang, Namba Fumihiko, Phyllis A. Dennery.
– Abstract 228

61 **Using Lung Ultrasound To Diagnose TTN and HMD in Neonates ≥ 28 Weeks Gestation**
Claudia T. Cadet, James Tsung, Ian Holzman.
– Abstract 229

62 **Anti-Gastroesophageal Reflux Surgery in Infants with Severe Chronic Lung Disease**
E.A. Jensen, D.A. Munson, H. Zhang, T.A. Blinman, H. Kirpalani.
– Abstract 230

63 **Monitoring Tidal Volume (Vt) on Neonatal Transport: Opportunity for Improvement in Ventilator Management**
Jennifer J. Hesler, Robert Locke, John Emberger, Theresa McGreevy, Amy M. Mackley, Wendy Sturtz, Tamie Hotchkiss, Tammy Search, David A. Paul.
– Abstract 231

Nephrology

6:00pm–7:30pm **Symphony Ballroom**

64 **Isolation of Urinary Exosomes in Neonates To Determine Presence and Development of Renal NA+ Transporters**
Scarlett McKinsey, Ian Holzman, Lisa Satlin.
– Abstract 232

65 **Relationship of Urinary Excretion of Magnesium, Potassium, Sodium and Calcium with Arterial Blood Pressure**
Ameya P. Patil, Susana Rapaport, Kelly Cervellione, Fernanda Kupferman, Robert P. Woroniecki.
– Abstract 233

66 **Abstract Withdrawn**
– Abstract 234

Sunday, March 24, 2013

Plenary Session III Presentation of Young Investigator Awards

8:30am–9:30am **Overture**

8:30am **Presentation of The Young Investigator Awards**

8:40am **Plenary Lecture - Why are we Not Controlling Pertussis in the United States?**
Nancy Messonnier, MD

9:30am **Break**

Platform Session

Emergency Medicine II

9:45am–12:00pm **Concerto A/B**

Moderator: Mark Cicero

9:45am **Analgesia for Appendicitis in Children in Pediatric and General Emergency Departments**
Kristen Delaney, Alexis Pankow, Jeffrey Avner, Joni Rabiner.
– Abstract 235

10:00am **Observation after Racemic Epinephrine for Croup in the Pediatric Emergency Department**
Julia R. Tokarski, Jeffrey R. Avner, Joni E. Rabiner.
– Abstract 236

10:15am **Performance in Trauma Resuscitation at a Pediatric Trauma Center**
Payal K. Gala, Kevin Osterhoudt, Sage R. Myers, Mariel Colella, Aaron Donoghue.
– Abstract 237

10:30am **Capnography during Critical Events in the Emergency Department: Impact of the 2010 American Heart Association Guidelines**
Adam Bullock, Melissa L. Langhan.
– Abstract 238

10:45am **Rapid Trichomonas Testing for Adolescents with Suspected Sexually Transmitted Infections (STIs) in the Emergency Department (ED)**
Heather M. Territo, Gale R. Burstein, Scott Bouton, Brian Wrotniak, Haiping Qiao.
– Abstract 239

11:00am **Comparison of Appendicitis Risk Scoring Protocols and the Need for Imaging in Diagnosing Appendicitis**
Sangeetha B. Rao, David Listman, Uri Belkind, Stasha O'Callaghan, Rosemary Thomas, Andrew Schneider, David H. Rubin.
– Abstract 240

11:15am **National Study of Children's Hospital Safety Centers**
Sadiqa A. Edmonds, Mike Gittelman, Karen S. Hill, Mark R. Zonfrillo.
– Abstract 241

11:30am **Characteristics Associated with Thromboprophylaxis in Critically Ill Children**
E. Vincent S. Faustino.
– Abstract 242

11:45am **Detection of Optic Nerve Head Elevation (ONHE) in Children with Increased Intracranial Pressure (IICP) Using Bedside Ocular Ultrasound (BOUS)**
Ronald F. Marchese, Aaron E. Chen, Rakesh D. Mistry.
– Abstract 243

Endocrinology

9:45am–12:00pm **Minuet**

Moderator: Michael Agus

9:45am **Targeting Nicotinic Acetylcholine Receptors Ameliorates Defective Counterregulatory Hormonal Responses in Animal Model of Hypoglycemia Associated Autonomic Failure (HAAF)**
Necla Kirtok, Uduak Akpan, Bistra Nankova, Edmund F. LaGamma.
– Abstract 244

10:00am **Association between the Degree of Control of Children and Adolescents with Diabetes Mellitus and QTc Prolongation on EKG**
Hariram Ganesh, Lily Q. Lew, Fernanda Kupferman, Kelly Cervellione, Susana Rapaport, Jeffrey H. Kern.
– Abstract 245

10:15am **Hyperinsulinism Profile: Emerging Biomarkers for Diagnosing Disease**
Christine T. Ferrara, Charles A. Stanley, Andrea Kelly.
– Abstract 246

10:30am **Growth Hormone Stimulation Testing: Area under Curve Correlates with Growth Hormone Peak but Not with IGF-1 or Pituitary Volume**
Laurie R. Braun, Molly O. Regelmann, Bradley N. Delman, Andrew Tenore, Robert Rapaport.
– Abstract 247

10:45am **Hypoglycemia and Increased Insulin Secretion in a New Form of Glycogen Storage Disease Due to Phosphoglucomutase-1 Deficiency**
Amanda A. Misfeldt, Hudson H. Freeze, Eva Morava, Can Ficicioglu, Charles A. Stanley.
– Abstract 248

11:00am **Predictors of Diabetic Ketoacidosis in Hospitalized Children with Type 1 Diabetes Mellitus**
Alan S. Weller, Stephen W. Marcella.
– Abstract 249

11:15am **National Survey on Metabolic Bone Disease of Prematurity**
Kevin J. Kovatch, Samuel J. Garber, Michael A. Levine, Andrea Kelly.
– Abstract 250

11:30am **Association of Serum Vitamin D Levels and Surgical Pediatric Orthopedic Fractures**
Barbara Minkowitz, Barabara Cerame, Renee K. Eng, Nicole D. Formoso, Sherri L. Luxenberg, Garrett Jordan, Samara Friedman, Ben H. Lee.
– Abstract 251

11:45am **Nicotinic Receptor Partial Agonists Attenuate Norepinephrine Release and Suppress Tyrosine Hydroxylase Protein Levels in PC 12 Cells: Implicatons for Sympathoadrenal Stress-Responsiveness**
Uduak S. Akpan, Necla Kirtok, Bistra Nankova, Edmund F. LaGamma.
– Abstract 252

General Pediatrics IV

9:45am–12:00pm **Maestro A**

Moderator: Marcia VanVleet

9:45am **Secondhand Smoke Exposure in Multiunit Housing: What's the Drift?**
Lauren Zajac, Kathryn Scharbach, Sandra F. Braganza.
– Abstract 253

10:00am **Cost Analysis of Staffing Options for Inpatient Care**
Evan Fieldston, Joan Li, Bo Huang.
– Abstract 254

10:15am **Smoking Policy on College Campuses: Influence of Sociodemographic Factors**
Jonathan Bass, Janet Lee, Andrew Adesman.
– Abstract 255

10:30am **Making Needles Easier To Bear: Parental Perception of Child's Comfort after Interdisciplinary Initiative**
Katherine O'Connor, Talia Roth, Catherine Skae, Sheila Liewehr.
– Abstract 256

10:45am **Prediction of Spinal Needle Depth for Successful Lumbar Puncture Using Weight, Height and Body Surface Area**
Meyrick K. Sarmiento.
– Abstract 257

11:00am **Determinants of Late Acute Rejection in Pediatric & Adolescent Kidney Transplant Recipients**
Loai A. Eid, Shamir Tuchman, Asha Moudgil.
– Abstract 258

11:15am **Preferences, Goals, and Treatment Initiation in ADHD**
Alexander Fiks, Stephanie Mayne, Elena DeBartolo, James Guevara, Thomas Power.
– Abstract 259

11:30am **Impact of the Change in "Actionable" Lead Level from 10μg/dL to 5μg/dL in an Urban Community**
Morgan Leafe, Matilde Irigoyen, Amman Hassan, Leonard Braitman, Cynthia DeLago.
– Abstract 260

11:45am **Impact of Parental Support on Health Indicators/Utilization of High-Risk NICU Babies after Discharge**
Maheswari Ekambaram, Cynthia DeLago.
– Abstract 261

General Pediatrics V

9:45am–12:00pm **Aria A**

Moderator: Ayoade Adeniyi

9:45am **Clinical Decision Support and Premature Infants: A Means To Protect from Respiratory Syncytial Virus**
Annique Hogan, Dean Karavite, Alexander Fiks, Scott Lorch, Lihai Song, Mark Ramos, Russell Localio, Robert Grundmeier.
– Abstract 262

10:00am **Randomized Controlled Trial of the Efficacy of Nebulized 3% Saline without Bronchodilators for Infants Admitted with Bronchiolitis: Preliminary Data**
Alyssa H. Silver, Katherine O'Connor, Ilir Agalliu, Gabriella Azzarone, Lindsey C. Douglas, Diana S. Lee, Sheila Liewehr, Joanne M. Nazif, Hai Jung H. Rhim, Susan Villegas, Nora Esteban-Cruciani.
– Abstract 263

10:15am **Comparing the Clinical Severity of RSV + and RSV – Bronchiolitis**
Kelly N.F. Fradin, Gabriella Azzarone, Nora Esteban-Cruciani, Joanne Nazif.
– Abstract 264

10:30am **Does New Prescription of Inhaled Corticosteroids on Hospital Discharge Decrease Hospitalizations and ED Visits for Asthma? Preliminary Data from a Retrospective Chart Review**
Jessica M. Gold, Meera S. Meerkov, Gabriella Azzarone, Alyssa H. Silver, Katherine O'Connor.
– Abstract 265

10:45am **Hospitalist and Non-Hospitalist Adherence to Evidence-Based Guidelines for the Management of Community-Acquired Pneumonia**
Clota Snow, Russell McCulloh, Zunaria Choudhary, Crystal-Rose Cuellar, Michael Koster, Brian Alverson.
– Abstract 266

11:00am **Relationship between Asthma Control and Depression among Adolescents in an Urban Community**
Vanessa Camino, Fernanda Kupferman, Kelly Cervellione, Vinod Dhar, Susana Rapaport, Won Baik-Han, Partha Chatterjee.
– Abstract 267

11:15am **Children with Asthma in the Emergency Department; What Did the Chest X-Ray Change?**
Panagiotis Kratimenos, Ioannis Koutroulis, Dante Marconi, Geoffrey F. Lim, Daniel R. Rubio, Joseph Jaeger, Janice Lichtenberger.
– Abstract 268

11:30am **Cognitive and Emotional Morbidity Following Youth Concussions**
Daniel J. Corwin, Christina L. Master, Kristy B. Arbogast, Mark R. Zonfrillo.
– Abstract 269

11:45am **Symptom Guided Emergency Department Discharge Instructions for Children with Mild Traumatic Brain Injury**
Adam Bartholomeo, Danielle Miano, Emily Ly, Sharon R. Smith.
– Abstract 270

Neonatal Pulmonary

9:45am–12:00pm **Maestro B**

Moderator: Gloria Pryhuber

9:45am **Tracheal Suctioning Does Not Alter Pulmonary Vascular Resistance (PVR) in Asphyxiated, Non-Vigorous Lambs with Meconium Aspiration**
Satyan Lakshminrusimha, Bobby Mathew, Sylvia F. Gugino, Carmon Koenigsknecht, Jayasree Nair, Devaraj Sambalingam, Melissa Carmen, Daniel D. Swartz.
– Abstract 271

10:00am **TRPV4 Regulates Fetal Lung Development and Injury**
Sujir Pritha Nayak, Yulian Wang, Xiaodi Chen, Barbara Stonestreet, Juan Sanchez-Esteban.
– Abstract 272

10:15am **Is the Higher Expression of Matrix Metalloproteinase-9 Associated with Bronchopulmonary Dysplasia in ELBW Infants?**
Umesh Paudel, Narendra Dereddy, Nayan Patel, Joseph Telliard, Vanessa Mercado, Johanna Calo, Lance A. Parton.
– Abstract 273

10:30am **B Type Natriuretic Peptide Levels in Preterm Neonates: A Marker of Severe Bronchopulmonary Dysplasia?**
Vaneet K. Kalra, Sanjeev Aggarwal, Prem Arora, Girija Natarajan.
– Abstract 274

10:45am **Single-Course Antenatal Betamethasone Alters Lung Morphormetry in Late Preterm Lambs**
Sushma Krishna, Shetal Shah, Sylvia Gugino, Satyan Lakshminrusimha.
– Abstract 275

11:00am **HO-1 Nuclear Localization Enhances DNA Repair by Increasing Availability of the DNA Repair Enzyme OGG1**
Monica L. Williams, Amal P. Fernando, Phyllis A. Dennery.
– Abstract 276

11:15am **Effect of Nitric Oxide with Vitamin A on Altered Lung Airway and Microvasculature Development during O_2-Induced Lung Injury**
Sana Mujahid, Courtney Thomas, Heber Nielsen, MaryAnn Volpe.
– Abstract 277

11:30am **Optimizing HFNC and Nasal CPAP Support in Preterm Infants Using Respiratory Inductive Plethysmography**
Soraya Abbasi, Emidio M. Sivieri, Jeffrey S. Gerdes.
– Abstract 278

11:45am **Respiratory Mechanics Measurements by Respiratory Inductive Plethysmography in Infants on Non-Invasive Respiratory Support**
Emidio M. Sivieri, Jeffrey S. Gerdes, Soraya Abbasi.
– Abstract 279

Neonatology III

9:45am–12:00pm **Overture**

Moderator: Jeff Shenberger

9:45am **The Profile of Endothelial Progenitor Cells in the Peripheral Blood of Preterm and Term Neonates: Are There Any Differences?**
Prem Arora, Sala Sadaps, Meena Sadaps, Vaneet Kalra, Steven Buck, Ranjan Monga, Nitin Chouthai.
– Abstract 280

10:00am **Coagulopathy in Newborns with Hypoxic Ischemic Encephalopathy (HIE) Treated Wtih Therapeutic Hypothermia**
Katie R. Forman, Yaser Diab, Edward Wong, An N. Massaro.
– Abstract 281

10:15am **Protection Against Neonatal Candidiasis by a Monoclonal Antibody Targeting the *Candida albicans* Adhesin, Als3p**
Anoop S. Pulickal, Sonia S. Laforce-Nesbitt, Lois L. Hoyer, Joseph M. Bliss.
– Abstract 282

10:30am **Aquaporins as Possible Autoimmune Effectors of Preeclampsia**
Nisreen S. Maari, Surendra Sharma.
– Abstract 283

10:45am **CXC Chemokine Inhibitor Can Delay Preterm Delivery Induced by Chorioamnionitis and Reduce Neonatal Mortality and Morbidity**
Ranjith Kamity, Hardik Patel, Sharif Younis, Edmund Miller, Mohamed Ahmed.
– Abstract 284

11:00am **Risk Factors for Oropharyngeal Aspiration in Newborns with Congenital Diaphragmatic Hernia**
Kara L. LaBarge, Rebecca A. Neth, Ann Liu, Natalie L. Davis, Catherine A. Sheils, Lawrence M. Rhein.
– Abstract 285

11:15am **Are Bone Morphogenetic Proteins Involved in Bronchopulmonary Dysplasia?**
Jenda M. Arawiran, Johanna Calo, Lance Parton, Susan Olson.
– Abstract 286

11:30am **Standardized Early Transition from Parenteral-to-Enteral Nutrition Will Decrease Central Line Utilization in Preterm Infants ≤1500 grams**
Lakshmi Vaithilingam, Lisa Saiman, Inga Gukhman, Eleanor Estebanez, Rakesh Sahni.
– Abstract 287

11:45am **Effects of Wharton's Jelly Mesenchymal Stem Cells on Neonatal Neutrophil Activity**
I. Khan, Z. Yuan, M. Mohammed, L. Zhang, G. Ren, F. Archer, A. Vetrano, A. Rabson, Y. Shi, B. Weinberger.
– Abstract 288

2013 ESPR Abstracts

Poster Session I
General Pediatrics

Friday, March 22, 2013
6:00pm–7:30pm

1

House Officer

Priapism as a Complication of Herbal Supplement Use: A Case Report

Subha Battu, Caterina Tiozzo, Steven Katz, David Fagan.
Pediatric, NUMC, East Meadow, NY.

BACKGROUND: Priapism is a disorder of having a sustained erection in the absence of sexual stimulation. Common causes include hematologic dyscrasias, leukemia, neurologic disease, pharmacologic agents or trauma. While the relationship between priapism and sickle cell disease has been widely described, there are few case reports linking priapism and G6PD deficiency. Moreover, there is little discussion in the literature describing the overuse of herbal supplements as a cause of priapism.
OBJECTIVE: To present a patient with G6PD deficiency whose first manifestation was an episode of priapism. The priapism occurred secondary to a large ingestion of a herbal supplementation.
DESIGN/METHODS: case report.
RESULTS: A 20 year old male with past medical history of scoliosis was transferred to the emergency department at Nassau University Medical Center with a 3 day history of a sustained erection. The patient started to have pain 2 days after sexual intercourse and managed it with aspirin at home. On the day of presentation, the pain was 10/10 and constant. There were no alleviating factors. He denied cough, fever, difficulty urinating, or trauma. He initially denied medication or drug use, but eventually did admit to a one month history of consuming Zion Roots drink, a supplement containing Sarsaparilla and Ginger among other herbs in amounts greater than recommended. This Jamaican herbal drink claims to enhance male stamina. After two attempts at aspiration and drainage, the patient was taken to the OR by Urology for placement of a Al Ghorab penile shunt. 300cc of dark brown blood was evacuated. During his hospital stay, the patient was found to have G6PD deficiency. CT scans were also completed to rule out malignant causes of priapism which were all negative. The patient was discharged and was followed up as an outpatient with urology and hematology and has not reported any reoccurrence of symptoms or loss of sexual function.
CONCLUSIONS: In general, patients who are found to be G6PD deficient have far fewer episodes of hemolysis than sickle cell patients. Patients are educated about drugs and foods to avoid to prevent hemolysis. Our patient's G6PD status was unknown until tested for during his hospitalization. It's likely that his G6PD status combined with his use of herbal supplements could have put him at increased risk for priapism. This is the first report, to our knowledge, of priapism secondary to overuse of a herbal supplement as first manifestation of G6PD deficiency.

2

Other

Sexual Risk Taking Behavior among US Teens: Update 2011

Karen Ginsburg, Andrew Adesman.
Developmental & Behavioral Pediatrics, Cohen Children's Medical Center of New York, Manhasset, NY.

BACKGROUND: In the past 21 years, the CDC has documented marked changes in sexual risk-taking behavior (SRTB) in high school (HS) students in the US. From 1991 until the early 2000's, SRTB declined; however, progress has since stalled. New 2011 data from the CDC's biennial Youth Risk Behavior Surveillance System (YRBSS) provides an opportunity to re-assess teens' SRTB.
OBJECTIVE: To identify significant changes in SRTB within the past 2 years.
DESIGN/METHODS: Data from the 2009 YRBSS (N=16,410) and 2011 YRBSS (N=15,425) were analyzed and compared statistically. Responses to 5 sexual risk questions were analyzed for the total cohort and separately by gender, grade, and ethnicity. The YRBSS uses independent, cross-sectional, 3-stage cluster samples to produce a representative sample of HS students attending public and private schools. YRBSS procedures protect student privacy and allow for anonymous participation.
RESULTS: All comparisons reflect 2011 data compared to 2009. Sexual intercourse (SI) before age 13 was lower in 2011 for 12th grade Black males (13.8% vs. 24.1%, p<.01), but no other subgroups. Regarding "sex under the influence", 12th grade males were more likely to report having drank alcohol or used drugs before last SI in 2011 (31.2% vs. 25.8%, p=0.04). The only other difference noted was white 9th grade females were less likely to have recently had sexual activity under the influence (22.0% vs. 32.7%, p=0.04). Regarding sexual activity in general, Asian 12th graders were significantly more likely to report ever having had SI (43.7% vs. 24.7%, p<0.01) whereas black 11th graders (63.6% vs. 71.3%, p=0.04) and Hispanic 12th grade males (61.0% vs. 68.4%, p=0.04) were significantly less likely to report ever having had SI. When asked about sex with 4 or more partners (lifetime), a decrease was noted for black 12th grade males (41.4% vs. 56.5%, p=0.01), but a very substantial increase was noted in Asian 12th graders (19.6% vs. 5.6%; p=0.04) and smaller but significant increase was noted in 12th grade white females (24.0 vs. 17.3%; p=0.02). Changes in condom use were only noted for 12th grade Hispanics, where males (32% vs. 42%; p=0.02) and females (49% vs. 58%; p=.05) were less likely to have SI without a condom in 2011.
CONCLUSIONS: 2011 YRBSS data suggest that sexual health interventions targeted at high-risk racial/ethnic groups (e.g., blacks and Hispanics) have been somewhat successful. Conversely, an increase in some SRTB is noted among Asians, a previously low risk ethnic group and, to a lesser extent, whites.

3

House Officer

Disordered Eating in Inner City Adolescent Males

Rashmi S. Bhopi, Paulo Pina, David H. Rubin.
Pediatrics, St. Barnabas Hospital, Bronx, NY; Pediatrics, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Studies have shown an increasing incidence of eating disorders in adolescent males. Inner city populations living in poverty tend to be vulnerable and an important target of the obesity epidemic, factors that could be associated with disordered eating behaviors like binge-eating and self-induced vomiting as a measure of weight control. Little is known about the epidemiology of disordered eating behaviors in inner city males.
OBJECTIVE: To determine the risk of eating disorders in healthy adolescent males using a validated questionnaire.
DESIGN/METHODS: We enrolled a convenience sample of 108 12-18 year old males (14.9 years, +/- 1.9; 77% Hispanic) seeking medical care at an ambulatory clinic of an inner city hospital. Most participants sought care for an acute illness or a physical exam. Participants completed the Eating Attitudes Test-26 (EAT-26), a validated measure of symptoms and behaviors characteristic of eating disorders. A retrospective chart review was done to note BMI and sexual preference when documented.
RESULTS: The EAT-26 was a reliable assessment of eating disorders in our population (Cronbach alpha = 0.698). 17.6% responded to using binging, 6.5% to vomiting, 4.6 % to laxative use as weight control measures. 7.4% males were found to be at risk of eating disorders. 12% were found to be underweight (BMI<18.5) and 32% were found to have BMI more than 25 with 16% being obese. 4.7% were identified as having same-sex attractions. We did not find a statistically significant association between age, BMI, sexual preference and risk for eating disorder. However, there were relationships amongst specific behaviors. Overweight or obese males were more likely to use laxatives as a weight control measure (OR 1.39, 95%CI 1.16-1.67). Using non-parametric testing, those boys that reported same-sex attractions were also more likely to use laxatives (p=0.034).
CONCLUSIONS: Our data show a high prevalence of disordered eating behaviors in inner city adolescent males. Furthermore there are no clear predictors of these behaviors, which could warrant universal screening.

4

Latino Caregiver Experiences with Asthma Health Communications: A Qualitative Evaluation

Antonio Riera, Agueda Ocasio, Gunjan Kamdar, Lauren Krumeich, Kyle Ragins, Sandra Trevino, Federico E. Vaca.
Pediatric Emergency Medicine, Yale University School of Medicine, New Haven, CT; Emergency Medicine, Yale University School of Medicine, New Haven, CT; Junta for Progressive Action, New Haven, CT; Yale University School of Medicine, New Haven, CT.

BACKGROUND: Latino children experience disparate asthma outcomes. Research on asthma health communication between limited English proficiency caregivers (LEPC) and healthcare providers is scarce.
OBJECTIVE: Characterize how asthma health communications are perceived and experienced by LEPC.
DESIGN/METHODS: A purposeful sample of LEPC of children 2-12 years old with asthma was chosen. An ethnically concordant researcher performed and digitally recorded semi-structured in-depth Spanish interviews at a local community organization or the participant's home. Caregiver acculturation was measured. Interviews were professionally transcribed. A bilingual research team independently coded Spanish transcripts. Codes were inductively derived and iteratively refined until thematic saturation was reached. Qualitative analysis software was used to facilitate data organization and review.
RESULTS: Twenty LEPC with an ability to speak English not well (70%) or not at all (30%) were interviewed. English reading ability (60% not at all, 40% not well) contrasted Spanish reading ability (70% very well, 20% well and 10% not well). Most were mothers age 24-50 (65%) and grandmothers age 50-63 (25%). Latino subgroups included Puerto Rican (35%), Colombian (20%), Mexican (15%), Dominican (15%), Ecuadorian (10%) and Cuban (5%). All LEPC measured to be "less acculturated". Major themes emerged:
1) LEPC confront significant emotional, physical (for child) and communication burdens.
2) Language discordant communications with health care providers are common. Perceptions of interpreter availability (*"In the hospital sometimes it's hard to find translators"*), delays in care (*"I always have to wait"*), lack of trust (*"And they don't translate it the same"*) and emotional responses (*"It's frustrating, it's difficult, it's a desperate situation"*) act as facilitators. A pervasive use of untrained interpreters, often a child is described.
3) Language concordant asthma education, exposure to learning opportunities and suitable action

plans are valued and desired.
CONCLUSIONS: The described LEPC experience with asthma communications is troublesome. An intentional strategy emphasizing effective communication, language concordant instruction, comprehensible action plans and access to educational opportunities is warranted. Future research on how interventions that reduce communication barriers narrow disparity gaps for at risk children is needed.

5

House Officer

Intravenous Magnesium Sulfate in the Treatment of Acute Asthma

Chiarina Galvez, Paulo Pina, Kathleen Asas.
Pediatrics, St. Barnabas Hospital, Bronx, NY; Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Intravenous magnesium sulfate (IVMS) has proven to be beneficial in the treatment of severe acute asthma in children, particularly in preventing hospital admission and improving bronchoconstriction; however, it is unclear how frequently IVMS is used in this population. Knowledge regarding the frequency and indications for use of IVMS in children is important to evaluate adherence to evidence based recommendations, demonstrate care gaps in the ED setting, and in developing tools such as clinical practice guidelines for EDs.
OBJECTIVE: To determine the prevalence, therapeutic goals, and barriers to IVMS use in children with severe acute asthma exacerbations.
DESIGN/METHODS: An email was sent to area emergency physicians inviting them to participate in an online questionnaire (Survey Monkey) regarding the use of IVMS in the treatment of children with acute asthma. The questionnaire included questions regarding demographic information and specific questions regarding use of IVMS. Results were analyzed using SPSS.
RESULTS: 43 responses were received and analyzed for the study. 25 (58.1%) respondents were between 25 and 35 years of age. 30 (70.0%) were in practice less than 10 years. 21 (48.8%) were female. Level of training ranged from pediatric or EM resident (18, 42%), to board certified in pediatric EM or EM (11, 25%). The remaining were board certified in pediatrics (14, 33%). 25 (58%) worked at Pediatric EDs. 43 (100%) respondents use IVMS. 31 (72%) use it to improve breathlessness, 17 (40%) to avoid PICU admission, and 7 (16%) to avoid hospital admission. 25 (58%) use it if there is no response to albuterol, ipatropium and steroids. No respondents used it as first line treatment. Those who have been in practice less than 10 years are more likely (OR 9.4, $p<0.02$) to use IVMS if there is no response to initial treatment within the first hour. There was no relation between reason and timing of use and respondents' age, gender, level of training, or ED setting. No barriers to IVMS use were reported.
CONCLUSIONS: IVMS is commonly used for acute asthma in the pediatric age group, usually to improve symptoms and mostly for patients who have not responded to initial treatment within the first hour. It is more commonly used to avoid PICU admission than to avoid hospital admission and does not appear to be given as part of any ED guidelines. Those early in their careers are more likely to follow recommendations of when to use IVMS.

6

House Officer

Seasonal Variation in Viral Bronchiolitis Severity

Kelly N.F. Fradin, Gabriella Azzarone, Nora Esteban-Cruciani, Joanne Nazif.
Pediatrics, Children's Hospital at Montefiore, Bronx, NY; Pediatrics, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Acute viral bronchiolitis is responsible for over 150,000 admissions per year in the United States. The differences in severity between bronchiolitis admissions during different seasons have not been well described in our region.
OBJECTIVE: To assess whether severity of viral bronchiolitis varies seasonally as measured by length of stay (LOS), use of supplemental oxygen, and rate of intensive care unit (ICU) admission.
DESIGN/METHODS: We conducted a retrospective cohort study involving electronic chart review of patients 0-24 months of age hospitalized between January 2007 and December 2010 for bronchiolitis, as determined by ICD-9 codes, in an inner city tertiary children's hospital. We excluded children with neuromuscular conditions, congenital heart disease, immunodeficiencies, chronic lung disease due to prematurity, tracheostomy, sickle cell, and cystic fibrosis. Chi square and t-tests were performed to compare severity outcomes of children hospitalized in the fall and winter defined as October to March with those hospitalized in the spring and summer defined as April to September. Data analysis was conducted using Stata.
RESULTS: 1246 children admitted with bronchiolitis met inclusion criteria: 1043 (83.7%) of these children were admitted during the fall or winter and 203 (16.3%) during the spring and summer. Bronchiolitis during spring and summer was strongly associated with lower rates of oxygen use and shorter hospital stays, but not with decreased risk of ICU stay.

	Fall / Winter	Spring / Summer	
% with ICU stay	10.2%	6.9%	p=0.15
% with supplemental oxygen	47.0%	30.5%	p<0.0001
Mean LOS in days (median)	3.6 (2.8)	2.8 (2.2)	p<0.0001

CONCLUSIONS: In our institution, children admitted with viral bronchiolitis during the spring and summer months had a less severe course of illness than those admitted during the winter, as determined by LOS and oxygen use. This may reflect epidemiologic variation in the causative virus or clinical differences in admission practices.

7

Medical Student

Enhancing the Patient Centered Medical Home for Children with Asthma through Quality Improvement (QI)

Melissa Donohue, Sara R. Slovin, Iman Sharif.
Philadelphia College of Osteopathic Medicine, Philadelphia, PA; Pediatrics, AI duPont Hospital for Children/Nemours, Wilmington, DE.

BACKGROUND: Childhood Asthma causes high morbidity and excessive emergency department (ED) utilization. Little is known about drivers of ED utilization amongst children who have access to primary care, and therefore, what factors a QI initiative to enhance medical homes for children with asthma may target.
OBJECTIVE: To understand why parents of children with asthma who have access to primary care use the ED.
DESIGN/METHODS: From a list of high ED utilizers (>= 5 visits over 18 months), we reviewed charts from two low-income urban practices. Trained interviewer used a structured interview guide to telephone English/bilingual parents regarding ED use, and arranged follow up in-depth interviews (60-90 min) during a home visit. Purposive sampling continued until saturation was reached. Interviews were audiotaped and coded for emergent themes.
RESULTS: Of the 26 eligible patients, 15 parents were telephoned, 9 agreed to home visit and 7 with kids age 1.5-13 years were interviewed in-depth. Emergent themes included: quality of life ("I had to learn how to do things differently… I couldn't do soccer or karate."), triggers ("Dust in school"), school management ("I wasn't feeling safe with her having her own medication, so I asked that the nurse give it to her."), access ("I wish they had services open 24 hours a day; I choose the ED instead of the office… I can't wait. What if I wait and then I miss another day of work; have to call a day in advance to arrange for special transportation, only one bus goes out there and it leaves every hour"), nurse triage ("We never call that, we always just go the ED. I just want to make her okay. I don't want to call a nurse and wait for a doctor to call back to say take her to the ED."), medication adherence ("I don't order her refills…I just get them from the hospital [when admitted]") and education ("I would like to learn more about asthma, the correct way to give it [medicine] to her, because I'm probably doing something wrong").
CONCLUSIONS: Interviews provided critical parental insight on medical home quality improvement, including 1) redesign of asthma triage protocols by on-call nurses; 2) advertising expanded office hours; 3) a project to enhance communication with school nurses; 4) environmental assessments of homes, buildings, and schools; 4) collaboration with state funding agency regarding covered transportation services.

8

House Officer

Prevalence and Correlates of Left Ventricular Hypertrophy in the Pediatric Hypertensive Population

Diana E. Drogalis, Anna Tsirka, Jennifer Friderici.
Pediatrics, Baystate Medical Center/Tufts University School of Medicine, Springfield, MA.

BACKGROUND: Hypertension (HTN) is common in childhood, yet the diagnosis is frequently delayed. Prior literature shows that up to 35% of children diagnosed with HTN have left ventricular hypertrophy (LVH) at presentation. Therefore, echocardiogram (ECHO) is recommended at initial evaluation. In recent years however, awareness of pediatric HTN has improved. We hypothesize the current prevalence of LVH in pediatric hypertensive patients is lower than previously reported.
OBJECTIVE: To determine the prevalence and correlates of LVH in the pediatric hypertensive population by ECHO. Secondary aims included evaluating the prevalence of LVH by electrocardiogram (ECG) and determining the correlation between ECHO and ECG in detecting LVH.
DESIGN/METHODS: A single-site retrospective chart review was performed from 7/1/09-2/20/12. Charts with ICD-9 code of "hypertension" were identified in the ECHO server and appointment database. Patients were considered at risk for LVH if ECG voltages (S in V1, R in V6) were ≥98%, or if LVMI was >95g/m2 (females) or 115 g/m2 (males) as per American Society of Echocardiography (ASE) guidelines.
RESULTS: 140 children (age 3-17) with untreated HTN were identified; 33 were excluded due to incomplete data. Mean age was 13.6 (SD 3.2) years. 78.5% of the cohort was male; 51.4% were obese. 33.6% had stage 1 HTN and 47.7% had stage 2 HTN. Mean LVMI was 79.6 (SD 20.7) g/m2, and 4.7% (95% CI 0.6%, 8.7%) met ASE LVH criteria. LVMI correlated positively with age ($r=0.43$, $p<0.001$); SBP ($r=0.29$, $p=0.001$); Black vs. white race ($r=0.24$, $p=0.009$); male gender ($r=0.30$, $p<0.001$). 18.7% (95% CI 11.2%, 26.2%) of patients had ECG LVH evidence. ECG LVH indicators did not correlate with LVMI ($r=-0.1$, $p=0.32$) or any other variables (all $r <|0.10|$). ECG voltages and LVMI showed poor agreement (Kappa -2.1, $p=0.93$).
CONCLUSIONS: In our single institution cohort of 140 patients, LVH incidence was <5% in untreated hypertensive children, which is significantly lower than prior literature reports. Our findings also suggest that ECG LVH criteria does not correlate with LVH findings by ECHO. We suggest that ECG may be redundant for initial evaluation of hypertension.

9

Fellow in Training

Diminished Exercise Response of Tissue Doppler Velocities in Pediatric Patients with Aortic Stenosis

Ashish Pal Saini, John Roberts, Matt Dean, Stephen E. Cyran, Linda B. Pauliks.
Division of Pediatric Cardiology, Penn State Children's Hospital, Hershey, PA.

BACKGROUND: In adult patients with aortic stenosis (AS) studies have shown a diminished ability to augment long axis wall motion on stress echocardiography using color tissue Doppler velocity imaging (TDI). Little is known about TDI stress echocardiography in children with AS.

OBJECTIVE: To use TDI exercise stress echocardiography to study the effect of AS on regional wall motion in children with and without AS.

DESIGN/METHODS: Eighteen patients with AS and 33 normal controls were prospectively recruited at clinically indicated stress echocardiography. Color TDI cine loops were acquired as digital echocardiographic raw data before and after Bruce exercise stress test. During offline analysis, the peak systolic (S) TDI velocity was measured from parasternal short axis in the basal posterior LV wall and from apical in the tricuspid, septal and lateral mitral ring.

RESULTS: Patients and controls were matched for age (13.7±2.8 v. 13.2±3.4y; NS), height and weight. AS was mild in 9 cases, moderate in 8 and severe in 1 patient. Exercise times were similar for AS and control at 13.1±2.6 v. 12.4±2.9 min (NS). All subjects reached at least 85% of predicted heart rate (AS 93±5 vs. 93±7%; NS). Baseline and peak heart rate and peak MET were similar. On TDI, baseline TDI systolic velocities were similar but AS patients had significantly lower peak S velocities in the lateral and posterior LV wall and in the RV free wall than controls.

	Baseline		Peak exercise stress	
Parameter	Normal N=33	AS N=18	Normal N=33	AS N=18
LV short axis S velocity (cm/s)	4.2±1.1	4.3±0.8	11.6±2.3	8.9±3.0 **
LV lateral mitral ring S velocity (cm/s)	8.1±2.0	7.3±1.9	14.5±2.9	12.3±2.2*
LV septal mitral ring S velocity (cm/s)	6.7±0.8	6.3±1.0	12.8±3.0	11.1±2.4
RV tricuspid ring S velocity (cm/s)	10.1±1.4	10.3±2.2	16.9±3.3	13.1±2.8 **
Heart rate (bpm)	89.2±16.8	88.1±15.1	193±11.3	190±15

Mean±STD. * p<0.05. ** p<0.01. S peak systolic velocity on color tissue Doppler imaging.

This result held true when mild AS group was analysed alone.

CONCLUSIONS: In pediatric patients with AS, TDI revealed a diminished capacity to augment LV and RV wall motion with exercise stress, although conventional testing had shown normal exercise times on the Bruce protocol. These findings are in accordance with previous studies in adults with AS. As such, TDI increases the sensitivity of the exercise stress test and could potentially be useful in risk stratification in children.

10

Central Venous Catheter Use and Thromboprophylaxis in Critically Ill Children

E. Vincent S. Faustino.
Department of Pediatrics, Yale School of Medicine, New Haven, CT.

BACKGROUND: The use of central venous catheters (CVC) is the single most significant risk factor for deep venous thrombosis (DVT) in critically ill children.

OBJECTIVE: In preparation for an intervention trial to reduce the incidence of CVC-related DVT, we aim to characterize DVT risk factors and pharmacologic thromboprophylaxis practice in critically ill children with CVC compared to those without CVC.

DESIGN/METHODS: We conducted a prospective multinational cross-sectional study on thromboprophylaxis in critically ill children. To replicate the eligibility criteria of the proposed trial, we included children hospitalized in pediatric intensive care units (ICU) on 3 study dates spread across the year who were <18 years old, not on therapeutic anticoagulation, not coagulopathic and did not have a recent or planned surgery. We collected data on known risk factors for DVT and use of thromboprophylaxis. We determined the associations between the DVT risk factors and CVC use with a nonlinear mixed effects model and reported the associations as odds ratio (OR) and 95% confidence interval (CI). Descriptive statistics were used to characterize CVC use and thromboprophylaxis practice.

RESULTS: A total of 1,104 (50.5% of 2,185) children from 59 ICUs in 7 countries were included in the analysis. Of these, 518 (46.9%) children had at least one CVC. Children with CVC were more likely to have other risk factors for DVT, such as congenital heart disease (OR: 3.14, 95% CI: 2.30-4.28), cancer (OR: 4.53, 95% CI: 2.85-7.19), sepsis (OR: 3.01, 95% CI: 2.04-4.43), mechanical ventilation (OR: 3.80, 95% CI: 3.02-4.77) or vasopressor support (OR: 6.96, 95% CI: 4.65-10.40). A total of 570 CVCs were inserted of which the peripherally inserted type (244, 42.8%) was the most common. Of the untunneled type (235, 41.2%), the femoral vein (120, 51.1%) was the most common site of insertion. Although pharmacologic thromboprophylaxis was associated with CVC use (OR: 2.65, 95% CI: 1.75-4.01), only 78 (15.1%) children with CVC were receiving thromboprophylaxis. Low molecular weight heparin (36, 6.9%) was the most commonly used agent in children with CVC.

CONCLUSIONS: CVC is commonly used in critically ill children. Those with CVC are more likely to have additional risk factors for DVT. Pharmacologic thromboprophylaxis is not commonly used in these children. These findings suggest that there are a significant number of critically ill children who may be eligible for an intervention trial to reduce the incidence of CVC-related DVT.

11

House Officer

Hospital-Acquired Hyponatremia in Children Following Hypotonic Versus Isotonic Intravenous Fluids Infusion: A Single Center Experience

Panagiotis Kratimenos, Ioannis Koutroulis, Dante Marconi, Joseph Jaeger, Andrew McInnes.
Dept of Pediatrics, Drexel University & The Children's Hospital at Monmouth Medical Center, Long Branch, NJ; Dept of Emergency Medicine, St. Christopher's Hospital for Children, Philadelphia, PA.

BACKGROUND: Parenteral Solutions (PS) may lead to serious, sometimes fatal, electrolyte abnormalities. In pediatric patients, Hospital-Acquired Hyponatremia (HAH) has been reported as one of the most common electrolyte abnormalities following PS administration.

OBJECTIVE: To evaluate the average change in serum sodium levels (mEq/L) within 24 hours of initiation of PS and to assess the incidence of HAH after the infusion of hypotonic vs. isotonic PS.

DESIGN/METHODS: A 5 year retrospective chart review was performed. Pediatric patients admitted to the pediatric ward who received PS for at least 12 hours were included. Patients with significant electrolyte disorders (specifically admission sodium <125 mEq/L or >155 mEq/L), moderate or severe dehydration, or those with evidence of renal insufficiency were excluded. Serum sodium levels on admission, as well as after PS infusion, were reported. Hyponatremia was defined as Na ≤ 135mEq/dL. The results were analyzed by statistician.

RESULTS: Over a 5 year period, 786 patients were identified who (1) received PS and (2) had assessment of serum sodium levels at admission and after ≥12 hours from the initiation of PS. Of those 586 were excluded leaving 200 patients to analyze. Average patient age was 8 years and average weight was 32 kg. There was no significant difference on the serum sodium on admission between the two groups. Of these 200 patients, 98 {49%} received hypotonic PS and 102 {51%} received isotonic PS. On average, patients that received hypotonic PS experienced a mean decrease of serum sodium of 1.74 mEq/dL On average, patients that received isotonic PS experienced an increase in serum sodium of 3.35 mEq/dL. Importantly in patients receiving hypotonic PS, 10 patients developed a serum sodium level ≤135 mEq/dL, whereas in patients receiving isotonic PS, only one developed a serum sodium of ≤135 mEq/dL (**OR=11.47**, 95%CI 1.44-91.45, **P=0.02**).

CONCLUSIONS: In pediatric patients admitted to a general pediatric ward for treatment of common pediatric illnesses, administration of hypotonic vs. isotonic PS was associated with a > 10 times risk of HAH. This data suggests that the hospitalized pediatric patients receiving hypotonic PS should have intense serial assessment of serum sodium levels. More studies are needed to address the safety of the hypotonic PS in children.

Poster Session I
Developmental Pediatrics

Friday, March 22, 2013
6:00pm–7:30pm

12

Fellow in Training

Clinical Criteria for Pharmacotherapy in Preschool Children with ADHD

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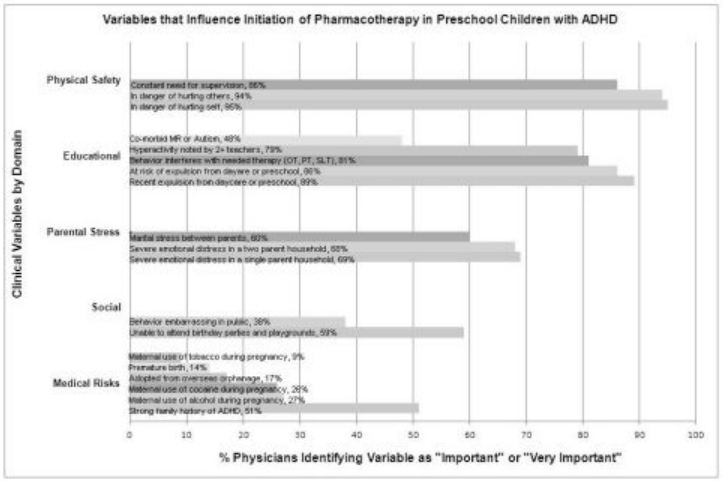
BACKGROUND: Clinical guidelines from the American Academy of Pediatrics and the American Academy of Child & Adolescent Psychiatry recommend that preschool children with ADHD (P-ADHD) be treated with medication if behavior therapy has failed. Although both organizations endorse DSM criteria for diagnosis, more explicit recommendations are not made regarding clinical criteria for pharmacotherapy.

OBJECTIVE: To determine which clinical variables influence the decision by medical specialists (MDs) to initiate pharmacotherapy in P-ADHD.

DESIGN/METHODS: The Preschool ADHD Treatment Questionnaire (PATQ) was developed and mailed to a randomized national sample of 3,000 MDs trained in the management of ADHD. The PATQ asked about MD demographics, practice setting, and the importance of 19 different clinical factors for initiation of pharmacotherapy. These 19 factors reflect 5 areas of concern: impact on education/developmental therapy, impact on peer relations/social life, medical risk factors, parental stress, and safety. MDs were asked to rate each factor on a 4-point Likert scale from *Not Important* to *Very Important*.

RESULTS: The sample consisted of 614 respondents: 322 developmental-behavior pediatricians, 170 child psychiatrists, 54 adult psychiatrists and 68 child neurologists. Figure 1 shows the percentage of respondents that identified each of the 19 variables as *Important* or *Very Important*. No significant differences were noted among the 4 subspecialties regarding which clinical factors were most or least important. 128 MDs (20.8%) reported prescribing medication as part of an initial treatment plan; these MDs were more likely to rate variables as *Important* or *Very Important*, especially family history of ADHD, hyperactivity noted by >2 teachers, behavior causing public embarrassment, and behavior precludes social outings (χ^2;p<.0001).



CONCLUSIONS: Safety and educational concerns were most important and medical risk factors were least important as clinical criteria for medical specialists when deciding to prescribe medication for preschool ADHD.

13

Fellow in Training

Performance on the NICU Network Neurobehavioral Scale (NNNS) by Preterm Twins

Jennifer J. Bragg, Robert Green, Annemarie Stroustrup.
Pediatrics, Mount Sinai School of Medicine, New York, NY.

BACKGROUND: The Neonatal Intensive Care Unit Network Neurobehavioral Scale (NNNS) provides an early neurobehavioral assessment of at-risk infants. It has been used to evaluate term and preterm infants. Performance of twins has not been studied. It is unknown whether twins perform more similarly than unrelated infants on the NNNS.

OBJECTIVE: To compare performance on the NNNS between related and unrelated gestational age (GA)-matched infants with birth weight less than 1500g.

DESIGN/METHODS: As part of an ongoing prospective study, infants born less than 1500g were evaluated with the NNNS at 34-36 weeks post-menstrual age. NNNS summary scales were derived for each group (twin A, twin B and GA-matched controls). ANOVA was used to compare performance between the 3 groups.

RESULTS: 9 pairs of twins and 9 singletons matched for GA at birth were available for analysis. Mean GA was 28 weeks (range 25-32 weeks), mean birth weight was 1044g, and 89% of mothers received steroids before delivery. 67% and 22% of mothers in the twin and GA-matched control groups, respectively, had premature rupture of membranes. All three groups were similar with regard to birth weight, length, head circumference and Apgar scores. A general linear model analysis of variance for repeated measures showed no significant differences between the three groups (twin A, twin B and GA-matched controls) ($p>0.05$).

CONCLUSIONS: When evaluated at 34-36 weeks corrected age, twins have similar performance on the NNNS regardless of birth order. In our small cohort, twins did not perform more similarly than unrelated gestational-age matched infants. More conclusive results will be drawn as additional twins are enrolled in this study. This is the first study to examine performance on the NNNS between twins and compared to gestational age matched controls. It suggests that using the NNNS on twin pairs for clinical and research purposes yields results similar to gestational-age matched infants and may not warrant further adjustment. This finding is important due to the rising incidence of multiple births.

14

Effects of Intraventricular Hemorrhage (IVH), Bronchopulmonary Dysyplasia (BPD) and Sepsis on Neurobehavioral Functioning as Measured by System Scoring of the Assessment of Preterm Infants' Behavior (APIB) at 41-43 Weeks Post Conceptual Age (PCA)

Gretchen Lawhon, Olayemi Ola, Jaime Jump, Krystal Hunter, Nicole Kemble, Vishwanath Bhat, Gary E. Stahl.
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BACKGROUND: APIB evaluations (Als et al., MRDD Research Reviews 2005; 11:94-102) of infants provide screening for neurological abnormalities and facilitate parents' understanding of their infants' behavior and development and support their parents in the transition home. The system scores of the APIB may show differences in the neurobehavioral organization of those infants who have had clinical complications of IVH and/or BPD and/or sepsis.

OBJECTIVE: To determine the effects of IVH and/or BPD and/or sepsis on the neurobehavioral functioning of preterm infants at 41-43 weeks PCA.

DESIGN/METHODS: Preterm infants evaluated after discharge at 41-43 weeks PCA with the APIB from January 2008 through June 2011 were included in this study. Relevant demographic and clinical data were collected. The systems of the APIB were scored on 9 point scales with 1 representing most well organized and 9 most poorly organized behavior. These infants were placed in 2 groups based on their gestational age at birth: 23-28 weeks and 29-34 weeks.

RESULTS: A total of 154 preterm infants were evaluated including 34 infants born at 23-28 weeks gestation and 120 infants born at 29-34 weeks gestation. Independent t-tests were used for p values in finding significant effects in motor, state, attentional and regulatory systems of the APIB. The clinical complications showing significant effects were: any IVH; any IVH with BPD; any IVH with sepsis; IVH >grade II; IVH > grade II with BPD and IVH >grade II with sepsis.

	Y/N	Motor - p	State - p	Attentional - p	Regulatory - p
any IVH	34/120	0.12	0.58	0.05	0.03
any IVH/BPD	9/145	0.03	<0.01	0.04	<0.01
any IVH/Sepsis	7/147	<0.01	<0.01	0.04	0.02
IVH > Grade II	14/140	0.01	0.02	0.01	0.01
IVH > Grade II/BPD	5/149	<0.01	<0.01	0.19	0.08
IVH > Grade II/Sepsis	4/150	<0.01	<0.01	0.04	0.02

CONCLUSIONS: Preterm infants who have had IVH alone or IVH with BPD and/or sepsis demonstrate less well organized motoric, state, attentional and regulatory behavior than those preterm infants who have not had an IVH with or without BPD and/or sepsis when evaluated at 41-43 weeks PCA or term.

15

House Officer

Evaluation of a Sibling Support Group for Families of Children with Autism Spectrum Disorders

Elaine Lin, Patricia Hametz, Maureen McSwiggan-Hardin, Katherine Sullivan, Mary McCord.
Pediatrics, New York Presbyterian - Columbia University Medical Center, New York, NY; Pediatrics, Columbia University College of Physicians & Surgeons, New York, NY; Child & Adolescent Psychiatry, New York Presbyterian - Columbia University Medical Center, New York, NY; Pediatrics, Medical College of Wisconsin, Milwaukee, WI.

BACKGROUND: Literature exists to suggest that siblings of children with autism spectrum disorders (ASD) experience less intimacy with their brother/sister, decreased parental attention, and increased responsibilities. Interventions such as sibling support groups have been shown to benefit families of children with chronic illnesses but data is limited for siblings of children with ASD.

OBJECTIVE: To assess the feasibility and impact of a pilot support group for siblings of children with ASD in an underserved community.

DESIGN/METHODS: Siblings and parents were recruited from schools and clinics located in a low-income community and that serve ASD families. We implemented four peer group sessions designed to help children understand ASD and explore their sibling relationships. Children completed an assessment of sibling knowledge of illness that included ability to name (0-3) and explain (0-5) their siblings' disorder. Parents and children completed a pre & post Sibling Perception Questionnaire (SPQ) using a Likert Scale (1-5) adapted from Sahler & Carpenter covering domains of interpersonal, intrapersonal, communication, fear of disease, and connectedness. Both groups also completed pre & post semi-structured interviews to further explore their family relationships, as well as expectations and feedback of the group. Changes in mean scores were compared for the sibling knowledge interview and SPQ using paired t-test. Thematic analysis was performed by two coders for the qualitative portions.

RESULTS: We enrolled nine families with children ages 7-10 who had a sibling with ASD. Children showed an increased ability to name (1.9 vs 2.3, $p=0.17$) and explain (2.8 vs 3.6, $p=0.05$) their sibling's disorder approaching statistical significance despite small sample size. Parents and children did not report a significant difference on any domains of the SPQ (parents: 2.7 vs 2.7, children: 2.5 vs 2.5). The most frequently described benefits of the group from both parents and children include increased understanding of autism, feelings of connectedness, and learning more coping skills.

CONCLUSIONS: In this study, we found that it is possible to create a support group for siblings of children with ASD. Our pilot data suggests that children gained knowledge about their siblings' illness and developed skills and relationships that could benefit families. Future study is warranted to assess the long-term impact of these groups.

16

House Officer

Autism Spectrum Disorders and Age of Diagnosis in an Urban Inner-City Pediatric Clinic

Indu Sivaraman, Kome Oseghale, Gina Exantus Bernard, Ellis Arnstein, Stefan Hagmann, Ayoade Adeniyi, Richard Neugebauer, Ram Kairam.
Pediatrics, Bronx Lebanon Hospital Center, Bronx, NY.

BACKGROUND: Early diagnosis of Autism Spectrum Disorder (ASD) is desirable in order to initiate appropriate therapy which may lead to improved outcomes. Despite the AAP recommendation for screening at 18 months with the Modified Checklist for Autism in Toddlers (M-CHAT), current national average age of diagnosis for Autism, PDD and Asperger syndrome is 48 months, 53 months, 75 months respectively.

OBJECTIVE: To identify the average age of first concern and time of diagnosis of Autism and to delineate factors associated with age of diagnosis.

DESIGN/METHODS: Retrospective chart review of children with a diagnosis of ASD receiving routine pediatric care at Bronx-Lebanon Hospital Center from 01/2008-12/2010.

RESULTS: 142 children (53% males) were diagnosed with ASD. Most were hispanics (58%) or blacks (21%), and were enrolled into medicaid (49%) or an HMO-plan (43%). Median age (IQR) of first clinical concern was 23 months (12-36 months), initiated mostly by caregivers (79%). Leading reasons were speech delay (76%), no social interaction (27 %), stereotypy (25 %) and self-injurious behavior (15 %). Diagnosis of ASD was established at a median age (IQR) of 30 months (22-36 months), and mostly by primary care provider (PCP) (30%) and neurologist (17

%). Of the children diagnosed, 77% were low functioning, 21% with PDD and 2% with Asperger syndrome. Comorbid factors like developmental delay, ADHD, epilepsy, and Rett-syndrome were found in 59%, 31%, 9%, and 4% of these children, respectively. Early Intervention (EI) services and Applied Behavior Analysis (ABA) were provided to 44 (31%) children at an median age (IQR) of 23 months (23-35 months) and 30 months (23-36 months), respectively. A M-CHAT result was documented only for 23 (16 %) cases. There was no statistically significant association between background variables and age of diagnosis.
CONCLUSIONS: This study shows that most children with ASD can be diagnosed by their PCP by 2 years of life. The impact of the M-CHAT on age of diagnosis in inner-city pediatric clinics needs to be further evaluated in a prospective study. There is also a need to develop better access to behavioral therapeutic interventions.

17

Distractibility, Vigilance and Delay in Children Attending the Pediatric Rheumatology Clinic

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BACKGROUND: Children with rheumatic diseases are likely to have problems with attention due to disease and biopsychosocial factors. The Gordon Diagnostic System (GDS) is a portable assessment device that aids in the diagnosis of attention deficits with three game-like 9-minute-long tasks, namely Vigilance, Distractibility and Delay.
OBJECTIVE: In this pilot study, we will preliminarily test children attending the rheumatology clinic (without a diagnosis of ADHD) for attention deficits using the GDS.
DESIGN/METHODS: We administered the GDS to a cross-sectional sample of children attending the pediatric rheumatology clinic and recorded Vigilance, Distractibility and Delay responses. We assessed quality of life (QOL) with parent reports of Pediatric QOL inventory; and disability with parent reports of the Childhood Health Assessment Questionnaire (CHAQ). Scores were examined for data distribution and compared with age-specific norms. Independent samples t-test and Mann Whitney U tests were used to compare the scores of patients with and without rheumatic diseases.
RESULTS: Out of 11 patients (6 girls), 6 patients had a rheumatic disease: systemic lupus (3); juvenile arthritis (2); dermatomyositis (1). Others had post-streptococcal reactive process (4) and livedo (1). Seven were non-White. The median school grade was 8 (range 3-10). Table below shows the scores of patients with/without rheumatic diseases. Distractibility correct scores were lower in children with rheumatic diseases (p=0.04-independent t test; p=0.08-Mann Whitney U test). Children with rheumatic diseases had a lower QOL.

Variable	Subcategory	No rheumatic disease (5)	Rheumatic disease (6)
Mean age, mean±SD (median)		14±2 (14)	12±3 (12)
GDS-Distractibility	Correct, mean±SD	40±2	29±10 (below normative values)
	Commissions, mean±SD (median)	2±2 (2)	5±5 (3)
GDS-Vigilance	Correct, mean±SD	43±2	41±4
	Commissions, mean±SD (median)	2±1 (3)	5±4 (5)
GDS-Delay	Efficiency Ratio, mean±SD	0.7±0.4	0.7±0.2
	#Responses, mean±SD	86±34	69±8
	#Correct, mean±SD	49±23	49±11
QOL, mean±SD		88±5	74±15
Disability Index, median (range)		0 (0-0.12)	0 (0-0.25)

CONCLUSIONS: In our small sample, children with rheumatic diseases performed worse on the distractibility task of the GDS.This study emphasizes the need for routine screening for attention deficits in children with rheumatic diseases and assessing these scores prospectively in relation to disease status and well being.

Poster Session I
Medical Education

Friday, March 22, 2013
6:00pm–7:30pm

18

Inter-Professional Training Program for Health Professional Learners in Southern Belize

Denise A. Soltis, Susan M. Leib.
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BACKGROUND: Inter-professional collaboration has been shown to improve patient care outcomes yet few health professional learners have experience working in inter-disciplinary settings. Less than 15% of medical and nursing schools in the US have interdisciplinary programs. Little information is available as to how medical learners perceive working in inter-professional teams.
OBJECTIVE: To determine how health professional learners respond to working in inter-professional teams and how this approach alters their attitudes about professionals from other health disciplines.
DESIGN/METHODS: From March through November 2012 confidential surveys were completed by medical, physician assistant and pharmacy students from the US and UK who participated in global health rotations at Hillside International Health Care, a rural primary care clinic in southern Belize. Survey items were based on a five-point likert scale and included learner's discipline, demographics, how learners viewed working in an interdisciplinary group, how inter-professional collaboration affected learners' understanding of other disciplines and how working in inter-professional teams impacted their approach to patient care.
RESULTS: 58 students completed the survey for a 70% percent response rate: 34% PA, 38% medical and 26% pharmacy students; 72% US students, the rest from the UK and Canada. 95% felt students worked well together and >80% strongly agreed the inter-professional component of the rotation added value to their training. 84% said they would be interested in additional inter-professional opportunities during their training. Over half of the participants felt that learners from other disciplines contributed more to patient care than they had expected and 100% of the students agreed that the experience improved their understanding of the abilities of other health professionals. Over 95% of respondents agreed that working in an interdisciplinary team leads to patient care outcomes that they could not have achieved alone and that learning with students from other disciplines will help them become more effective healthcare team members.
CONCLUSIONS: This study demonstrates that health professional learners benefit from training with students from other disciplines, that they perceive such experiences positively and that they would welcome further opportunities to work in inter-professional teams. Health professional schools should consider instituting more inter-professional education into their experiential programs.

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House Officer

Barriers to Patient- and Family-Centered Care in the Era of Resident Work Hours Restrictions

Matthew P. Kusulas, Joanne Nazif.
Pediatrics, Children's Hospital at Montefiore, Bronx, NY.

BACKGROUND: Patient- and family-centered care (PFCC) recognizes that the family is a child's primary source of support and is essential to clinical decision making. Acknowledging the importance of PFCC, the Accreditation Council for Graduate Medical Education identified barriers to PFCC in the learning environment. However, in the current era of restrictive work hours, new obstacles to consistent PFCC may have emerged.
OBJECTIVE: To assess pediatric residents' perceptions of their understanding of PFCC, assess residents' perceptions of the benefits of PFCC, and identify barriers to providing consistent PFCC at an urban academic children's hospital, the Children's Hospital at Montefiore (CHAM).
DESIGN/METHODS: We conducted a focus group of 8 residents in which participants were asked to identify barriers to providing PFCC. All CHAM pediatric residents were subsequently invited to complete a survey that assessed their perceived understanding of PFCC as well as their attitudes regarding PFCC. The survey also asked participants to rate how often they encounter each identified barrier in their practice. Data was analyzed using descriptive statistics.
RESULTS: Ten barriers were identified by the focus group. 57 of 84 residents (68%) completed the survey, 72% of which had experience with PFCC prior to starting their training. 95% agreed or strongly agreed that they understand what PFCC means, while 87% agreed or strongly agreed that they understand how to put PFCC into practice as a resident. The majority of respondents believe that PFCC can increase family satisfaction (100%), increase patient satisfaction (89%), improve patient outcomes (62%), increase efficiency of care (58%), and increase personal satisfaction (51%), while the majority did not believe PFCC decreases cost of care (60%) or improves staff satisfaction (51%). Most have experienced increased family (69%) and patient (55%) satisfaction first hand. Of the 10 barriers, the majority of responders felt the following 3 frequently or always created an obstacle to PFCC: the structure of the day (84%); difficulty balancing time with patients and families with administrative tasks (82%); the physical environment (58%).
CONCLUSIONS: While residents at our institution feel they understand what PFCC entails and agree that PFCC can provide important benefits, resident responsibilities and daily schedules need to be planned in ways that are more conducive to PFCC in order to make it the standard of care.

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House Officer

A Learner-Based Evaluation of Varied Formats of Chief Resident Led Educational Sessions

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BACKGROUND: Chief Rounds, or Morning Report, is traditionally described as a large group, case-based format. At our institution, it has evolved to include other designs with small group interaction and competition. The audience includes multiple levels of learners, from medical students to attendings. Each session is facilitated by a chief resident.
OBJECTIVE: We hypothesized that small group, team-based formats would be rated more interactive and effective than the large group format. We further hypothesized that learners would prefer a variety of formats.
DESIGN/METHODS: Residents and attending physicians were surveyed regarding interactivity, effectiveness, and preference of three formats of Chief Rounds. These include: 1)Traditional: the group at large asks questions regarding history, physical, and laboratory studies, and a differential diagnosis is created by the group; the session culminates with one diagnosis, and a presentation by the facilitator on that topic. 2)McChief Rounds: a competition where history, physical, and laboratory study questions are asked by small training-level-based teams; each team submits one final diagnosis and management plan, and the session culminates with a topic-specific presentation by the facilitator. 3)Progressive Chief Rounds: a team learning competition where each training-level-based team has an individual case or question regarding one common topic; after the teams have a brief period of time to work on their answer, they report out to the large group, followed by a brief presentation by the facilitator after each team's answer.
RESULTS: Data collection is ongoing. Of 32 responses collected thus far, 97% and 88% of

respondents rated McChief Rounds and Progressive Chief Rounds as interactive, respectively, compared to 69% for Traditional Chief Rounds. McChief Rounds were rated as effective by 100% of respondents and Progressive Chief Rounds were found to be effective by 94% of respondents, compared with 84% for Traditional Chief Rounds. Only 16% of respondents prefer the Traditional Chief Rounds style over the other two styles, and overall, 97% of the respondents prefer having a variety of formats.
CONCLUSIONS: Learners rated small group, team-based styles as more effective and interactive than traditional large-group Chief Rounds. Learners prefer a variety of formats in this educational venue. Based on this data, we will continue to offer a variety of small, team-based educational sessions.

21

Somebody Tell the Students: Dichotomy between Standardized Patients' and Medical Students' Assessments of Professionalism

Hai Jung H. Rhim, Ilir Agalliu, Miriam Schechter.
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BACKGROUND: Professionalism is a core competency in medical training, which is best evaluated by collecting formative assessments in varied settings from multiple evaluators, including students themselves. Students' self-assessments are typically compared to faculty or peer evaluations, but anchoring them to patients' perceptions should be the ultimate goal. As a surrogate, standardized patients (SP) trained to evaluate students may provide a more consistent method to capture the patient perspective.
OBJECTIVE: To determine the correlation and agreement between SPs' assessments and students' self-assessments on professionalism during a pediatric Objective Structured Clinical Exercise (OSCE).
DESIGN/METHODS: Since 2011, all 3rd year students at Albert Einstein College of Medicine participate in an OSCE during the pediatrics clerkship. SPs portray an apathetic adolescent who opens up only if the student is able to negotiate a nonjudgmental rapport in a professional manner. SPs trained to assess professionalism complete a checklist and students complete an identical self-assessment. SPs give verbal feedback on communication skills and professionalism. Students complete an anonymous survey rating their experience. Intraclass correlation coefficients (ICC) between SP and student evaluations were computed using two-way random ANOVA models, whereas inter-rater agreement (IRA) was determined by linear-weighted kappa statistics.
RESULTS: N=217 students

Professionalism Attributes	ICC	p-val	IRA	p-val
Introduction	0.48	<0.001	0.18	<0.001
Attitude	0.02	0.45	-0.04	0.81
Courtesy	0.16	0.10	0.05	0.18
Patient Preferences	0.10	0.23	0.03	0.24
Empathy	0.30	0.01	0.08	0.04
Word Choice	0.12	0.18	0.04	0.20
Verbal Tone	0.27	0.01	0.14	<0.01
Medical Jargon	0.38	<0.001	0.15	<0.01
Mannerisms	-0.05	0.65	-0.01	0.58
Composure	0.12	0.17	0.03	0.27
Establishing Confidentiality	0.85	<0.001	0.63	<0.001

	Very Useful	Somewhat Useful	Not Useful
Feedback from SP	78%	20%	2%

CONCLUSIONS: There was fair to poor inter-rater reliability and agreement between SP and student assessments of professionalism attributes, except establishment of confidentiality. A dichotomy exists between SPs' and medical students' perceptions. Immediate feedback by SPs can play a key role in improving trainees' awareness, which our students found very useful. SP feedback may prove an invaluable educational tool in the upcoming era of AHRQ national benchmarks for patients' experiences with health care.

22

Evaluating and Implementing a Residency Training Program on Breaking Bad News

Anthony Orsini, Patricia Eaton, Maryann LoFrumento.
Neonatology, MidAtlantic Neonatology Associates, Morristown, NJ; General Pediatrics, Goryeb Children's Hospital at Atlantic Health System, Morristown, NJ.

BACKGROUND: One of the greatest challenges for healthcare professionals is learning how to effectively and compassionately communicate emotionally and medically devastating information. Although communicating or "breaking bad news" (BBN) to patients is ubiquitous for medical professionals, less than 10% of clinicians report having received formal training in BBN. Typically, medical residents (Res) indirectly acquire BBN skills via observation of senior faculty and/or didactic lectures, educational methods which can leave Res inadequately prepared, apprehensive and anxious when they directly provide BBN as attending physicians.
OBJECTIVE: To create and evaluate a BBN program for pediatric Res which provides education on how to effectively and compassionately communicate emotionally and medically devastating information to parents of an ill child.
DESIGN/METHODS: Res at a single institution (n=34) were randomly assigned into 4 study groups. Each group experienced a learner-centered BBN program utilizing an institutional multidisciplinary team which consisted of improvisational role-play (RP) sessions with professional actors, followed by either an individualized video-based review session or five hours of didactic lectures, and concluded with a second RP experience and a self-assessment. All RP sessions were reviewed and scored by a panel of BBN physicians. BBN physicians RP scores, actor RP scores, and Res self-assessments were analyzed for changes pre and post-BBN interaction.
RESULTS: Res RP scores improved after BBN education ($p<0.05$). Residents who initially indicated they were uncomfortable with BBN showed the greatest improvement and had the best overall scores in the second RP. In contrast, residents who were comfortable with BBN only marginally improved after involvement in the BBN program. Overall, 82% reported that the BBN curriculum was important to their training and that RP and RP review with BBN physicians were more effective than didactic lectures ($p<0.05$); all participating Res reported improved competency with BBN after study involvement.
CONCLUSIONS: The current BBN cirruculum emphasizing RP with individualized assessments and immediate review were effective in providing competency for Res in communicating emotionally and medically devastating information to professional actors. Based on current study results, an effective BBN program should involve minimal didactic preparation, followed by a single RP session with professional actors and individualized review.

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House Officer

Impact of a Novel Training Curriculum for Pediatric Residents in the Prevention of Intimate Partner Violence among Adolescents

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BACKGROUND: The AAP recommends Intimate Partner Violence (IPV) screening during adolescent office visits,and supports IPV-specific training during residency.
OBJECTIVE: To assess the impact of a novel IPV specific training module on pediatric residents' IPV relevant knowledge and attitude.
DESIGN/METHODS: A seven-hour IPV training program on IPV relevant screening,educatio n,policies and resources was offered in July/August of 2010, and again in July/August of 2011. Residents completed a pre and post-training survey consisting of 60 questions that were arranged into 14 distinct themes/competencies and mean score was calculated for each. Paired sample t-tests with a p-value set at <0.05 were used to evaluate participants' change in survey responses before and after the training. After the 2011 training,a convenience sample of caregivers and adolescents were assessed with another questionnaire focusing on IPV and provider interview.
RESULTS: Of 36 residents trained and surveyed in 2010(PGY-1, 2 and 3),18(50%) received a second training module in 2011. Baseline survey showed that 60% of the residents lacked prior IPV-specific training, and 50% were unaware of relevant community resources. Mean values for 12 out of the 14 IPV-relevant themes improved significantly after the initial training module.

	2010 Training Session		
Theme/Competency	Mean Scores		p-value
	Before	After	
Self-efficacy	18.67	22.87	0.000
Referral	12.86	16.86	0.000
Health Care Role	35.30	38.63	0.002
Screening	15.50	17.90	0.001
Workplace	18.66	22.24	0.000
Too Busy/Can't Help	16.03	17.58	0.008
Limitations	12.80	14.77	0.003
Legal Requirements	9.40	11.80	0.000
Don't Need Training	8.90	10.16	0.024
Victim Understanding	11.13	12.70	0.016
Identify and Document	10.86	12.14	0.002
Victim Autonomy	15.97	17.34	0.024
Staff Preparation	9.57	9.57	1.000
Relationship of Alcohol and Drugs	11.83	12.07	0.482

In response to the 2nd training module, further improvement was noted in these themes/competencies.Among studied teenagers (n=113),86% indicated that they would ask for help if they were victims of IPV; while 80% of the caregivers(n=101)would discuss "healthy relations" with their teenagers.
CONCLUSIONS: This IPV-specific training module for residents improved significantly their competencies. IPV-specific training may need to be incorporated into the pediatric residency-training curriculum.

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Fellow in Training

Giving Bad News: Pediatric Resident Opinions Regarding Communication Skills

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BACKGROUND: Giving bad news is a challenging task that requires effective communication skills which should be developed during pediatric residency. The ACGME identifies interpersonal and communication skills as a core competency. Methods described to teach and assess this competency include observation, role modeling and didactic teaching. However, the educational experience of pediatric trainees varies.
OBJECTIVE: To examine pediatric resident opinions regarding the importance of developing proficiency disclosing bad news, and explore resident confidence with skills used when giving bad news.
DESIGN/METHODS: During 2011-12, pediatric residents at University of Maryland Medical Center completed the Pediatric Housestaff Communication Skills Survey (Rider et al.). This 5-point Likert scale survey explores the importance of developing skill and confidence with effective parent communication. Five questions were highlighted, which focus on effective communication when giving bad news. Data was analyzed to identify trends based on PGY.

RESULTS: 35/42 residents participated (PGY1=14, PGY2=11, PGY3=10). 98% expressed high or very high importance of developing effective communication skills, but 49% felt rather or very confident with their ability. All felt it was highly or very highly important to develop skills necessary when giving bad news, but 11% were rather or very confident. 98% expressed high or very high importance of developing skills to discuss end of life issues, but none felt rather or very confident with their ability. 98% reported high or very high importance of building rapport with parents, but 65% felt rather or very confident. 94% reported high or very high importance of showing empathy, and 80% felt rather or very confident with these affective skills. Only 13% of those who were confident showing empathy felt rather or very confident disclosing bad news and none felt rather or very confident discussing end of life issues. Confidence was not affected by PGY.
CONCLUSIONS: Pediatric residents value the development of advanced communication skills necessary to disclose bad news. However, residents express a lack of confidence in giving bad news, which is not affected by PGY. Exposure of residents to a communication skills curriculum specifically targeted at giving bad news and discussing end of life issues may improve resident confidence. Funded by Mead Johnson Nutritionals Training Grant.

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House Officer

Objective Assessment of a Formal Handoff Curriculum for Pediatric Residents

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BACKGROUND: Hospitals and healthcare facilities aim to provide safe, effective healthcare to their patients. Medical residents are critical in delivering this care, and use written and oral handoffs for their patients with increasing frequency under the new ACGME duty-hour restrictions. Errors frequently occur during this process and little formal education is provided to residents about handoffs. Although programs are implementing formal handoff curricula, assessment of their effectiveness has utilized subjective evaluation methods.
OBJECTIVE: To objectively evaluate the effectiveness of a formal handoff curriculum.
DESIGN/METHODS: Senior residents were asked to complete a structured evaluation while observing evening intern sign-outs of their inpatient pediatrics teams. The itemized questionnaire assessed three aspects of handoff: (1) whether key elements of clinical information were conveyed; (2) accuracy of the information being transferred; (3) whether the intervention was beneficial. Each patient was a specific data point (pre-intervention n=33, post-intervention n=44). The intervention was a formal lecture with audience participation given during a noon conference during which the majority of residents were present. Data collection occurred over 4 weeks, with intervention occurring halfway through. The data were then analyzed using SAS statistical software.
RESULTS: Chi-square analysis demonstrated that post-intervention, there was statistically significant increase in reporting of patient's age ($p<0.05$), past medical history ($p<0.05$), relevant diagnostic results ($p<0.05$), treatments($p<0.05$) consults ($p<0.05$), and diagnoses ($p<0.05$). There was no statistically significant change in the post-intervention group with regard to opportunity for questions, identifying ill patients, contingency planning or accuracy of patient information.
CONCLUSIONS: A formalized handoff curriculum for pediatric residents is associated with a statistically significant improvement in certain aspects of handoff, such as reporting of certain demographic data. However, it was not associated with other aspects such as contingency planning. The tool itself demonstrated content validity and face validity owing to the introduction of an unbiased observer who was able to identify the presence or absence of certain components of the handoff.

Poster Session I
Neonatology - General

Friday, March 22, 2013
6:00pm–7:30pm

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Fellow in Training

Histologic Chorioamnionitis and Severe Intraventricular Hemorrhage in Very Low Birthweight Infants

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BACKGROUND: Severe intraventricular hemorrhage (IVH) is an early indicator for adverse neurodevelopmental outcomes. Past studies have shown conflicting results when trying to determine if there is an association between chorioamnionitis, fetal inflammation, and severe IVH. These studies have been limited by small sample size, and the inclusion of grades I and II IVH.
OBJECTIVE: To determine if there is an association between histologic chorioamnionitis, fetal inflammation, and severe IVH.
DESIGN/METHODS: Data were retrospectively obtained from singleton, inborn infants < 1500 grams at Christiana Care Health System from July 2002 through July 2011. IVH was diagnosed by head ultrasound in the 1st week of life and severe IVH was classified as grade III-IV. Histologic chorioamnionitis and funisitis were diagnosed by placental pathology. To further evaluate early inflammatory response from histologic chorioamnionitis, CBCs from the first 48 hours of life were evaluated for leukocytosis, defined as a WBC ≥ 30,000/ml. Statistical analysis included ANOVA, Chi-Square and logistic regression.
RESULTS: The study sample included 1003 infants of which nine percent (n=93) were diagnosed with severe IVH. Infants found to have severe IVH were of lower gestational age (25.2 ± 2.1 vs 28.2 ± 2.8wks; $p<0.001$), had less preeclampsia (12% vs 38%; $p<0.001$), and fewer received antenatal steroids (61% vs 76%; $p=0.005$) compared to those without severe IVH. On unadjusted analysis, histologic chorioamnionitis and funisitis were associated with increased odds of severe IVH.

	Severe IVH Unadjusted OR (95% CI)	Severe IVH Adjusted OR (95% CI)
Histologic Chorioamnionitis (n=458)	2.9 (1.8-4.5)	1.1 (0.6-2)
Funisitis (n=226)	1.8 (1.1-2.9)	0.84 (0.5-1.4)
Histologic Chorioamnionitis with Leukocytosis (n=78)	0.73 (0.34-1.6)	0.44 (0.2-1.1)

After adjusting for gestational age, preeclampsia, antenatal steroids, C-section delivery, and race, neither histologic chorioamnionitis nor funisitis were associated with severe IVH. There was no association between leukocytosis and severe IVH on adjusted and unadjusted analysis.
CONCLUSIONS: In our large sample of VLBW infants, there was no evidence that histologic chorioamnionitis, funisitis, or leukocytosis increased the odds of severe IVH. Our data suggest that histologic chorioamnionitis and perinatal inflammation, as measured by funisitis and leukocytosis, do not have a major role in the pathophysiology of severe IVH.

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Fellow in Training

Interindividual Expression of BCRP/ABCG2 Efflux Transporter mRNA in Term Human Placentas

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BACKGROUND: Breast cancer resistance protein (BCRP) is an ATP-binding cassette transporter that is expressed in placental syncytiotrophoblasts and plays a crucial role in extruding a wide range of substances, thereby protecting the fetus from chemical exposure. A number of drugs, including antiretrovirals, nitrofurantoin, and glyburide, are commonly administered to pregnant women and BCRP has been suggested to limit fetal accumulation of these drugs as part of the placental barrier. Polymorphisms in the gene encoding BCRP have been described and are associated with interindividual variation in BCRP expression and transporter activity in a variety of tissues. These findings suggest that there may be differences in fetal drug exposure due to variation of BCRP expression between placentas.
OBJECTIVE: The purpose of this pilot study was to evaluate the variability of BCRP mRNA expression in healthy, term placentas.
DESIGN/METHODS: Ten full-term placentas were collected after elective caesarean sections from healthy mothers with uncomplicated pregnancies. Subject-specific information (including maternal age, gestational age, and parental ethnicities) was obtained prior to the delivery. Regionally-defined tissue samples (medial, intermediate, and peripheral) were collected from each placenta. Each sample was analyzed for the expression of BCRP mRNA by quantitative real-time polymerase chain reaction (qPCR). BCRP expression was normalized to the expression of housekeeping genes. To investigate intraplacental variation, regional samples were normalized to medial BCRP mRNA levels.
RESULTS: Individuals from diverse ethnic backgrounds were recruited for this study. A five-fold difference in BCRP mRNA expression was noted between the lowest and highest expressing placenta. Intraplacental variability in BCRP mRNA expression was less than nine percent and this was statistically insignificant ($p=0.615$). Histology confirmed that samples were comprised mainly of villous tissue.
CONCLUSIONS: There is notable interindividual variation in the expression of placental BCRP mRNA. Since BCRP protects the fetus against the accumulation of its substrates, certain individuals, due to genetic polymorphisms, may be at an increased risk for fetal exposure to BCRP-transported drugs prescribed during pregnancy (Supported by ES0205022 and ES005022).

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House Officer

Are Routine Cord IgM and Urine CMV Cultures Warranted in the Initial Evaluation of Small-for-Gestational Age Neonates?

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BACKGROUND: Cytomegalovirus (CMV) is the commonest perinatal viral infection in developed countries. It has a wide variety of clinical presentations and results in many sequelae including being small-for-gestational age (SGA). Routine evaluation for SGA babies often includes serum/cord IgM and urine culture for CMV. With newer drugs to treat CMV available, determining the efficacy of using birth weight (BW) to screen for congenital CMV is important. However, other maternal, placental and fetal factors play a significant role in the etiology of SGA births. We therefore examined the relevance of routine CMV screening in the evaluation of SGA babies.
OBJECTIVE: 1. To assess the yield of cord IgM and urine CMV culture for identifying congenital infection in SGA neonates; 2. To determine the effect of common maternal risk factors on birth weight.
DESIGN/METHODS: We conducted a retrospective chart review of consecutive SGA babies admitted to the NICU between Jan 2005 and Jul 2011 in an urban hospital serving an inner city community. Neonates with a BW below the 10th percentile for gestational age and/or neonates presenting with signs and symptoms of congenital infections were included. We also collected data on maternal risk factors for SGA.
RESULTS: 122 SGA neonates were admitted to the NICU during the study period. Male-to-female ratio was 1:1. Mean BW was 1577g (SD 571g). About 50% of the mothers were ≤24years; and 65% were African Americans. 83% of the mothers had at least 1 prenatal visit. Preterm delivery (< 37weeks) comprised 71% of all the SGA babies. Urine culture for CMV was sent for 94 babies and only 1 was positive. Four of the 50 cord/serum samples sent for IgM were positive (>20mg/dl). Sixty four had cranial ultrasound; none showed intracranial calcifications. Regression analysis

showed no significant relationship between the birth weight and cord IgM titers (R^2 = -0.008). ANOVA analysis revealed significant reduction in BW with only maternal preeclampsia (X^2 = 9.12; P < 0.005) and hypertension (X^2 = 10.87, P < 0.001).
CONCLUSIONS: The yield of newborns with congenital CMV obtained by screening SGA infants is very low. The use of routine cord/serum IgM and urine culture in SGA babies to screen for CMV may not be warranted. Maternal hypertensive disorders are much more highly correlated with SGA birth than CMV status.

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Fellow in Training

Hemodynamic and Echocardiographic Variables Influencing SVC Flow in the VLBW Infants

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The Carman and Ann Adams Department of Pediatrics, Wayne State University School of Medicine, Children's Hospital of Michigan, Detroit, MI.

BACKGROUND: SVC flow measured by echocardiography has been shown to correlate well with effective systemic, especially cerebral blood flow and is a more reliable measure than mean arterial blood pressure (MAP) in hemodynamically compromised VLBW infants. However variables affecting SVC flow in these infants with constantly changing hemodynamics are still unknown.
OBJECTIVE: To study the associations of SVC flow with age, gestational age (GA), weight, hemodynamic and echocardiographic variables in VLBW infants in the first two weeks of life.
DESIGN/METHODS: Prospective, observational cohort study. SVC flow was obtained by a previously validated method (Kluckow et al., 2000) when echocardiography was performed in VLBW infants < 1500 Gms according to the unit PDA protocol. Data for 2011-2012 is reported.
RESULTS: Total of 50 echocardiograms from 31 babies are included. Mean age and weight at echocardiogram were 6.6± 0.7 days and 1107±43.4 grams respectively. Mean GA was 29.15±0.43 weeks. There was a significant positive correlation between SVC flow and age in days (r=0.33, p=0.046) and negative correlations with serum pBNP levels (n= 19) (r=-0.44, p=0.043) and left ventricular end diastolic diameter (r=-0.30, p=0.03) within 72 hours of life. Left ventricular mass and shortening fractions were positively correlated with SVC flow but were not statistically significant. There was a positive correlation of SVC flow and MAP for all patients (r=0.40, p=0.004) but this association was not significant in patients without ionotropes. Patients with a large PDA had lower SVC flow compared to those with no PDA but was not statistically significant. Weight at echo was negatively correlated with SVC flow (r=-0.40, p=0.016). Infants on Dopamine had significantly lower SVC flow compared to those on Dobutamine at the time of the study (100.48±43.92 vs. 144.53±27.12, p=0.012). There was no correlation with HR or Base Excess in this cohort. There were 2 babies who developed late onset of IVH had low SVC flow (<40 ml/kg/min) and normal MAPs at less than 24 hours of life.
CONCLUSIONS: SVC flow estimates systemic blood flow but is influenced by the age, weight, left ventricular function and filling, and use of ionotropes. Dobutamine is associated with higher SVC flow in these compromised infants compared to Dopamine. Functional echocardiography including SVC flow is a useful tool to assess the changing hemodynamic interactions in VLBW infants.

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Concurrent Administration of Apoptotic Inhibitors and Hypothermia Attenuates Further Hypoxic Cerebral Injury in Newborn Piglets

Shadi Malaeb, Endla Anday, Anli Zhu, Maria Delivoria-Papadopoulos.
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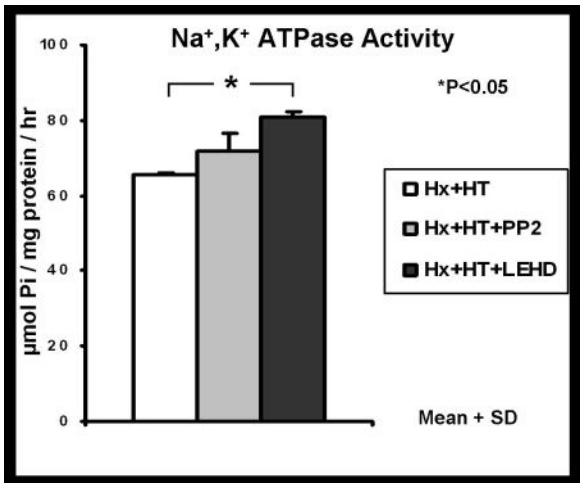
BACKGROUND: Hypothermia (HT) is used to treat infants with hypoxic ischemic encephalopathy but neurologic outcome of survivors remains guarded. We have previously shown that hypoxic (Hx) cerebral injury is associated with decreased Na^+, K^+ ATPase activity, an index of neuronal cell membrane integrity, and increased activation of apoptosis pathway mediators Src kinase and caspase-9 in the newborn piglet brain. Selective inhibitors for Src kinase (PP2) and caspase-9 (LEHD-fmk) reduced hypoxic cerebral injury.
OBJECTIVE: The present study tests the hypothesis that concurrent hypothermia and administration of inhibitors of Src kinase or caspase-9 after hypoxia is associated with added neuroprotection compared to hypothermia alone.
DESIGN/METHODS: Newborn piglets were exposed to hypoxia ($FiO_2$0.07 for 1 hr) then returned to $FiO_2$0.21-0.37. They received either saline (n=2), PP2 (1mg/kg iv; n=4), or LEHD-fmk (1mg/kg iv; n=2) immediately after hypoxia and then were cooled to 33°C for 4 hrs. Na^+,K^+ ATPase activity in cell membranes of the cerebral cortex was measured spectrophotometrically as an index of neuronal cell membrane integrity.
RESULTS: Na^+,K^+ ATPase activity was 23% higher 4 hours after hypoxia in hypothermic piglets receiving caspase-9 inhibitor compared to saline (80.6±1.6 vs 65.5±0.6 µmol Pi/mg protein/hr; M±SD; ANOVA and Bonferroni t-test; p<0.05). We noted a trend towards higher Na^+,K^+ ATPase activity with hypothermia and Src kinase inhibitor compared to hypothermia alone (71.6±5.1 vs 65.5±0.6; NS; Fig.1).
CONCLUSIONS: We conclude that concurrent administration of caspase 9 inhibitor (LEHD-fmk) with hypothermia is associated with an improved neuronal cell membrane integrity compared to hypothermia alone after hypoxia. We propose that caspase 9 inhibition further decreases neuronal cell death and preserves cell membrane integrity in the newborn piglet brain. We suggest that concurrent treatment with anti-apoptotic agents augments neuroprotection by hypothermia. (NIH-HD20337).



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Assessing the Cardioprotective Properties of Controlled Hypothermia in Neonates with Moderate to Severe Hypoxic Ischemic Encephalopathy Utilizing Cardiac Troponin I

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BACKGROUND: Myocardial injury is a common sequel of perinatal asphyxia, but little is known about the effects of hypothermia on the heart. Cardiac troponin I (cTnI) is a good biomarker in diagnosing acute myocardial infarction in adults but limited data exists for neonates.
OBJECTIVE: This study aims to test the hypothesis that hypothermia achieves cardioprotection in infants with moderate to severe Hypoxic-ischemic encephalopathy (HIE) utilizing concentrations and trends of serum cTnI. We further hypothesize that cTnI has predictive value in assessing cardiac injury.
DESIGN/METHODS: Retrospective review of cTnI concentrations in neonates admitted to our institution with moderate to severe HIE from June 2009- August 2012. We compared concentrations and trends of cTnI to clinical or echocardiography evidence of cardiac dysfunction.
RESULTS: Forty neonates were admitted with median GA: 38 wk; birth weight 3049g and 5 min Apgar score:3. Median cTnI values (ng/ml) are shown in the table.

Groups	Pre cooling	24 hrs	48 hrs	72 hrs	96 hrs	120 hrs
All infants	0.13(0.01-0.56)n=38	0.12(0.01-3.13)n=38	0.08(0.01-2.55)n=37	0.05(0.01-0.55)n=37	0.08(0.01-1.08)n=28	0.18(0.02-0.49)n=11
No inotrope	0.17(0.01-0.56)n=15	0.10(0.01-1.00)n=16	0.04(0.01-2.55)n=15	0.03(0.01-0.45)n=16	0.04(0.01-0.54)n=11	0.22(0.20-0.41)n=3
Inotrope	0.13(0.01-0.43)n=23	0.10(0.01-0.52)n=22	0.09(0.01-0.56)n=22	0.04(0.01-0.55)n=21	0.08(0.01-0.45)n=16	0.10(0.02-0.31) n=8
Positive ECHO	0.12(0.01-0.56)n=23	0.20(0.01-1.00)n=25	0.11(0.01-2.55)n=24	0.07(0.01-0.55)n=23	0.17(0.01-0.54)n=17	0.18(0.02-0.49)n=11

All infants demonstrated elevated cTnI post-HI injury with subsequent decline during controlled hypothermia (lowest at 72h) suggestive of cardioprotection. cTnI levels increased in all infants following re-warming (96h to 120h) with infants treated with inotrope experiencing less increase compared to no inotrope treatment. Infants with ECHO evidence of cardiac dysfunction had minimal cTnI decline during hypothermia and a rapid rebound following re-warming.
CONCLUSIONS: Therapeutic hypothermia in setting of neonatal HIE achieves cardioprotection that is transiently lost following re-warming as evidenced by the trends in cTnI levels. We deduce that cardioprotection from hypothermia is attenuated earlier in infants with prior inotropic support compared to infants without inotrope support.

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Multi-Institution Report of Transfusion Related Acute Gut Injury (TRAGI) from an Online Registry: www.tragiregistry.com: Feasibility of Collaboration

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BACKGROUND: TRAGI is documented in multiple reports where proposed etiologic factors include: extreme prematurity, permissive anemia, feeding during transfusion, disrupted angiogenesis, blood storage lesions & dysregulated immunologic barrier defense (reviewed in Sem Perinatol 36(4):294, 2012). All reports are retrospective & limited by small numbers of affected neonates at one center. Two consecutive Users' Groups met at both the 2011 and 2012 PAS meetings. They concluded that a multicenter database was needed to better characterize TRAGI & to help foster a clinical trial targeted at prevention; the group will reconvene at PAS 2013.
OBJECTIVE: To develop an online database: i) to capture data from a diverse group of institutions with different clinical practices to help identify common features of TRAGI & ii) to identify clinicians interested in a future multicenter trial.
DESIGN/METHODS: We asked neonatologists to submit cases they encountered. TRAGI is defined as the development of NEC Stage IIb <48h after a PRBC transfusion.

RESULTS: TRAGI cases reported on www.tragiregistry.com

Mean SEM (Median, Minimum-Maximum)	TRAGI N=24
Birth weight (grams)	934 ± 70 (904, 590-2200)
Gestational age (weeks)	27 ± 1 (27, 24-35)
Age at onset of NEC (days)	32 ± 3 (29, 9-72)
Postconceptual age at onset of NEC (weeks)	32 ± 1 (31, 26-38)
Full feeds at onset of NEC	88%
Hematocrit before NEC	26 ± 1 (26, 20-36)
Made NPO for transfusion	17%
Hrs after PRBCs to 1st signs of NEC	22 ± 3 (18, 3-48)
Majority of feeds EBM prior to onset of NEC	35%
Interested in a future trial	96%

Since the registry's debut in Oct 2011, HIPAA-compliant, de-identified demographic & clinical data was collected from TRAGI patients from 10 institutions. As we and others previously reported, TRAGI cases were generally characterized by prematurity, significant anemia, & a curious centering of disease around 32 wks PCA. The role of EBM and NPO status during transfusion did not appear related to the pathogenesis of TRAGI. Clinicians had no difficulty in using the registry.

CONCLUSIONS: This online database has allowed clinicians using different clinical strategies to compare their experiences which continue to show consistency in case presentation. We speculate that 1) the consistent pattern of affected cases will contribute to hypotheses formation & 2) clinicians are willing to self-identify as participants in a future, prospective, multicenter trial of disease prevention.

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Fellow in Training

Getting to Zero: Development of a NEC QI Initiative To Decrease Progression in NEC Severity

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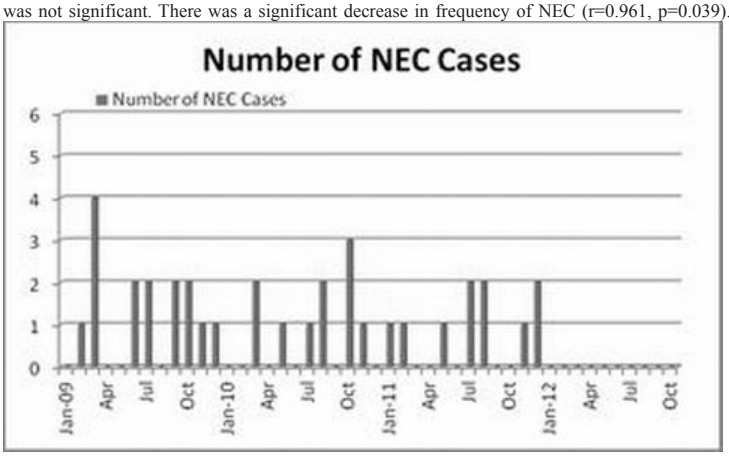
Hospital of Richmond at VCU, Richmond, VA.

BACKGROUND: Clinical symptoms and signs of Necrotizing Enterocolitis (NEC) are non-specific and disease progression is associated with significant morbidity and mortality.

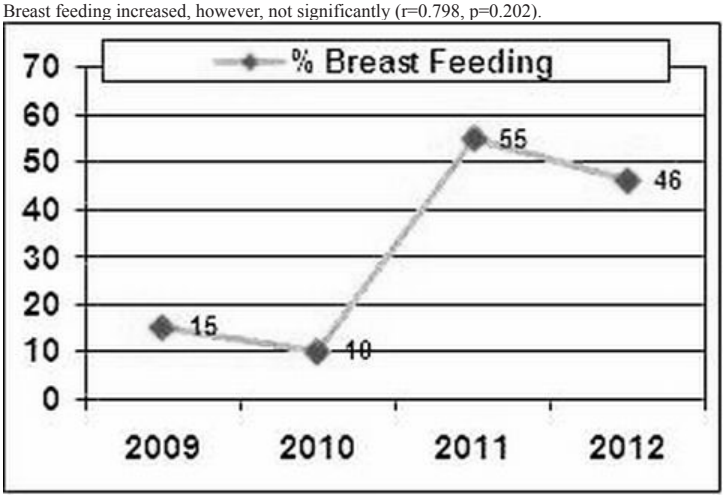
OBJECTIVE: Staff education using an alert system of unhealthy intestinal function that will impact on progression to severe NEC.

DESIGN/METHODS: Education of staff in importance of change in baseline physiology, gut health status, identification of normal gut XRAY pattern, and increased strategies to encourage breast milk feedings. Inborn infants <1500g were retrospectively examined over 3 ½ yrs. Statistical assessment with SPSS v.20 linear regression was used.

RESULTS: The rate of Stage II and III NEC was 25% in 2009 (N=56), 15.3% in 2010 (N=73), 12.3% in 2011 (N=56) and 0% through Oct 2012 (N=38). Average GA of NEC infants was 26.4 ± .4 weeks and BW of 847grams ± 52 grams. Change in GA (r = 0.239, p=0.261) or BW (r=0.181, p=0.397) was not significant. There was a significant decrease in frequency of NEC (r=0.961, p=0.039).



Breast feeding increased, however, not significantly (r=0.798, p=0.202).



CONCLUSIONS: These findings support the use of a multifaceted approach and early warning score tool that will reduce the incidence of severe NEC.

Acknowledgements:Gail Barker RN, JACKS Summer Scholars Fund and JACKS Summer Scholars Brian Wentworth and Melissa Haslam.

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Fellow in Training

Does Vitamin D Deficiency at Birth Affect the Risk and or Severity of Bronchopulmonary Dysplasia (BPD) among VLBW Infants

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BACKGROUND: Animal studies have highlighted a crucial role for vitamin D in regulation of lung growth and alveolar cell differentiation. Vitamin D is a mediator of epithelial mesenchymal cell interaction. In vitro studies demonstrated a role for vitamin D in synthesis and release of surfactant. Mice deficient in vitamin D had smaller lung volume and reduced number of alveoli compared to mice replete with vitamin D. Similarly, vitamin D was shown to play an important role in promoting alveolar type II cell proliferation, reducing apoptosis, and increasing alveolar count among rat pups who received postnatal supplements of vitamin D.

OBJECTIVE: To examine the effect of vitamin D deficiency on risk and severity of BPD in a cohort of VLBWI.

DESIGN/METHODS: VLBWI (BW ≤1250g) who had respiratory distress in the first 24 hrs of life were included. Serum levels of total 25 OH vitamin D were determined at birth and 21 days with HPLC tandem mass spectrometry method. Jobe and Bancalari's definition of BPD was used. Infants were divided into 2 groups based on presence (BPD+) or absence (BPD-) of BPD. All infants received daily IV vitamin D supplementation through parenteral nutrition. Vitamin D sufficiency was defined as >30 ng/ml, insufficiency as 10-30 ng/ml and deficiency as <10 ng/ml.

RESULTS: Thirty one infants were included; 7 infants died prior to 36 wks PMA. Mean (± SD) vitamin D levels increased significantly from day 1 (n=31) to 21 d of life (n=26) (13.90 ±7.43 ng/ml vs 40.54 ±21.64 ng/ml. p=0.000). At 21 days, 65 % of infants (17/26) were vitamin D sufficient. Twelve infants developed BPD: 4 had mild BPD, 7 moderate BPD and 1 severe BPD. Infants in BPD + group (n=12) had similar BW but lower gestational age compared to infants in BPD - group (n=12). [mean (±SD) 941.58 ±115.55 gm vs 854.58±315.27 gm, p=0.379 and 26±2weeks vs 28 ±2 wks, p=0.001, respectively]. Mean (± SD) levels of vitamin D on day 1 were comparable among infants with and without BPD (12.42 ± 7.12 ng/ml vs 16.83 ±8.13 ng/ml, p=0.388). Similarly, vitamin D levels on day 21 were similar between infants groups (mean±SD: 37.92±16.98 ng/ml vs 39±23.55ng/ml, p=0.900). Logistic regression analysis failed to reveal an association between vitamin D levels on day 1 and risk and or severity of BPD (P=0.228).

CONCLUSIONS: There was no association between levels of vitamin D at birth and risk and severity of BPD in this cohort.

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House Officer

Long Term Effect of Hypoxia on the Eya3 (Eyes Absent Homolog 3) Protein Expression in the Cerebral Cortex of Newborn Piglets

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BACKGROUND: EYA3 Tyrosine phosphatase specifically dephosphorylates Tyr^{142} of histone H2AX (H2AXY142ph). Tyr^{142} phosphorylation of histone H2AX plays a central role in DNA repair and acts as a mark that distinguishes between apoptotic and repair responses to genotoxic stress. Loss of Eya activity results in increased apoptotic cell death. Src kinase is linked to cell proliferation and differentiation. Previously we have shown that hypoxia results in increased activation of Src kinase in the cortex of newborn piglets.

OBJECTIVE: The present study aims to investigates the longitudinal effect of inhibiting the hypoxia-induced increased expression of Eya3 protein and tests the hypothesis that administration of a selective inhibitor of Src kinase, prior to hypoxia, will attenuate the hypoxia-induced expression of Eya3.

DESIGN/METHODS: Piglets were divided into 6 groups: normoxia (Nx, n=3), acute hypoxia (Hx, n=3), hypoxia followed by 1 day (Hx-1D, n=3) and 14 days (Hx-14D, n=3) in FiO_2 0.21, hypoxia-pretreated with selective Src kinase inhibitor (PP2, 1mg/kg i.v. 30 min prior to hypoxia) followed by 1 day (Hx+PP2-1D, n=3) and 14 days (Hx+PP2-14D, n=3) in FiO_2 0.21. Nuclei were isolated and expression of Eya3 was determined by Western blot using Eya3 antibodies. Band density was expressed as absorbance (OD/mm^2).

RESULTS: The expression of Eya3 was 108.9±10 in normoxia and 213.48±12 in hypoxia ($p < 0.05$). During recovery, expression of Eya3 was 253.5±39 in Hx-1D, 278.4±2 in Hx-14D, 153.5±46.9 in Hx+PP2-1D ($p < 0.05$ vs Hx) and 125.35±14 in Hx+PP2-14D ($p < 0.05$ vs Hx). The data show that following 1 day and 14 day after hypoxia, expression of Eya3 attenuated by the administration of Src kinase inhibitor.

CONCLUSIONS: Src kinase mediated expression of Eya3 following hypoxia persists for 1 day and 14 days in the Hx group, however, the hypoxia-induced increase in Eya3 expression was prevented by Src kinase inhibition on day 1 to day 14 in the hypoxia-pretreated with the Src kinase inhibitor group. Increased expression of Eya3 by dephosphorylating Tyr^{142} on histone protein H2AX will facilitate binding of DNA repair factors and increase the potential for DNA repair in the hypoxic brain that may result in increased cell survival. We propose that Src kinase inhibitors, by preventing H2AX Tyr^{142} phosphorylation, offer potential strategy for DNA repair in the hypoxic newborn brain. (NIH-HD-20337).

Fellow in Training

Is Pulse Oximetry (SpO_2) Screening for Critical Congenital Heart Disease (CCHD) Applicable among Low Birth Weight (LBW) Infants in a NICU Setting?

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BACKGROUND: Pulse-oximetry screening for CCHD is recommended by AAP and focuses on screening term neonates in well-baby nurseries. There are no data on SpO_2 screening values among LBW infants in a NICU setting.

OBJECTIVE: To assess feasibility and compliance of CCHD screening in a NICU setting and compare SpO_2 results between LBW and normal birth weight (NBW>2500g) infants.

DESIGN/METHODS: Routine SpO_2 screening for CCHD was implemented in the NICU in March 2012. An analysis of SpO_2 screening values was conducted over a 6 mon period as a QA project. Patients were screened at the time of discharge and was considered positive if any SpO_2 were < 90%, < 95% in both extremities or if there was a >3% absolute difference between right hand and foot.

RESULTS: A total of 358 infants were discharged in the 6 mon period. Results were available for 270 babies (75.4%). The compliance rate for this newly introduced screening in the NICU was 68% in the first month of introduction and improved to 92% by 6th month. Two infants failed the screening test, but had normal echo (false positive rate of 0.7%). Almost half of LBW infants had an echo performed for clinical indications. LBW infants had lower preductal SpO_2 values but similar false positive rate compared to NBW infants

Mean±sd	LBW < 2500g (n=182)	NBW > 2500g (n=176)
Gestational age (wk)	31.5±3.9*	38.3±2.3
Birth weight (g)	1570±507*	3337±581
Median Apgar scores (1 & 5 min)	7 and 8*	8 and 9
CCHD screen performed	136(74.7%)	134(76.1%)
Age at CCHD screen (d)	18±17*	10±10
Preductal SpO_2 screen	97.5±1%*	99.4±1%
Postductal SpO_2 screen	99.6±0.7%*	98.9±1%
Pre-post ductal SpO_2 difference	-2.32±0.48%*	0.2±0.2%
Echocardiogram for clinical indications	102 (56%)	76 (43%)
Discharged home on oxygen	29 (16%)	1(0.5%)
CCHD screen failures (false positive)	1 (0.74%)	1 (0.75%)

(*p<0.05 cf. NBW by Mann-Whitney U test).

CONCLUSIONS: Preductal SpO_2 range at discharge is lower in LBW infants compared to NBW infants.This QA project did not identify any new cases of CCHD but demonstrated a low false positive rate among LBW infants. Screening compliance improved over a 6 mon period with nursing education. A significant number of LBW patients in the NICU are evaluated with an echo for clinical indications. SpO_2 screening may be a beneficial tool to screen patients without an echo during their NICU course and needs to be validated in a large cohort of preterm/LBW neonates.

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Fellow in Training

Long Term Effect of Src Kinase Inhibition on Caspase-1 Activity Following Hypoxia in the Cerebral Cortex of Newborn Piglets

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BACKGROUND: It is known that caspase-1 participates in initiation of pyroptosis and the formation of the inflammasomes with end products IL-1, IL-18 and TNFa. Previously we showed that caspase-1 activity is increased following hypoxia and persist 14 days. Src kinase, a protein tyrosine kinase, is linked to cell proliferation and differentiation and is upregulated during hypoxia. We have also shown that Src kinase inhibition results in decreased activity of caspase-1 following hypoxia.

OBJECTIVE: The present study tests the hypothesis that inhibition of Src kinase, by a selective inhibitor, PP2, will prevent the activation of caspase-1 at 1 and 14 days after hypoxia in the cerebral cortex of the newborn piglet.

DESIGN/METHODS: Piglets were divided into: Normoxia (Nx, n=5), Hypoxia (Hx, n=5), Hypoxia day 1 (HxD1, n=5), Hypoxia day 14 (HxD14,n=5), Hypoxia pretreated with PP2 (1 mg/kg, IV 30 min prior to Hx) acute (Hx+PP2, n=5), day 1 (Hx+PP2-D1, n=2), day 14 (HxPP2-D14, n=5). Hypoxic piglets were exposed to FiO_2 0.07 for 1 hour. Tissue hypoxia was documented by ATP and phosphocreatine (PCr) levels. Caspase-1 activity in the cytosol was determined by spectrophotometry, using a specific substrate (Ac-Trp-Glu-His-Asp-AMC) for caspase-1.

RESULTS: ATP (µmoles/g brain) was 5.05±0.72 in Nx, 1.94±0.5 in Hx (P<0.05 vs Nx), 3.2±0.65 in Hx+PP2 (p<0.05 vs Nx, NS vs Hx) and PCr (µmoles/g brain) was 3.448±0.508 in Nx, 1.232±0.382 in Hx (P<0.05 vs Nx), 1.906±0.615 in HxPP2 (p<0.05 vs Nx, NS vs Hx). Caspase-1 activity (nmols/mg protein/hr) was 0.738±0.1 in Nx, 1.2±0.14 in Hx (p<0.05 vs Nx), 1.226±0.069 (p<0.05 vs Nx, NS vs Hx) in Hx day 1, 1.144±0.22 in Hx day 14 (p<0.05 vs Nx, NS vs Hx), 0.83±0.16 in Hx+PP2 (P<0.05 vs Hx, NS vs Nx), 0.964±0.0095 Hx+PP2-D1 (NS vs Hx), 1.079±0.2 Hx+PP2-D14 (NS vs Hx). The data show that caspase-1 was attenuated by the administration of Src kinase inhibitor following hypoxia but was not maintained on day 1 and day 14.

CONCLUSIONS: We concluded that hypoxia results in increased activity of caspase-1 in the cytosolic fraction of the cerebral cortex of the newborn piglets and the hypoxia-induced activation of caspase-1 is mediated by Src kinase. Since blockade by Src kinase inhibitor was not effective long term, we propose that multiple doses of the inhibitor will extend the effect of Src kinase inhibition on long term activation of caspase-1. (NIH 20337)

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Fellow in Training

Mechanism of Caspase-8 Activation Following Hypoxia in the Newborn Piglet Brain

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BACKGROUND: Caspase-8 is a Class I or initiator caspase that is activated in the early phase of apoptosis. Caspase-8 can activate downstream caspases that participate in programmed cell death. Previously we have shown that hypoxia results in increased activation of caspase-8 and increased activity of Src kinase in the cerebral cortex of newborn piglets.

OBJECTIVE: We tested the hypothesis that increased activation of caspase-8 in brain following hypoxia is mediated by Src kinase.

DESIGN/METHODS: Piglets were divided into 3 groups: Normoxic (Nx, n=5), Hypoxic (Hx, n=5), and hypoxic+PP2 (Hx+PP2, n=5). PP2 (4-amino-5-(4-chlorophenyl)-7-(dimethylethyl)pyrazolo[3,4-*d*] pyrimidine) is a selective inhibitor of Src kinase. Hx+PP2 piglets recieved 1mg/kg i.v. of PP2 30 min prior to hypoxia. Piglets in the Hx and Hx+PP2 group were exposed to hypoxia (FiO_2 0.07) for 1 hr. Hypoxia was confirmed by levels of ATP and phosphocreatinine (PCr). Caspase-8 activity in cytosol was determined spectrofluorometrically. Expression of caspase-8 was assessed by Western blot. The bands were measured by densitometry as optical density (OD/mm^2 and expressed as % of a standard Nx control.

RESULTS: ATP (µmol/g brain) was 5.07±0.72 in Nx, 1.95±1.01 in Hx (p<0.05 vs Nx), and 3.21±0.65 in Hx+PP2 group (p<0.05 vs Nx; p=NS vs Hx). PCr (µmol/g brain) was 3.45±0.51 in the Nx group, 1.23±0.38 in the Hx group (p<0.05 vs Nx), and 1.91±0.62 in the Hx+PP2 group (p<0.05 vs Nx; p=NS vs Hx). Caspase-8 activity (nmols/mg protein/hr) was 1.84±0.73 in the Nx group, 3.39±0.46 in the hypoxic group (p<0.05 vs Nx), and 2.05±0.45 in the Hx+PP2 group (p=NS vs Nx). Caspase-8 expression as % of control was 113±16 in Nx, 189±8 in Hx (n=2) (p<0.05 vs Nx), and 109±20 in the Hx+PP2 group (p<0.05 vs Hx; p=NS vs Nx). The data show that caspase-8 activity and expression are significantly decreased after hypoxia in the presence of the Src kinase inhibitor, PP2.

CONCLUSIONS: We conclude that the hypoxia-induced increased activation of caspase-8 in the cerebral cortex after hypoxia is mediated by Src kinase. Src kinase inhibition, by preventing CaM kinase IV activation and CREB phosphorylation, potentially decreases caspase-8 expression. In addition by blocking caspase-9 mediated caspase-3 activation, Src kinase inhibition, can prevent caspase-3 mediated activation of caspase-8. Thus, Src kinase inhibition presents a multipronged strategy for neuroprotection following hypoxia. (NIH 20337).

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Fellow in Training

Postnatal Growth in Infants with Neonatal Abstinence Syndrome

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BACKGROUND: While methadone is the treatment of choice for management of opioid dependence in pregnant women, methadone maintenance during pregnancy is associated with adverse infant outcomes such as preterm birth and low birth weight. Few studies have examined the effects of methadone and illicit substances on the post-natal growth of these infants.

OBJECTIVE: To examine the growth patterns in infants hospitalized for Neonatal Abstinence Syndrome (NAS).

DESIGN/METHODS: Retrospective analysis was performed of hospitalized infants over a four year period. The study included newborns exposed to either methadone or illicit substances in utero and who required treatment for NAS with Neonatal Morphine Solution. All infants were hospitalized for their care at Thomas Jefferson University Hospital (TJUH) for the duration of their treatment. Prenatal drug and medication use, duration of infant treatment and infant growth parameters until time of discharge were examined. Birth weight was analyzed in a multiple linear regression model. Postnatal weight (repeated measures per infant at 0, 7, 14, 30, 45, and 60 days) was analyzed in a linear mixed effects model.

RESULTS: There were 214 infants included over a time period of January 1, 2007 to December 31, 2010. Prenatally, 90% of mothers were on methadone, 14% of mothers used heroin, 15% cocaine, 9% marijuana, 24% benzodiazepines, and 43% were smokers. Infant birth weight was significantly affected by prenatal smoking (p=0.010) and heroin use (p=0.004) in the mothers. Postnatal weight gain was significantly affected in infants whose mothers had used benzodiazepines during pregnancy. This difference increased during the hospital stay (p< .001). While infants exposed to prenatal heroin showed poorer weight gain during the early part of their hospitalization, this difference decreased during the course of their stay. An initial significant difference in weight gain between infants treated and not treated with phenobarbital (an adjunct to neonatal morphine solution) decreased to zero (p<0.001) from day 0 to day 60.

CONCLUSIONS: Infants with NAS are at increased risk of low birth weight and poor weight gain in the postnatal period, particularly when maternal methadone use is combined with benzodiazepines, heroin, and smoking. While the rate of postnatal weight gain can recover with some substances, the use of prenatal benzodiazepines may put the infant at higher risk for poor weight gain during the first few months of life. Close follow up is warranted in this high risk population.

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Medical Student

The Use of the Laryngeal Mask Airway in the Difficult Neonatal Airway

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BACKGROUND: The Laryngeal Mask Airway (LMA)is a non invasive airway device used to deliver respiratory support. It can be used for the delivery of anesthesia, serve as a conduit for scopes, provide continuous positive airway support and can be used for both resuscitation and maintenence of the newborn airway.

OBJECTIVE: This retrospective study characterizes the use of the LMA in 14 neonates admitted to a tertiary Neonatal Intensive Care Unit during a ten period (2002 to 2011).

DESIGN/METHODS: All infants in whom the LMA was utilized for airway resuscitation or maintenance were included in the study. The study was approved by the IRB. The following parameters were evaluated: Indication for use of the LMA, Use of the LMA as resuscitation or maintenance, median gestational age and birth weight, length of stay, need for intubation or tracheostomy and outcome.

RESULTS: Of the 14 study patients 93 % of patients had micrognathia, 43% had Pierre Robin Sequence, 43% had multiple congenital anomalies, 5% had RDS, and 36% presented with skeletal deformities likely to affect respiration. The LMA was used for resuscitation in 37% of the patients, for maintenance of the airway in 42% and both in 21% patients. Median Birth Weight was 2333g (1045-4045), median Gestational Age was 33 weeks (29-41) and median length of stay was 74 days (21-265). 36% of these patients did not require intubation or tracheostomy. Median Length of use for resuscitation was 2 hours 10 minutes (15 mins - 9 hours). Median use for Maintenance of airway was 5 days (5 hours - 16 days). 86% of patients survived to discharge.

CONCLUSIONS: The use of LMA in infants with difficult airway may delay or avoid more invasive respiratory interventions such as intubation or tracheostomy. It is possible to maintain airway patency and ventilation for long periods of time and in smaller airways. The use of the LMA in the difficult neonatal airway allows tailoring of respiratory support to the individual patient based on their specific ventilation requirement. Because of the small number of patients in this study, further studies are needed to evaluate the efficacy of the use of the LMA in the difficult neonatal airway.

Poster Session I
Neonatal Epidemiology

Friday, March 22, 2013
6:00pm–7:30pm

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MCHAT Screen for Autism in Preterm Infants…Take the Next Step

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BACKGROUND: The AAP recommends administering a standardized autism specific screening tool to all children beginning at 18 months. The Modified Checklist for Autism in Toddlers (MCHAT) is a common screening tool for autism spectrum disorder (ASD) with 23 yes/no questions; 6 are "critical" questions. Studies show, up to 25% of preterm infants screen abnormally using the MCHAT. The high rate of abnormal screening has been attributed to the neurocognitive disabilities in preterm populations. The **S**tructured **F**ollow **U**p **I**nterview (SFUI) intended to improve specificity for the MCHAT was not utilized in any studies.

OBJECTIVE: To evaluate clinical and sociodemographic risk factors (RF) associated with false positive abnormal screenings for ASD in former preterm infants utilizing the MCHAT pre and post SFUI.

DESIGN/METHODS: This is a retrospective cohort analysis of former preterm infants screened at the Neonatal Regional Follow up Program whose guardians filled out an MCHAT at 24 months adjusted age (AA). Pre and post SFUI failed screening rates were determined. RF's for a failed screening pre and post SFUI were compared. Categorical variables were compared using chi square analysis and continuous variables were compared using a t test. P<0.05 is statistically significant.

RESULTS: There were 320 preterm infants screened for ASD over 4 years. The median gestational age at birth was 32 **weeks** [Range (R): 22-36]. The median AA at MCHAT screen was 24.5**months** (R: 20-30). The mean birthweight was 1692 grams ± 695 grams. 48(15%) of the preterm infants screened abnormally initially; after a SFUI, abnormal screens were reduced to 24 (7.5%). **Clinical variables** associated with a false positive screen: included:No enrollment in early intervention [no:12(80%) v yes:12(37%)]; or special education [no:19(68%) v yes:5(25%)]; a reduced amount of total abnormal responses [abnormal pre SFUI reverting to normal post SFUI v abnormal pre SFUI remaining abnormal] [median(R)] [4(3-12) v 7(3-15)]; and critical abnormal responses [0.5(0-3) v 2.5(0-6)] **Sociodemographic variables** associated with a false positive screen: sex [female:11(79%) v male:13(38%)] lower maternal age(29.8±4.9 v 33.3±5.6).

CONCLUSIONS: The SFUI is critical to reduce the rate of abnormal ASD screens by potentially up to 50% in preterm infants and reduce the number of referrals to rule out ASD. The child's identified developmental delays up to 1-2 years must be considered when evaluating their risk of a truely abnormal screening test.

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Improved Survival of Extremely Preterm Infants Is Dependent on the Level of Birth Hospital and the Timing of Transfer to the Regional Perinatal Center

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BACKGROUND: Extremely preterm infants' delivery at tertiary care centers increases survival & decreases morbidities. Little is known about the association of intact survival with community birth hospital level or timing of transfer to a Regional Perinatal Center(RPC).

OBJECTIVE: To examine the relationship of survival&intact survival(without severe intraventricular hemorrhage/periventricular leukomalacia) with birth hospital level of perinatal care & timing of transfer to the RPC.

DESIGN/METHODS: We compared survival&intact survival of infants ≤28 wks gestation(GA) born at RPC(inborn) with those transferred from referring hospitals(levels I, II-III NICU, outborn) between 1/1/06-12/31/11. We examined the association of survival & intact survival with birth hospital level(I, II, III) & timing of transfer(<48hrs, 48hr-7d, 7-28d, >28d). χ^2, Fisher & T- tests were used, p<0.05 was considered significant.

RESULTS: There were 492 inborn & 175 outborn infants, 9 level IV, 76 level III, 68 level II, 10 level I, 12 others(home/ER/out of state) deliveries. Inborn & outborn average birthweight, GA & length of stay were 826±273g(SD), 26±2wks & 64±46d vs 860±260g, 26±2wks & 64±56d respectively(NS). Within the 23wk outborns, those transferred from level III to RPC had higher survival than those from level II hospitals(survival=90% vs 29%;intact survival=60% vs 0%; p's<0.05). Of all 23-25wk outborn infants, survival was significantly better when transferred from level III than level II(87% vs 59%), but intact survival did not reach significance(65% vs 44%). For the 26-28wk group, survival(90% vs 95%) & intact survival(79% vs 85%) were similar for level III & II hospitals. Timing of transfer for 23-25wk group when transferred <48hrs vs 48hr-7d vs >7d from all referring hospitals was significantly associated with survival(69% vs 50% vs 89%), while the intact survival difference was not significant(53% vs 0% vs 68%). Similar trends were seen in the transfer timing of 26-28wk group with survival(92% vs 75% vs 90%,NS) & intact survival(81% vs 50% vs 77%,NS).

CONCLUSIONS: The level of perinatal care & timely transfer to an RPC matters most for the smallest preterm infants. Presence of a neonatologist at level II hospital is not sufficient without other key perinatal staff and ancillary services to close the gap in survival or intact survival of these infants when compared with birth at level III hospital prior to transfer to RPC.

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Undergraduate Student

Health Illiteracy in the NICU

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BACKGROUND: Health literacy is "the ability to obtain, process, and understand health information to make informed decisions about health care" (AHRQ: Health Literacy Universal Precautions Toolkit, April 2010). Health literacy involves using both prose literacy and numeracy to understand events and make knowledgeable health decisions. Poor health literacy among parents in the NICU may contribute to inadequate health communication during the hospital course and increased infant mortality/morbidity, especially among infants with complex medical disorders being discharged from the NICU.

OBJECTIVE: To determine health literacy rates in NICU parents.

DESIGN/METHODS: Health literacy was assessed using the Newest Vital Sign (NVS) in NICU parents </= 4 days of admission and within 5 days of discharge (n=83). A cohort of parents of non-NICU infants were assessed within 4 days of delivery (n=25). Parental demographics and infant health (SNAP) was ascertained. Race/ethnicity was by parental self-report. A Likert scale measured nurse's assessment of parental comprehension with discharge teaching. All parents were assessed using the English-language NVS and were eligible for entry if they expected and planned their health communications in English.

RESULTS: 37.3% of parents on admission and 24% at discharge had suspect health literacy status (p=0.026). By comparison, suspect health literacy for non-NICU parents was 20% at <4 days. Age, parent gender, or history of healthcare related employment did not affect NVS scores. Infant health was not correlated to NVS scores. Post-high school education increased health literacy (p=0.042), although 27.3% of parents with post-high school education had suspect health literacy status when measured within 4 days of admission. Self-identified Non-Black/Non-White Hispanics who chose to receive their NICU medical communication in English had an OR 6.42 (95%CI 1.16-37.07) for suspect health literacy status using the English version of NVS.

CONCLUSIONS: Poor and suspect health literacy rates are high among parents of newborn infants, especially in the NICU population (24-37%). There is risk that communication of medical concepts across all race/ethnicities during the hospitalization course and at time of discharge teaching may not be optimal. Given high baseline frequency rates of suspect health literacy, enactment of methods of improving health communication (e.g. "teach-back") may be a recommended universal strategy for NICUs.

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Outborn Very Low Birth Weight Infants Have Higher Rates of Early Intervention Enrollment Than Inborns

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BACKGROUND: Preterm newborns delivered in a tertiary care center (inborn) have improved survival and outcomes when compared with preterm newborns transferred to a tertiary center after birth (outborn), thus supporting the regionalization of perinatal care. However, little is known about neurodevelopmental outcome differences between inborn and outborn infants.

OBJECTIVE: To determine the neurodevelopmental delay significant enough to require therapeutic services of inborn vs. outborn very low birth weight infants (≤1500 g, VLBW) and morbidities associated with their developmental delays at 12± 2 months (m) corrected age (CA).
DESIGN/METHODS: This is a retrospective cohort study of former preterm children who were discharged from Maria Fareri Children's Hospital NICU (MFCH) and evaluated at the Follow-Up Program at 12± 2 m CA between February 2002 and September 2011. For analysis chi square, Fisher's exact and t- tests were used. A p value <0.05 was considered significant.
RESULTS: Of the 1142 infants evaluated, 517 were VLBW infants. Of these, 375 were discharged from MFCH with 306 inborns and 69 outborns. Mean birth weight was not significantly different (1242±447 g vs. 1128±440 g), but gestational age (GA) was (28.5±2.6 vs. 27.7±2.4 w, p=0.01) between the inborns and outborns respectively. The inborn group, qualified for and received significantly less early intervention services (EI, 58%) at one year of CA than the outborn group (74%, p=0.02). There was no difference in receipt of EI services between singleton and multiple gestations. However the outborn multiple subgroup had higher rates of requiring EI (92%) than the inborn multiples (53%, p=0.01). Medicaid as compared with private insurance was related with significantly higher rates of EI. Upon subgroup analysis, among the private insurance group, outborns had higher EI rates (83%) than the inborns (50%, p=0.01). Older maternal age, younger GA, 5 min APGAR score<7, caffeine treatment, infection, necrotizing enterocolitis, postnatal steroids and retinopathy of prematurity were significantly higher in patients who required EI (p's<0.05).
CONCLUSIONS: Our data suggest that VLBW outborn infants require more early intervention services than that of inborn babies. These findings support the importance for VLBW infants to be delivered at a tertiary care center for not only better survival but also better long term neurodevelopmental outcomes.

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House Officer

Perinatal Factors Associated with Increased Length of NICU Stay in Late Preterm Infants

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Pediatrics and Neonatology, Christiana Care Health System, Newark, DE; Pediatrics, Jefferson Medical College, Philadelphia, PA.

BACKGROUND: Nearly half a million neonates are born prematurely each year and 70% of these neonates will be considered late preterm, born between 34 – 36 6/7 weeks gestation. Though these newborns are near term, many require admission to the NICU and some for prolonged periods.
OBJECTIVE: To identify factors associated with increased length of stay (LOS) in the NICU in the late preterm population.
DESIGN/METHODS: Data were retrospectively obtained from infants between 34 – 36 6/7 weeks gestation at Christiana Care Health System, a regional level 3 NICU, from January, 2005 through December, 2009. A prolonged LOS was defined as those infants with a LOS in the upper quartile. Analysis was limited to perinatal variables, as postnatal variables may be part of the causal pathway for prolonged LOS, and are not useful for antenatal counseling. Statistical analysis included ANOVA, Chi-Square, and logistic regression. Variables were added into the multivariable model if they had a p<0.2 on unadjusted analysis or were known confounders for LOS.
RESULTS: The study sample included 1568 infants with median LOS of 9 days (Interquartile range 9- 13 days). Infants with prolonged LOS (n=398) had a lower gestational age (34.6 ± .8 vs 35.1 ± .8 wks, p<0.001), lower birthweight (2162 ± 467 vs 2448 ± 479grams, p<0.001), and were more likely to be born by cesarean delivery (59% vs 51%, p<0.01) compared to infants without prolonged LOS. There was also an increase in parity (2.4 ± 1.4 vs 2.2 ± 1.3, p=0.003), maternal smoking (22% vs 16%, p=0.004) and maternal drug use (13% vs 8%, p=0.004) in the prolonged LOS group compared to infants without prolonged LOS. After adjusting for gestational age, race, cesarean section, parity, clinical chorioamnionitis, smoking, drug use, antenatal antibiotics, antenatal steroids, and 5 minute Apgar ≤ 3, only gestational age (OR 0.43, 95% CI 0.37-0.51), cesarean section (OR 1.4, 95% CI 1.1-1.8), and maternal drug use (OR 1.6, 95% CI 1.0-2.6) remained independently associated with prolonged LOS.
CONCLUSIONS: In our large sample of late preterm infants, associations were identified among decreased gestational age, cesarean section, and maternal drug use with prolonged LOS. As late preterm infants are frequently admitted to the NICU, our data are useful for counseling parents regarding length of NICU stay and provide a sub-population to target for optimizing LOS.

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Fellow in Training

Assessment of Perinatal Regionalization: Antenatal Transfer of Mothers between 23 and 32 Weeks Gestation

Misty Melendi, Michelle Macheras, Scott Lorch.
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BACKGROUND: Previous data suggest delivery of premature infants at higher-level hospitals reduces neonatal mortality. Despite recommendations for regionalized care for infants and mothers, weakening of these systems occurred by the 1990s. Transfer of mothers admitted to lower level hospitals between 23 and 32 weeks gestation may function as an assessment of the degree of perinatal regionalization.
OBJECTIVE: To determine transfer rates of mothers admitted to level 1 or 2 hospitals between 23 and 32 weeks gestation and its association with different maternal complications, co-morbid conditions, and socio-demographic factors.
DESIGN/METHODS: Using California birth certificates linked to maternal and infant hospital records, we performed a retrospective, population-based cohort study of mothers hospitalized at level 1 or 2 hospitals between 1995 and 2009 with a gestational age between 23 and 32 weeks. Exclusion criteria included all infants with a major congenital anomaly and unavoidable deliveries occurring within 24 hours of admission. Logistic regression models assessed the association between antenatal transfer and maternal complications, co-morbid conditions, and socio-demographic factors after controlling for multiple admissions of the same mother.
RESULTS: Of 116,015 visits of mothers admitted to level 1 or 2 hospitals between 23 to 32 weeks, 5.4% were transferred from 1995 to 2009. While rates of transfer increased from 7.2% in 1995 to 13% in 2004, rates declined to 2.3% in 2009. After multivariable regression controlling for socio-demographic factors and medical conditions, the odds of transfer for a 23-32 week patient was 2.27 higher pre-2005 (95% CI 2.17, 2.44). At 23 weeks, we observed decreased odds of transfer (OR 0.76, CI 0.67, 0.86) with no statistical difference among other gestational ages. Many medical conditions were associated with transfer, including preterm labor (OR 2.89, 95% CI 2.71, 3.09) and premature rupture of membranes (OR 6.27, 95% CI 5.69, 6.92), while abruption was associated with lower odds of transfer (OR 0.34, 95% CI 0.26, 0.43). Hispanic mothers had significantly decreased odds of transfer as compared to white mothers (OR 0.81, 95% CI 0.76, 0.87).
CONCLUSIONS: Antenatal transfer of mothers between 23 and 32 weeks gestation from lower level hospitals continued to decline over time after peaking in 2004. These results suggest more preterm infants are born in lower level hospitals and regionalization continues to weaken.

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Fellow in Training

Early Introduction of Solid Foods to Premature Infants and Impact on Feeding Behaviors

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BACKGROUND: AAP recommends infants advance to solid food at 6 months and preterm infants advance when developmentally ready. Studies show preterm infants who start solids early are more likely to have feeding difficulties.
OBJECTIVE: To assess the importance of developmental readiness for solid food in premature infants and its impact on feeding behaviors and parental perception.
DESIGN/METHODS: Parents of premature infants completed the Feeding Behavior Questionnaire (FBQ; DeMauro et al) at NICU follow-up. The FBQ focused on demographics, developmental readiness, feeding avoidant behaviors, duration of feeding, age of solid introduction, and parental perception of infant feeding patterns. Parental perception was measured using the Andrews & Withey's Delighted-Terrible Scale. Data was analyzed using Student's t-test and χ^2 test.
RESULTS: Of 87 subjects, 41 were "developmentally ready" (DR)-no problems with head/neck control, sitting with support, sucking, swallowing and/or choking. 46 were "not developmentally ready" (NDR). Significant differences were noted in duration of feeding, parental comfort, parental stress and parental perception of child's eating habits. NDR infants displayed significant food avoidant behaviors.

DR and NDR Premature Infants

	DR, n=41	NDR, n=46	P value
< 28 weeks gestation, n(%)	9(22)	18(39)	0.08
< = 1500 grams, n(%)	24(59)	28(61)	0.82
Age recommended to start solids by pediatrician (gestation-adjusted), mean±SD (months)	3.8±1.8	4.0±2.4	0.75
Duration of feeding > 35 min, n(%)	6(15)	15(33)	0.05
Parental perception of feeding pattern	5.5(Pleased)	4.3(Mixed)	<0.001
Parental comfort with feeding	4.3(Sometimes comfortable)	3.3(Average)	<0.001
Parental stress with feeding	2.4(Relaxed)	2.9(Average)	0.02
Child's appetite	4.0(Good)	3.1(Average)	<0.001
Food Avoidance Behavior, n(%)			
Pushing food away	14(34)	32(70)	<0.001
Leaning back	14(34)	29(63)	<0.01
Turning head	23(56)	34(74)	0.08
Closing mouth	21(51)	30(65)	0.19
Gagging	9(22)	30(65)	<0.001
Holding food in mouth	13(32)	31(67)	<0.001
Spitting	21(51)	25(54)	0.77
Crying	9(22)	25(54)	<0.01

CONCLUSIONS: Pediatricians need to assess developmental readiness when considering introduction of solid foods for premature infants.

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Fellow in Training

Failure To Adjust for Gestational Age When Plotting Premature Infant Growth and Its Impact on Parental Satisfaction

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BACKGROUND: Growth patterns of preterm infants differ considerably from those of term infants with normal birth weights. The CDC recommends that gestation-adjusted age be used to plot a child's growth until 24 months of age.
OBJECTIVE: To compare parental perception of premature infant growth using gestation-adjusted age versus chronologic age plots.
DESIGN/METHODS: Parents of premature infants (3.5 – 24 months, chronologic age) were shown their infant's gestation-adjusted growth plots (GAGP) at NICU follow-up visits. They were then asked to complete a questionnaire about their impressions of their child's growth. Specifically, parents were asked if, at their most recent pediatrician (PCP) visit, they were informed about their child's growth percentiles and if these percentiles were based on GAGP. Parents then rated how they felt about their child's growth after the PCP visit and at the NICU follow-up using the Andrews & Withey's Delighted-Terrible Scale, a published 7-point self-report measure of satisfaction. Student's t-test and Fisher's exact test were used to compare ratings in the PCP and NICU setting, with statistical significance defined as p<.05.
RESULTS: 70 parents completed the questionnaire. 45 were informed of GAGP by their PCP

(informed parents), 16 were provided growth percentiles not adjusted for prematurity (uninformed parents), and 9 were not told about growth percentiles at all. Significant differences in satisfaction were noted between parents informed and uninformed of GAGP.

Parent Satisfaction with Growth Data Presented at PCP and NICU Follow-Up Visits: Effect of PCP Using Gestation Adjusted Age Plots by Parent Report

	Growth Data Adjusted by PCP for Gestational Age (n=45)	Growth Data Not Adjusted by PCP for Gestational Age (n=16)	p-value
Birth weight of infant, mean±SD (pounds)	2.9±1.1	3.2±1.3	0.35
Gestation-adjusted age of infant at visit, mean±SD (months)	11.6±7.1	10.4±5.7	0.51
# (%) of parents ≥*Mostly Satisfied* with growth data at PCP office	40 (89%)	8 (50%)	<0.01
# (%) of parents ≥*Mostly Satisfied* with growth data at NICU Follow-Up	44 (98%)	16 (100%)	0.74
# (%) of parents reporting satisfaction at NICU Follow-Up > satisfaction at prior PCP visit	10 (22%)	11 (69%)	<0.01

CONCLUSIONS: Contrary to CDC recommendations, many pediatricians (37%) did not provide parents with gestation adjusted growth data; this was associated with significantly lower parent satisfaction.

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Fellow in Training

Correlation of Growth Trajectory between Appropriate and Small for Gestational Age Infants to Their Neuro-Cognitive Outcome

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BACKGROUND: Preterm babies and high risk term infants requiring NICU admission are at increased risk of postnatal growth restriction. Babies born Small for Gestational age (SGA≤10%) either catch up in growth and become appropriate for age (AA>10%) or remain small for their age (SA≤10%). Babies born appropriate for gestational age (AGA>10%) remain AA or fail to thrive and become SA.

OBJECTIVE: The goal of this study is to compare the neuro-cognitive outcome with the growth trajectory between those born SGA and AGA.

DESIGN/METHODS: This is a retrospective study of patients who are seen at a Regional Neonatal Follow-up Program affiliated with a level IV NICU who had a Bayley III evaluation at approximately 36-42 months adjusted age. Patients are classified into four groups SGA at birth and SA or AA at the time of the Bayley evaluation; or AGA at birth and SA or AA at the time of their evaluation. Six comparisons were made utilizing independent sample t-tests to evaluate the impact of in utero growth vs postnatal growth upon the child's Bayley cognitive score. Conditions which may impact cognition were compared between SGA and AGA children utilizing chi square analysis for categorical variables and t-test for continuous variables. P<0.05 is statistically significant.

RESULTS: 68 babies who had a Bayley III evaluation were included. There were 10 SGA babies, 4 were SA and 6 were AA; 58 AGA babies, 8 were SA and 50 were AA. 63 babies were preterm and 5 were term, gestational age (GA): (24-39 weeks). Mean GA and birthweight were equal between SGA and AGA infants. SGA and AGA infants had equal likelihood of experiencing morbidities such as IVH, BPD, sepsis, ROP and an abnormal neurological exam at the time of their Bayley evaluation. If a patient was born SGA they had a significantly lower mean cognitive score compared to those born AGA (mean ± SD): 92.2 ± 4.4 v 99.7 ± 11.7.

At Birth → At Bayley	Bayley Cognitive score Mean ± SD
SGA→SA	91.3±4.8
V	
SGA→AA	93.0±4.5
AGA→SA*	93.1±7.5
V	
AGA→AA	100.2±11.3
SGA→SA	91.3±4.8
V	
AGA→SA	93.1±7.5
SGA→AA*	93.0±4.5
V	
AGA→AA	100.2±11.3
SGA→SA*	91.3±4.8
V	
AGA→AA	100.2±11.3
SGA→AA	93.0±4.5
V	
AGA→SA	93.1±7.5

*p<0.05

CONCLUSIONS: To be born AGA appears to be protective when maintaining normal postnatal growth. However, improved postnatal growth amongst SGA infants, does not correlate with a better cognitive outcome at 3 years of age.

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Fellow in Training

Cost-Effectiveness of Interventions To Improve Neonatal Mortality in Ghana

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BACKGROUND: Approximately 4 million infants die annually in the first 28 days of life. Most of these deaths occur in developing countries like Ghana. Limited resources pose a major barrier to implementation of interventions, such as expanding neonatology intensive care unit (NICU) services at a tertiary medical center, use of postnatal home visits, or use of trained traditional birth attendants (TBAs) that could improve neonatal survival.

OBJECTIVE: To estimate the incremental cost-effectiveness ratio (ICER) of 3 perinatal interventions towards reducing neonatal mortality in Ghana.

DESIGN/METHODS: We used a decision analytic model to determine the ICER of expanding NICU services at Korle-Bu Hospital, implementing postnatal home visits, or expanding the use of TBAs as compared to the current neonatal care standard in Ghana. Outcome probabilities for NICU expansion were obtained from a prospective cohort of 171 infants admitted at Korle-Bu Hospital in 2012 and the medical literature. Costs were estimated from daily resources used by the infants in 2012 dollars. Outcome probabilities for postnatal home visits were taken from the medical literature. Costs were estimated from the Ghana Community-Based Health Planning and Services Program. Outcome probabilities and costs of expanding the use of TBAs were estimated from the Zambia LUNESP study. The current neonatal care standard was assigned a value of 0. The effectiveness measure used was lives saved. Sensitivity analyses were performed to evaluate the robustness of the base-case estimates.

RESULTS: Compared to the current neonatal care standard, postnatal home visits, expansion of NICU services and training TBAs led to $24.35, $28.08 and $67.60 increase in cost per neonate and an ICER of $1790.44, $7832.33 and $5365.08 per life saved, respectively. The net marginal benefit was <$50,000 for each arm 97.5% of the time. Of the 36 variables included in the model, the ICERs were sensitive only to extreme drops in cost of NICU expansion, decreased number of infants needing NICU services, or increased cost of home visits, each of which made NICU expansion most cost-effective. In multi-way sensitivity analysis, home visits were the preferred option 59.8%, TBAs 34.9% and NICU expansion 5.4% of the time.

CONCLUSIONS: All options had net marginal benefit <$50,000. Postnatal home visits, as proposed by the WHO and UNICEF, was the most cost-effective intervention that may decrease neonatal mortality in Ghana, and possibly other developing countries with scarce resources.

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Clustering and Periodicity of Necrotizing Enterocolitis in a Single NICU over Two Decades

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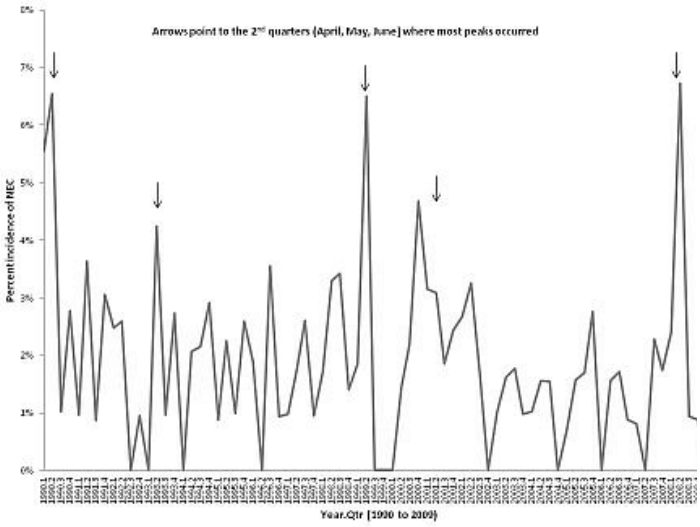
BACKGROUND: There are conflicting reports of periodicity and clustering in the incidence of necrotizing enterocolitis (NEC) probably due to demographic and practice variations in various NICUs. A long-term sample from a single tertiary NICU may be useful in clarifying this issue.

OBJECTIVE: To investigate temporal trends in periodicity and clustering of NEC over 2 decades within a single center.

DESIGN/METHODS: A retrospective cohort study was conducted at the Univ. of CT Health Center NICU from all infants admitted between Jan. 1990 and Jun. 2009. Infants with Stage II or III NEC were identified from prospectively collected databases. No exclusions were made. During the study -period, this NICU experienced changes in neonatal practice consistent with other centers in the US. NEC incidence was determined based on birth dates. Frequency distributions of NEC were determined based on calendar years, yearly-quarters and months of birth. Chi square tests were used to compare statistically significant changes in frequency.

RESULTS: There were 8806 infants admitted over the study periods of 19.5 years. The demographic profile of the admitted population showed no changes over time. Over the 2 decades of study, there were no trends in the yearly incidence of NEC. There were no trends noted when specific gestational age or birth-weight groups were studied. However, there was a significant increase in the frequency of NEC for the months of April, May and June; or the 2nd quarter of the calendar year (OR 1.85; $p < 0.004$ compared to 1st quarter; $p < 0.025$ compared to 3rd and 4th quarters). This clustering was seen in most calendar years studied. The periodicity of this peak was not predictable from year to year (interval periodicity) but all peaks within the study-period corresponded to the 2nd quarter of the calendar year (seasonal periodicity).



CONCLUSIONS: Peak incidence of NEC occurred in infants born in months of April, May and June. This clustering was largely consistent over the past two decades despite major changes in the management of infants in the NICU.

Poster Session I
Neonatal Infectious Diseases

Friday, March 22, 2013
6:00pm–7:30pm

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Role of Perinatal Factors and Genital Mycoplasmas (GM) in Necrotizing Enterocolitis (NEC)

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BACKGROUND: The etiopathogenesis of NEC in premature infants is largely unknown. Among perinatal factors involved in development of NEC the role of GM has been implicated (Okogbule-Wonodi, 2011) but other perinatal factors have not been studied.
OBJECTIVE: To investigate the association between GM, perinatal factors and the occurrence of NEC in premature infants.
DESIGN/METHODS: A retrospective cohort study was conducted from admissions to the University of CT Health Center NICU from 2004-2007 with maternal and infant cultures done for GM. As per the center's policy pregnancies with preterm labor had vaginal cultures for GM. Mothers were treated with macrolide antibiotics (Erythromycin or Azithromycin) for suspected or confirmed GM. Per NICU policy intubated infants had respiratory cultures for GM. These mother-infant dyads were studied for the occurrence of NEC during hospital stay. Univariate comparisons of risk factors for GM and NEC were done. Factors associated with GM were evaluated for their relationship to NEC using multiple logistic regression analyses.
RESULTS: During the study-period, there were 2855 admissions. Respiratory cultures for GM were done in intubated infants (n=556). Evaluation of NEC was limited to 365 infants who were ≤ 1500 gm birth weight (BW) and survived > 3 days. Comparisons were made of infants with or without GM +ve cultures.

	GM -neg;N = 303	GM+ve; N = 62	p value
Multiple Gestation N (%)	95 (32%)	11 (18%)	0.0283
Premature rupture of membranes N(%)	107* (36%)	38 (61%)	0.0002
Rupture of membranes > 12 hr N(%)	68* (28%)	27 (46%)	0.0100
Prenatal Macrolide use N(%)	8 (3%)	30 (48%)	0.0001
Prenatal steroid use N(%)	189* (63%)	38* (84%)	0.0055
C-section N(%)	240 (80%)	40 (66%)	0.0109
GA (wk) Mean ± sd	26.9 ± 2.1	25.7 ± 2.2	0.0004
BW (gm) Mean ± sd	938 ± 268	851 ± 261	0.0201

The risk for NEC was significantly higher in infants who were GM +ve(unadjusted OR 2.84; 95% CI 1.01-8.01; p = 0.0402) The association between GM + ve cultures and NEC remained significant after adjusting for BW and prenatal steroids (aOR 3.15; 95% CI 1.01-9.83; p = 0.048) or BW with prenatal treatment with macrolide antibiotics (aOR 4.61; 95% CI 1.50-14.18; p = 0.008). There were no significant differences in race, gender, Apgar scores and cord pH in infants with or without GM +ve cultures.
CONCLUSIONS: Premature infants ≤1500 gm BW born after maternal identification and management of GM and who survive beyond 3 days of age have a 3 to 4- fold increased risk for NEC.

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Reduced Neonatal Anti-Viral CD8$^+$ T Cell Responses Are Due to Intrinsic Defects of Neonatal CD8$^+$ T Cells

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BACKGROUND: There is little data on what controls immature immune responses and why neonates exhibit increased mortality to influenza virus. We have established an animal model using day 3 old mice to investigate the neonatal immune response to influenza.
OBJECTIVE: We have shown previously that primary CD8$^+$ T cell responses are reduced and delayed in neonates. Thus, we sought to determine if an intrinsic defect in neonatal CD8$^+$ T cells or the neonatal environment were responsible for the reduced anti-influenza virus CD8$^+$ T cell responses in neonates.
DESIGN/METHODS: Three day old neonatal mice were infected intranasally with WSN-OVA influenza virus, a virus that expresses the $OVA_{257-264}$ peptide; adult mice served as controls. At the time of infection, mice were given an intraperitoneal injection of purified OT-I cells, CD8$^+$ T cells that express a transgenic T cell receptor specific for the $OVA_{257-264}$ peptide. These OT-I cells were isolated from adult mice that were congenically mismatched with the neonatal mice so that donor cells could be distinguished from host cells. Mice were harvested at day 7 post infection, pulmonary lymphocytes were isolated and analyzed using flow cytometry. In addition, survival was tracked in comparison to control neonates who did not receive adult T cells.
RESULTS: Neonatal mice infected with influenza virus exhibit reduced anti-influenza CD8$^+$ T cell responses on day 6, 10 and 14 postinfection. In contrast, neonatal mice that received adult OT-I cells had a robust expansion of the $OVA_{257-264}$-specific CD8$^+$ T cells (54.1% versus 19.6% in the adults). Despite this expansion of virus-specific CD8$^+$ T cells in the neonate, the mortality remained the same as the control group.
CONCLUSIONS: We sought to demonstrate whether intrinsic defects in the neonatal CD8$^+$ T cells or extrinsic factors in the neonatal environment were responsible for a reduced and delayed expansion of virus-specific neonatal CD8$^+$ T cells, and ultimately, the high associated mortality after influenza infection. Our studies indicate that intrinsic defects of CD8$^+$ T cells in neonates are responsible for the reduced expansion of these cells. Further studies are needed to investigate the mechanisms responsible for these defects, which may allow us to develop novel therapeutic strategies against viral respiratory infections that enhance viral clearance, and reduce morbidity and mortality in neonates.

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Salivary Cytokine Analysis in Preterm Infants: Relationship to Early Delivery and Levels in the Well Full Term Infant

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Pediatrics-Neonatal Medicine, Children's Hospital of Richmond at Virginia Commonwealth University School of Medicine, Richmond, VA.

BACKGROUND: The mucosa-associated lymphoid tissue (MALT) assists in the protection of the respiratory and gastrointestinal tracts from pathogens. Salivary cytokines likely interact in oropharyngeal absorption of medications or colostrum during early immune development. As the immune response of the preterm infant is immature, we sought to investigate the level of un-stimulated salivary cytokine activity present in the preterm (PT) infant as compared to the healthy full term (FT) infant.
OBJECTIVE: To determine the maturity of cytokine response and relationship between cytokine levels in the well FT and PT infant.
DESIGN/METHODS: Eligible subjects were infants admitted to NYU Hospital whose mother consented to saliva study at the time of birth. This study was approved by NYU IRB. Saliva samples were collected using a sterile swab that was saturated with the infants saliva in a consistent standardized manner within 24 hours after birth. Samples were analyzed using multiplex Luminex system. Data were analyzed by single and multiple linear regression.
RESULTS: Thirty PT infants (mean GA 28.3 ± 43 weeks) and 19 FT infants (39.8 ±25 weeks) infant saliva samples were analyzed for interferon-γ (IFNγ), TNF-α, IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12, IL-17a, IP-10, sCD40L, and MCP-1. All PT infant samples had similar detectable levels. PT infant saliva was significantly related to elevated IL8 while IL4, IL10, IL12 and sCD40L were negatively correlated with prematurity, see Table 1.

pg/ml	**IL-10**	**IL-12**	**IL-4**	**IL-8**	**sCD40L**
FT Infant (N=19)	7.88	9.03	9.82	16.48	49.39
PT Infant (N=30)	3.49	3.05	4.04	156.61	20.94
p-values	0.04	0.039	0.046	0.004	0.019

CONCLUSIONS: Cytokine biomarker concentrations differ in the PT and FT infant saliva during the first 24 hours of life with a significant difference in specific cytokine levels using the multiplex cytokine analysis. This analysis identifies IL8 and sCD40L as factors that may have immune clinical roles in MALT for the PT infant that may warrant further investigations.

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T-Cells Are Preferentially Expressed Following Neonatal Hyperoxia in Adult Mice

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BACKGROUND: Prolonged exposure of newborn mice to O_2 produces changes similar to bronchopulmonary dysplasia (BPD) in infants. We have shown that neonatal hyperoxia alters cytokine response & induce lymphocyte infiltration of the lung in adult mice. Infants who survive BPD are susceptible to infections. We plan to test the hypothesis that oxidant stress from hyperoxia disrupts immunoregulation & produce changes in adaptive immune response in adult mice.

OBJECTIVE: To assess the adaptive immune response gene expression following neonatal hyperoxia in adult mice.

DESIGN/METHODS: Newborn litters were randomized at 3d to 85% O_2 or room air (RA) for 12d. On d15 following exposure, half were sacrificed & the rest were recovered in RA until 3 months (M). Whole lung mRNA was isolated in all the groups (N=4 in each group; RA & O_2 at 12d & 3 M). Gene expression by RT-qPCR was performed on a panel of genes representing T-cell / B-cell activation (SA Biosciences, MD). Data was analyzed by PCR array data analysis web portal. A fold change of 4 & $p < 0.05$ was considered significant.

RESULTS: 12d hyperoxia increased p21 expression & decreased expression of 23 genes representing T/B activation > 4 fold; three of them significantly (cd1d1, Il4 & rag1) compared to the RA group (Table 1). However, no differences were noted between the RA & O_2 groups at 3 M. Adult mice at 3 months decreased expression of p21 & increased expression of 11 genes, 6 of them significantly (cd28, cd40lg, cd3d, cd3e, Il27).

Increased in 12d O_2 Group	Fold Change	p Value	Decreased in 12d O_2 Group	Fold Change	p Value
Cdkn1a (p21)	6.4	0.002	Cd1d1	15.4	0.04
			IL4	6.3	0.02
			Rag1	4.9	0.01
Increased in 3M O_2 Group	**Fold Change**	**p Value**	**Decreased in 3M O_2 Group**	**Fold Change**	**p Value**
Cd28 / Cd40lg	5.1	0.01	Cdkn1a (p21)	4.3	0.002
Cd3d	4.2	0.002			
Cd3e	8.0	0.03			
IL27	4.6	0.004			
Tnfsf13b	5.2	0.01			

CONCLUSIONS: Adult mice exposed to neonatal hyperoxia, preferentially increased expression of genes involved in T-cell activation, differentiation & proliferation. Selective T-cell proliferation may be due to decreased expression of p21, an inhibitor of cell proliferation. This suggests that p21, a cell cycle regulator may play a critical role in immune function, confering proliferation advantages to T-cells over B-cells in adult mice following prolonged stimulation by O_2 in the newborn period. This may have implications following BPD in premature newborns prone to infections.

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House Officer

Outcomes Associated with Different Antibiotic Regimens for Necrotizing Enterocolitis

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Pediatrics, Columbia University Medical Center, New York, NY; Infection Prevention & Control, NY-Presbyterian Hospital, New York, NY; Pediatrics, Cornell Medical Center, New York, NY; Pediatrics, Children's Hospital of Philadelphia, Philadelphia, PA; Pediatrics, Christiana Care Health Services, Newark, DE.

BACKGROUND: Necrotizing enterocolitis (NEC) is a serious disease in the neonatal intensive care unit (NICU). Complications include bacteremia, stricture formation and neurodevelopmental impairment. There is limited evidence about the efficacy of various antibiotic regimens in the treatment of NEC and the prevention of this disease.

OBJECTIVE: To describe the outcomes associated with different antibiotic regimens for NEC.

DESIGN/METHODS: A retrospective study of antibiotic use for NEC was conducted in four level III NICUs from May 2009-April 2012. NEC classification was based upon attending neonatologist documentation of diagnosis of and treatment for NEC, or fulfillment of the National Healthcare Safety Network definition for NEC. Management was analyzed based upon number of drugs, days of therapy, anaerobic coverage, dual coverage for Gram negative bacteria, and use of vancomycin and 3rd generation cephalosporins. Outcomes analyzed were mortality, progression to surgery, and blood stream infection (BSI) that occurred from initiation of therapy until 10 days of the end of treatment for NEC. Univariate analysis was performed using chi-squared or Fisher's exact test for categorical variables and Wilcoxon rank sum test for continuous variables. Multivariable analysis was performed using logistic regression. Differences between centers were also compared.

RESULTS: 144 patients with NEC were identified, of whom 100 had birth weight <1500g. Common regimens included ampicillin or vancomycin with gentamicin, +/- use of anaerobic coverage, or use of vancomycin and piperacillin/tazobactam. In univariate analysis, no single or combination of antibiotics was associated with death or subsequent BSI. In multivariable analysis, no single or combination of antibiotics was associated with death, progression to surgery or subsequent BSI. As expected, sicker infants, as indicated by both surgical intervention and duration of antibiotic for >7 days, had an increased odds of death independent of antibiotic regimen used.

CONCLUSIONS: We found great diversity in antibiotic prescribing practices for NEC, both within and between sites. Choice of regimen was not associated with decreased incidence of blood stream infection, progression to surgery, or death. Evidence-based guidelines remain an elusive goal for antimicrobial treatment for infants with NEC.

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Medical Student

Predictors of Infections with Gram-Negative Bacilli in Neonatal Intensive Care Units and Antibiotic Susceptibility Patterns

Nicole Green, Sarah A. Clock, David Paul, Jeffrey Perlman, Theoklis Zaoutis, Yu-hui Ferng, Luis Alba, Elaine Larson, Lisa Saiman, Sameer Patel.
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BACKGROUND: Antibiotic resistance among gram-negative bacilli (GNB) is of increasing concern in neonatal intensive care units (NICUs).

OBJECTIVE: Determine predictors of GNB infections in the Neonatal ICU and antibiotic susceptibility patterns.

DESIGN/METHODS: We performed a prospective study of GNB infections in 4 level III NICUs from May 2009 to April 2012. Eligible infants were admitted <7 days of age and hospitalized ≥ 4 days. Eligible GNB infections were those that occurred >3 days of age in a sterile body site or a non-sterile site with clinician documentation of infection plus treatment with intravenous antibiotics. Each site performed microbiologic identification and susceptibility testing. Multivariable Cox proportional hazards regression was used to identify predictors of time to first gram-negative infection.

RESULTS: Among 5398 eligible infants, 172 GNB infections occurred in 141 (2.6%) infants. The rate among infants birth weight (BW) ≥2500 grams, 1500-2499 grams (low BW), < 1500 grams (very LBW), and <1000 grams (extremely LBW) was 1.27, 0.84, 1.00, and 2.09 per 1000 patient-days, respectively. Blood stream infections (BSIs) and urinary tract infections (UTIs) were most common (n=65, 38% and n=81, 47%, respectively). Respiratory (n=17, 10%), skin/wound (n=10, 5.8%) and central nervous system (n=1, 0.6%) infections were rare. Few isolates were non-susceptible to gentamicin, third generation cephalosporin agents, piperacillin/tazobactam, or carbapenem agents (13.9%, 9.8%, 8.2% and 0% respectively) and the proportions of non-susceptible isolates were similar among sites. Independent predictors for GNB infections were birth weight (BW) < 1000 grams or extremely low birth weight (ELBW) [HR 1.82, p=0.02] and use of mechanical ventilation [HR 3.50, p<0.01]. Low birth weight (LBW) [HR 0.73, p<0.01], very low birth weight (VLBW) [HR= 0.88, p=0.01], and antibiotic exposure (per day) [HR=0.99, p=0.03] had decreased risk for gram-negative infection.

CONCLUSIONS: In this study population, GNB infections were relatively rare as was non-susceptibility to selected agents. ELBW infants and full term infants with comorbid conditions requiring NICU hospitalization were at greatest risk of GNB infections. Future efforts should continue to monitor antimicrobial resistance.

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Fellow in Training

Effect of Hyperoxia Exposure on T-Lymphocyte Maturation, Differentiation and Function in Neonate Mice

Angela Leon-Hernandez, Hardik Patel, Michelle Bodgan, Lyndsey Manoff, Sharif Younis, Barbara Sherry, Mohamed Ahmed.
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BACKGROUND: The immune response in premature infants has been proving to be defective at different levels. T cell response in neonates is suboptimal with a reduce ability to proliferate and synthesize cytokines. Very early in gestation, the down regulation of the innate immune response is significantly greater than in term infants and contributes to the greatly increased infection rate, which contribute to the pathogenesis of common adverse outcomes of prematurity, including chronic lung disease and neuro-developmental impairment. Oxygen is the most common therapy used in NICU and the potential effect of hyperoxic exposure has become a focus of concern. To our knowledge, the relation between hyperoxia exposure and T-lymphocytes differentiation and function in neonatal period has not been evaluated before.

OBJECTIVE: Studying hyperoxia impact on thymus micro-environment development and T cells differentiation and function.

DESIGN/METHODS: Wild neonatal mice (P2) were housed either at room air (FiO_2 21%), or hyperoxia (FiO_2 95%) for five days. After exposure, thymus was extracted, stained with specific T Cells markers (CD45, CD4, CD8) and analyzed using Flow Cytometry. For T cell proliferation, neonate mice in both environment were injected with BrdU on 4th day after exposure (0.5mg/animal IP), and 24hr later, thymus was extracted, fixed, stained with anti-BrdU and appropriate specific antibodies and analyzed using flow cytometry. To asses T-reg cells maturation, neonate mice were injected with anti-CD3 antibody (1mg/kg IP) on 2nd day of exposure, thymus was harvested 3 days later. CD4+ve cells were stained for internal protein FoxP3 and analyzed using flow cytometry.

RESULTS: There was no significant difference in total number of T cells between studied groups. Among T cell subpopulation, there was significant decrease of CD4+ cells in hyperoxic compared to normoxic group ($P<0.05$). For T cell proliferation, there was significant reduction of BrdU incorporation in all T cell population (CD4+, CD8+ and double +veCD4/CD8 cells). T-reg cells (CD4+/FOXP3+) was also significantly lower in hyperoxic neonate mice compared o normoxic ones ($P<0.05$).

CONCLUSIONS: Acute hyperoxia has direct inhibitory effect on T-cell proliferation, differentiation and maturation which directly impact on T-cell functional maturation in neonates.

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Fellow in Training

Central Line Associated Blood Stream Infections (CLABSIs) in Neonates: A Comparison of Tunneled, Peripherally Inserted and Umbilical Lines

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Children's National Medical Center, Washington, DC.

BACKGROUND: CLABSI is a major health problem with high morbidity and mortality in sick newborns. Despite successful preventive measures, eliminating CLABSI remains a challenge nationwide. Identification of risk factors and the population at risk is useful in preventing CLABSIs.

OBJECTIVE: To study patients' characteristics and CLABSI rates based on CL type in neonates admitted to NICU.

DESIGN/METHODS: We followed a cohort of neonates admitted to CNMC NICU from 01/2008 to 06/2010, who had at least one CL. These neonates were monitored for development of lab confirmed CLABSI as defined by CDC National Healthcare Safety Network. Patient characteristics including sex, gestational age (GA), birth weight (BW), NICU stay, CL type and dwell time were collected. In patients who had BSI, cultured organisms were documented. CLs were divided into 3 groups (tunneled(Broviacs), peripherally inserted central catheters (PICCs), and umbilical lines (UL)). BSI rates were calculated for each CL based upon 1000 days of CL.

RESULTS: There were 1450 CLs in 851 neonates during the study. There were 55.8% males, median GA was 35 weeks (mean 33.3 ± 5.8 SD). Median BW was 2245.5 grams (2176.1 ± 1136.4). Median CL dwell time was 11 days (19.2 ± 23.8). No BSI was reported in 97.5% of CLs. There were 36 cases of BSI in 21 patients. Neonates with BSI had smaller GA (28 ± 4.2 vs. 33.4 ± 5.8 weeks, $p<0.009$), lower BW (1376.5 ± 1089.1 vs. 2195.9± 1131 grams, $p<0.001$), longer CL dwell time (42.8 ± 34.5 vs. 22.1 ± 26.8 days, $p<0.001$), and longer NICU stay (96.5 ± 88.4 vs. 39.2 ± 43.5 days, $p<0.0001$). PICC dwell time was significantly longer in BSI group in comparison to the rest of cohort (43.3 ± 29.3 vs. 24.9 ± 22.6 days, $p<0.0001$). Kaplan-Meier Analysis showed no statistically significant difference between time to CLABSI in neonates who had Broviacs or PICCs (Log Rank=0.31, p=0.576). BSI rate was 1.23(95% CI 0.74-1.92) for PICCS, 1.23(0.50–2.54) for ULs, and 1.55(0.74–2.86) for Broviacs. Gram Negative Rods (GNR) consisted 36.1% of BSI cases, followed by Staph Aureus (33.3%).

CONCLUSIONS: CLABSI occurred more frequently in premature, LBW neonates, who had lengthy NICU stay. PICC lines stayed significantly longer in neonates who had BSI in comparison to neonates who did not. There was no statistically significant difference between time to CLABSI in neonates who had Broviacs or PICCs. GNRs were associated with 1/3 of BSI episodes.

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Fellow in Training

A Mouse Model for Adhesion of *Candida Parapsilosis* to Endothelial Cells

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BACKGROUND: Systemic candidiasis is the third most common cause of neonatal sepsis and leads to substantial morbidity and mortality. *Candida albicans* is the most frequent species involved, but *Candida parapsilosis* is uniquely prevalent in this population, having been identified in up to 50% of cases in some centers. Adhesion of *C. albicans* to endothelial surfaces is key in the pathogenesis of candidiasis, but little is known about *C. parapsilosis* interaction with endothelial cells. Preliminary data from clinical isolates suggest that different strains of *C. parapsilosis* exhibit different adhesive phenotypes when in contact with human endothelial cells *in vitro*.

OBJECTIVE: We evaluated the utility of a mouse model to interrogate the adhesion profile of *C. parapsilosis* by studying the early distribution of fungal elements in different organs after simulated hematogenously disseminated infection.

DESIGN/METHODS: A clinical isolate of *C. parapsilosis* that exhibits efficient adhesion to human endothelial cells *in vitro* was administered by tail vein injection to 4-6 week old BALB/c female mice. Mice were euthanized 15 minutes after the injection to capture the initial phases of adhesion to tissue endothelium. Organs including spleen, kidney, liver, lung, brain and ears were harvested, homogenized and plated and the fungal load was quantified in each organ. Tissue burden was compared and histological analysis is underway to determine the distribution of fungal elements.

RESULTS: After intravenous injection, the adhesive strain of *C. parapsilosis* was easily detected in all organs, but the fungal burden varied widely. The highest fungal loads were detected in the lung and the spleen with the brain being relatively spared. Fungal colony counts in the brain were 100-fold lower than the rest of the organs with intermediate counts for kidney and liver. Yeast were also detected in the ear.

CONCLUSIONS: These observations provide the basis for a novel animal model to study the adhesive properties of *C. parapsilosis in vivo* and the early interaction of *C. parapsilosis* with endothelial cells. Additionally, the presence of yeast elements in the ear and the ear's transparent nature provide the opportunity for real-time investigation of yeast-endothelium interactions using intravital microscopy.

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Decreased Central Line Associated Blood Stream Infection Rate after Addition of a Disinfecting IV Access Port Cap to a Central Line Bundle

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George, Joanne Fox, Robyn Harvey, Gary Stahl.
Pediatrics/Neonatology, Cooper University Hospital, Camden, NJ;
Patient Care Services, Cooper University Hospital, Camden, NJ.

BACKGROUND: Central line associated blood stream infection (CLABSI) is a complication of the use of central lines in neonatal intensive care units (NICU) and is a major contributor to mortality, morbidity, length of stay and cost in this population. The use of central line care bundles has been shown to decrease CLABSIs. We report on our CLABSI rate after the introduction of a comprehensive central line bundle and after addition of a disinfecting IV access port cap to the bundle. The port cap is impregnated with 70% isopropyl alcohol (Curos® Port Protector Caps, Ivera Medical Corp, San Diego, CA).

OBJECTIVE: To determine if the addition of a disinfecting IV access port cap would decrease the CLABSI rate when combined with a comprehensive central line care bundle.

DESIGN/METHODS: Retrospective cohort study in a single, 35 bed level IIIB NICU comparing the CLABSI rate per 1000 line days prior to and after the introduction of a comprehensive central line bundle and before and after the addition of a disinfecting IV access port cap to the care bundle.

RESULTS: In the three years prior to the introduction of the central line care bundle (2009-11), there were 27 CLABSIs in 6654 line days for a CLABSI rate of 4.1/1000 days. The comprehensive central line care bundle was introduced at the beginning of 2012. During the first 3 months of 2012, there were 2 CLABSIs in 411 line days for a rate of 4.9/1000 days. In the 7 months since the addition of the disinfecting IV access port caps on 4/1/12, there have been no CLABSIs in 691 line days for a rate of 0/1000 line days. Although the trend is encouraging, the decreased CLABSI rate during the 7 months since the addition of the caps is not statistically significant (Chi-square, p=0.092) compared to the CLABSI rate during the 39 months before introduction of the caps. Prior to the use of the caps, 29 of 372 infants with a central line had a CLABSI compared to 0 of 67 infants since cap use began (RR 0.10, 95% CI 0.006 to 1.62, p=0.105, NNT=13.8).

CONCLUSIONS: The addition of a disinfecting IV port access cap to a comprehensive central line care bundle appears to have decreased the CLABSI rate in our NICU. Since a NICU CLABSI costs between $6,000 and $12,000, disinfecting IV access port caps, which cost about $1 per line per day if changed daily, may be a cost-effective means of decreasing CLABSIs. Data collection is ongoing.

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Fellow in Training

Methicillin Resistant *Staphylococcus Aureus* (MRSA) and the Individual Room Neonatal Intensive Care Unit

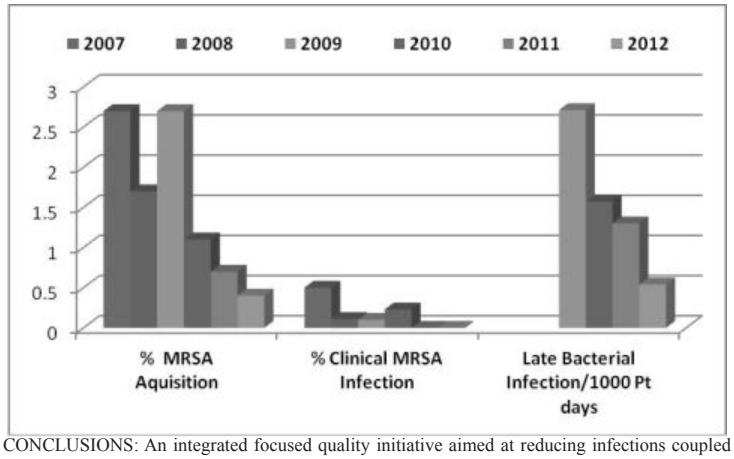
Tazuddin A. Mohammed, Jose L. Munoz, Russell R. Moores, Jr.,
Jie Xu, Sharon A. Cone, Janis Faye Ober, Susan Collins Lewis,
Michael B. Edmond, Karen D. Hendricks-Munoz.
Pediatrics, Division of Neonatology, Children's Hospital of Richmond at VCU, Richmond, VA; Pediatrics, Division of Infectious Diseases, Children's Hospital of Richmond at VCU, Richmond, VA; Department of Infection Prevention, Children's Hospital of Richmond at VCU, Richmond, VA.

BACKGROUND: MRSA and late bacterial infections are significant clinical risks in the Neonatal Intensive Care Unit with associated morbidity. In 2008 the NICU moved from the large communal NICU to a 40 bed individual room NICU design. Additionally, in an effort to address central line associated blood stream infection and MRSA colonization, a sequence of hospital wide initiatives were introduced.

OBJECTIVE: To determine whether a single bed construction NICU design coupled with an intensive quality infection reducing initiative decreases MRSA and overall nosocomial infections.

DESIGN/METHODS: An analysis of prospective infection events that occurred pre and post move to a single construction NICU coupled with an intensive quality initiative that included hand hygiene, hygiene monitors, staff education and weekly MRSA and nosocomial infection surveillance of all infants admitted to the CHoR NICU at VCU between 1/2007 and 10/2012.

RESULTS: During the study period 1789 infants were admitted to the CHoR NICU of which 55% were preterm<37 weeks gestation, 85% were inborn and 96% received prenatal care. There was no significant change in acuity in the NICU. (% acquisition=# that acquired MRSA after initial negative screen).



CONCLUSIONS: An integrated focused quality initiative aimed at reducing infections coupled with the use of an individual bed design NICU facility has been associated with a decrease in MRSA colonization and late clinical bacterial infection in the NICU. These findings will be used to assess initiatives to sustain bacterial infection reductions in the NICU.

Poster Session I
Neonatal Fetal Nutrition

Friday, March 22, 2013
6:00pm–7:30pm

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Fellow in Training

Growth Patterns in Extremely Low Birth Weight Infants Fed Donor Breast Milk: A Single-Center Study

Laura Madore, Tina Jumani, Sarbattama Sen.
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BACKGROUND: Breast milk (BM) is the recommended form of nutrition for preterm infants. Human donor breast milk (DBM) is an alternative when BM is unavailable. DBM may offer many of the same benefits as mother's own milk, but may not adequately support infant growth. Slow weight gain in premature infants has been linked to poorer neurodevelopmental outcomes. In 2010 our NICU implemented a donor breast milk policy; eligibility guidelines include infants born ≤1,000 grams, or multiples when at least one is ≤1,000g, in whom mother's BM is unavailable or in low quantities.

OBJECTIVE: The objective of this study was to determine the effects of DBM on growth patterns in extremely low birth weight infants compared to infants that were fed either mother's own milk or preterm formula.

DESIGN/METHODS: This study was a retrospective, single-center cohort study approved by Tufts Medical Center IRB. Twenty-six preterm infants were fed DBM. Birth-weight and gestational age matched controls were then divided into two feeding cohorts: contemporaneously fed mother's own milk (MOM, n=26) and historical formula fed (FF, n=26). Growth rates, time to full feeds, time to regain birth weight, and any associated morbidities were compared using t test and chi squared analysis.

RESULTS: DBM infants gained less weight compared to infants fed MOM or FF in the first 30 days of life (mean in grams/kg/day ± SD): DBM 15.9 ± 4.0 vs. MOM 23.3 ± 4.0 and FF 21.7 ± 4.6.

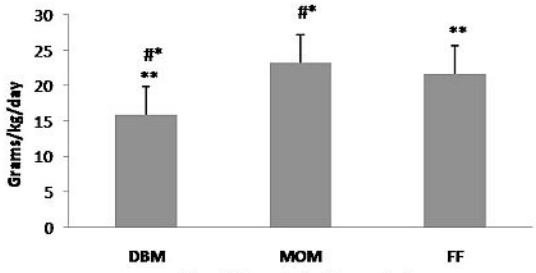

Figure1: Comparison of growth (grams/kg/day) between feeding groups in the first 30 days of life. Data is shown as mean ± SD. #* indicates p<0.001 DBM vs MOM and ** indicates p<0.001 DBM vs FF.

There was no statistically significant difference in time to reach full feeds, regaining birth weight, necrotizing enterocolitis or any other morbidities. The overall cost for donor milk in these 26 infants was $5,000 versus $925 for the same amount in preterm formula.

CONCLUSIONS: In our center, growth rates of preterm infants fed DBM are significantly less than infants fed BM or formula in the first month of life. Given the strong association between early weight gain and improved neurodevelopmental outcomes, the potential effects of DBM feeding on long-term outcome must be examined.

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Metabolic Bone Disease Remains Common in Infants with Moderate to Severe BPD

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BACKGROUND: Infants with brochopulmonary dysplasia (BPD) have multiple risk factors predisposing them to bone demineralization and metabolic bone disease (MBD). Most descriptions of MBD in this population are from an earlier era.

OBJECTIVE: To evaluate the incidence and severity of MBD in infants with BPD followed by the Neonatal Chronic Lung Disease (NeoCLD) Program at The Children's Hospital of Philadelphia and examine factors that may correlate with severity of bone disease.

DESIGN/METHODS: A retrospective review was conducted of all infants with gestational age (GA) <32 weeks and birth weight (BW) <1500g followed by the NeoCLD program between Sept. 2010 and Oct. 2012. MBD was classified as follows: (1) Absent; (2) Mild: Laboratory abnormalities only (serum Phosphate <5.5 mg/dL and alkaline phosphatase >400 U/L, or only one of these with PTH >130 pg/mL or 25 $(OH)_2$VitD level <20 ng/mL); (3) Moderate: Radiographic evidence of bone demineralization; or (4) Severe: fracture(s). We hypothesized that the following factors may correlate with MBD: GA, BW, SGA (<10th percentile for GA), failure to thrive upon admission to the program (<10th percentile for post-menstrual age (PMA)), and severity of BPD classified by NIH consensus definition. Logistic regression was used to compare these factors with severity of MBD.

RESULTS: We identified 83 patients with mean GA 26 weeks (range 23-30) and BW 757g (range 420-1390). Mean PMA on admission was 39.5 weeks (range 27-54). Thirty (36%) were SGA at birth however 41 (49.4%) had failure to thrive by admission (p=0.04). All but 3 (moderate) had severe BPD. MBD was common (90.4%), with 6 (7.2%) categorized as mild, 50 (60.2%) as moderate, and 16 (19.3%) as severe. By univariate analysis, only decreasing GA (p=0.003) and BW (p=0.018) correlated with increasing MBD severity. In the multivariate model only GA remained significant (p=0.05). Neither SGA, nor Failure to thrive on admission correlated with severity of MBD. Due to the homogeneity of BPD, we could not evaluate for association with MBD.

CONCLUSIONS: MBD was common, frequently with a high degree of severity, in this series of infants with moderate to severe BPD. Lower GA was the only factor found to correlate with severity of MBD. Further research to identify predictors and therapies for MBD in this at risk population is needed.

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Fellow in Training

Analysis of Expressed Breast Milk (EBM) Protein Content Predicts Accumulated Protein Debt after Preterm Birth

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Newborn Medicine, Floating Hospital for Children, Tufts Medical Center, Boston, MA.

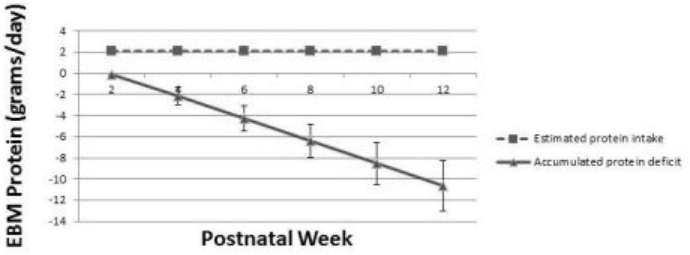
BACKGROUND: EBM fortification for preterm infants assumes equal EBM protein content using published mean protein values. Studies show that EBM protein content is highly variable between mothers and is often below published levels. Since EBM protein actually decreases with advancing weeks of lactation the current approach may result in significant protein debt over time.

OBJECTIVE: To determine if measured EBM protein content defines a significant degree of accumulated protein debt over time after preterm birth.

DESIGN/METHODS: The Julie Z7 milk analyzer (Scope Electric Ltd, Germany) was used to determine EBM protein content at day of life (DOL) 10 and every 2 weeks thereafter from mothers of 5 preterm infants at 24-29 6/7 weeks gestational age at birth. The anticipated protein debt based on milk analysis was calculated up to 12 weeks postnatal age and compared to presumed protein intake using current published mean EBM protein levels (1.4 g/dl).

RESULTS: EBM protein content was 1.3 g/dl ± 0.04 (mean ± SD) at DOL 10 which is 7% below published estimates for EBM protein content. Assuming protein content from EBM analysis is not utilized but current published mean EBM protein levels are used for protein fortification, Figure 1 demonstrates anticipated cumulative protein debt over time (solid line) versus presumed EBM protein intake (dashed line) in infants receiving 150 ml/kg/day of EBM. These five infants will accumulate an average protein debt of 10.6 g by 12 weeks postnatal age.

Figure 1: Estimated Protein Intake and Cumulative Protein Deficit (based on EBM 150 ml/kg/day)



CONCLUSIONS: Without use of specific EBM protein analysis, preterm infants will accumulate significant protein debt over time, potentially compromising growth and neurodevelopment. We speculate that individualized EBM fortification may better optimize nutrition and facilitate ideal growth and neurodevelopmental outcomes in preterm infants. A prospective, randomized, blinded and gestational age stratified trial is underway to test this hypothesis.

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Initiating 20 cal/oz vs 24 cal/oz Preterm Formula Feeds in Very Low Birth Weight Infants: Impact on Feeding Tolerance and Necrotizing Enterocolitis

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Pediatrics/Neonatology, Thomas Jefferson University/Nemours,
Philadelphia, PA; Alere Health, Atlanta, GA; Pediatrics/Neonatology,
Cohen Children's Medical Center, New Hyde Park, NY.

BACKGROUND: Establishing enteral feeds in very low birth weight (VLBW) infants is crucial for feeding tolerance, improved postnatal weight gain and neurodevelopment. Historically, feeds start at 20cal/oz preterm formula (PTF) and advanced to 24 cal/oz. Lower calorie formulas fail to provide adequate nutrition and do not effectively stimulate intestinal motility. Minimal osmolarity differences exist among PTF. Feeding intolerance or adverse outcomes, such as necrotizing enterocolitis (NEC), should not be different between 20 cal/oz PTF (PTF20) and 24 cal/oz PTF (PTF24).

OBJECTIVE: To compare type of PTF used for initiating feedings and feeding intolerance and NEC in VLBW infants.

DESIGN/METHODS: Retrospective data analysis of all infants in a large neonatal database with birth weight (BW) < 1500 grams and gestational age (GA) <33 weeks from 2008-Sept 2012. Infants with feeding initiated with 20cal/oz formula (PTF20 group) were compared with infants with feeding initiated with 24 cal/oz formula (PTF24 group). The groups were compared for baseline demographics, clinical characteristics, feeding milestones and NEC. Logistic regression controlling for BW and Apgar scores compared outcome results.

RESULTS: 891 infants included (780, PTF20 and 110, PTF24 groups). There was no significant difference in feeding tolerance (NPO episodes, NPO days and time to reach full feeds) between the two groups. The incidence of NEC was higher (6.2%) in PTF20 compared to PTF24 (2.7%) but this difference was not statistically significant (p=0.14). There was a trend towards decreased length of hospitalization in PTF24 group.

	PTF20 (n=780)	PTF24 (n=111)
GA	29.1 ± 2.3	29.3 ± 2.2
BW*	1117 ± 274	1180± 256
Apgar 5 mins*	8 (1-9)	8 (1-10)
Start feeds (d)	4.4± 5.1	3.6± 3.9
Full feeds (d)	22.4 ± 19.4	20.5± 17.7
Mean NPO episodes	2.2	1.9
Mean Days NPO	9.4	7.4
Mean Days TPN	22.6	20.8
Wt gain (gms/day)	21.9 ± 4.2	21.4 ± 4.1
Mean discharge Wt	2468	2357
NEC (%)	48 (6.2)	3 (2.7)
LOS (days)**	61.3 ± 27.2	55.5 ± 33.1

*p<0.05

**p=0.09

CONCLUSIONS: PTF24 was safe and well tolerated by VLBW infants. Initiating feeding with PTF24 was not associated with the increased risk of NEC in VLBW infants.

Cardiac & Pulmonary Development Platform Session

Saturday, March 23, 2013
8:00am–9:30am

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8:00am

TBX1 Interacts with JUN and a Dominant Negative JUN Missense Mutation Is Associated with Congenital Heart Disease

Hua Pan, Tao Zhang, Cary A. Kraft, Indu Subbaraj, Julie De Mesmaeker, Brande C. Latney, Elizabeth Goldmuntz, Shoumo Bhattacharya, Jason Z. Stoller.
Pediatrics/Neonatology, Children's Hospital of Philadelphia,
Philadelphia, PA; Cardiovascular Medicine, Wellcome Trust Centre
for Human Genetics, Univ. of Oxford, Oxford, United Kingdom;
Cardiology, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Mice missing the proto-oncogene Jun have a thin right ventricle, prominent endocardial cushions, and a 100% incidence of persistent truncus arteriosus. Although Jun is critical for proliferation, cell cycle regulation, differentiation, and cell death, all biologic functions crucial for embryogenesis, there is little known about its role during cardiac development. Similar outflow tract defects are commonly seen in DiGeorge syndrome (DGS). DGS (aka 22q11 deletion syndrome) patients are hemizygous for more than 30 genes including the transcription factor TBX1. Accruing evidence points to a causative role for TBX1 in the pathogenesis of DGS although exact mechanisms remain unclear.

OBJECTIVE: To elucidate the role of Jun during heart development and in DiGeorge syndrome.

DESIGN/METHODS: TBX1-interacting proteins were discovered in a high throughput mammalian coactivator trap. Functional and physical interactions were determined in luciferase and protein complementation assays, respectively. Cre-loxP mouse models were utilized for tissue-specific knockout studies. Human DNA was screened for mutations by conventional sequencing.

RESULTS: The screen revealed multiple transcription factors, including the proto-oncogene Jun, which mediate a significant increase in TBX1-dependent transcriptional activity. Tbx1 and Jun physically and functionally interact and are co-expressed in the embryonic mouse. Tissue-specific knockout of Jun recapitulates cardiac defects reminiscent of the DGS phenotype. A screen of patients with congenital heart defects similar to those seen in Jun mutant mice revealed a patient with interrupted aortic arch who harbors a novel dominant negative JUN mutation that alters the TBX1 interaction.

CONCLUSIONS: Our results suggest that Jun has reiterated roles in different tissues important for heart development and tissue-specific mouse knockouts of Jun phenocopy important aspects of the DGS phenotype. JUN physically and functionally interacts with TBX1 and this interaction may play a role in the pathogenesis of DGS. The overall contribution of JUN to human congenital heart disease remains to be determined. NHLBI K08-HL086633, P50-HL062177, P50-HL074731, NCRR UL1-RR024134, AHA 11BGIA7370043, WW Smith H1104.

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8:15am

Ph.D. Student

The Matricellular Protein CCN5 Is Coordinately Regulated with Proliferation of Murine Alveolar Epithelial Cells during Development and in Response to Hyperoxic Injury

Najla A. Fiaturi, Heber C. Nielsen, John J. Castellot.
Program in Pharmacology, Tufts University, Boston, MA; Pediatrics,
Floating Hospital atTufts Medical Center, Boston, MA; Cell,
Molecular and Developmental Biology, Tufts University, Boston, MA;
Anatomy and Cell Biology, Tufts University, Boston, MA.

BACKGROUND: Lung immaturity is the major cause of morbidity and mortality in premature infants, especially those born <28 weeks gestation. Proper lung development from 23-28 weeks requires coordinated cell proliferation and differentiation. Infants born at this age are at high risk for Bronchopulmonary Dysplasia (BPD), a chronic lung disease characterized by arrested alveolarization and airway hyperreactivity. The mechanisms regulating normal alveolar development and BPD are not well understood. Of novel interest is the role of matricellular protein CCN5 (Cysteine-rich protein 61/Connective tissue growth factor/Nephroblastoma-overexpressed protein), which we reported is present in developing alveolar epithelium. The mechanism of action and biological function of CCN5 in smooth muscle cells (SMCs) is well-studied. CCN5 is a cell cycle regulator that inhibits SMC proliferation and promotes SMC differentiation. The cell-specific expression and function of CCN5 in alveolar development and injury is unknown.

OBJECTIVE: To define the role of CCN5 in alveolar epithelial development and hyperoxic injury.

DESIGN/METHODS: Five-day-old neonatal C57/B6 mice were exposed to room air (RA) or 90% O_2 (hyperoxia) from days 5 -13 of life (the major period of murine alveolarization). On day 13, pups were sacrificed. The right lung was fixed and used for immunofluoresence staining. The left lung was used for protein analysis.

RESULTS: In RA pups at postnatal day 13, immunofluorescence showed prominent CCN5 expression in alveolar type I cells (T1) (identified by a T1-specific antibody). Double labeling with Ki67 showed active proliferation of CCN5-positive T1 cells. In contrast, immunofluorescence analysis of surfactant protein C, CCN5, and Ki67 expression showed that type II alveolar cells (T2) are not proliferating and do not express CCN5. Western Blot analysis showed that CCN5 expression is greatly reduced in hyperoxic versus normoxic lungs.

CONCLUSIONS: CCN5 expression correlates positively with proliferation in TI and TII cells during normal alveolarization and in hyperoxic injury where proliferation is redued. This contrasts strongly with our data in SMCs in which CCN5 is highly expressed in non-proliferating cells and is poorly expressed in proliferating SMCs. We speculate that CCN5 is a functional regulator of alveolar epithelial proliferation during development and response to injury.

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8:30am

Graduate Student

Pigment Epithelium Derived Factor (PEDF) Regulates Inhibition of Vascularization and Alveolarization in Neonatal Oxygen Injury

Michelle Bennett, Linh Dang, Sana Mujahid, MaryAnn
Volpe, Anne Chetty, Heber Nielsen.
Sackler School of Biomedical Sciences, Tufts University, Boston, MA; Pediatrics,
Floating Hospital for Children at Tufts Medical Center, Boston, MA.

BACKGROUND: BPD is a chronic lung disease of preterm infants characterized by arrested microvascular and alveolar development. Much is known about pro-angiogenic factors in lung microvascular development and BPD, very little is known about the role of angiostatic factors. PEDF is a potent angiostatic factor important in retinal vascular injury.

OBJECTIVE: Hypothesis: PEDF, produced by developing type II cells in response to hyperoxia, inhibits lung microvascular and alveolar development.

DESIGN/METHODS: *In Vivo: W*ild type (WT) and PEDF (-/-) mice (postnatal day 5 to 13) were exposed to room air (RA) or 0.9 FiO_2. The mean linear intercept (inversely proportional to alveolar surface area) was measured in 5μ sections (5 non-overlapping fields per section, 20X Mag) from inflation fixed lungs. PECAM immunofluorescence identified lung microvasculature. *In Vitro*: E18 fetal mouse lung Type II (T2) cells were cultured in RA or 0.9FiO_2 (24 hrs) and conditioned medium (CM) collected. The effect of CM from RA or O_2-exposed T2 cells on angiogenesis was analyzed by exposing mouse lung endothelial (MFLM) cells grown on matrigel to CM with and without PEDF antibody. *A*ngiogenesis was analyzed by quantifying endothelial tube formation.

RESULTS: Lungs from 0.9FiO_2-exposed WT mice had reduced alveolar surface area (increased MLI) compared to RA-exposed mice ($P < 0.05$). This alveolar loss was reversed in 0.9FiO_2-exposed PEDF (-/-) mice. Vascular development was impaired in WT hyperoxic mice (fewer PECAM-positive cells compared to RA.0.9FiO_2-exposed PEDF (-/-) mice had more PECAM-positive cells and less impaired airway architecture than WT mice. MFLM cells exposed to RA-exposed T2 cell CM formed more capillary tubes (100% ± 4) in a well-organized tubular network compared to CM from 0.9FiO_2-exposed T2 cells (51% ± 10 of RA CM, $P < 0.05$), an effect abolished by added PEDF antibody (99% ± 6).

CONCLUSIONS: The importance of PEDF in mediating O_2-induced lung injury in developing lung is shown by the findings that PEDF knockout restores *in vivo* alveolarization and vasculogenesis in 0.9FiO_2 and anti-PEDF antibody abolishes O_2-induced impaired angiogenesis *in vitro*. We propose that BPD results from an altered balance between pro- and anti-angiogenic factors. Intervention with anti-angiostatic agents may be an effective strategy for BPD prevention.

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8:45am

Graduate Student

ErbB4 JmaCyt1 Isoform Drives Fetal Mouse Lung Type II Cell Proliferation and Differentiation

Arlene E. Reyna, Dorothea Wiegel, Heber C. Nielsen, Christiane E.L. Dammann.
Sackler School for Biomedical Sciences, Tufts University, Boston, MA;
Newborn Medicine, Floating Hospital for Children at Tufts Medical
Center, Boston, MA; Hannover Medical School, Hannover, Germany.

BACKGROUND: Neuregulin (NRG) is the ligand for the ErbB4 receptor, a major regulator of alveolar type II (T2) cell differentiation and proliferation. ErbB4 undergoes alternative splicing, producing 4 isoforms. Isoform-specific roles are important in diseases such as cancer and schizophrenia. The ErbB4 Jma-Cyt1 (JmaCyt1) isoform is distinguished by differential inclusion of peptide sequences (Jma) that are cleavage targets for tumor necrosis factor conversion enzyme followed by gamma secretase. These cleavage events release an intracellular ErbB4 fragment that traffics to the nucleus to drive gene transcription in cooperation with transcription factors. JmaCyt1 also has a PI3K binding site (Cyt1), allowing PI3K-Akt induced signaling, which we found is prominent in mature fetal T2 cells. We reported that JmaCyt1 is the major isoform in fetal T2 cells at the onset of surfactant synthesis, and that it is the major driver of surfactant synthesis in MLE12 cells. These studies suggest JmaCyt1 is critical in lung development.
OBJECTIVE: Determine ErbB4 JmaCyt1 effects on fetal T2 cell proliferation and differentiation.
DESIGN/METHODS: Each ErbB4 isoform was overexpressed in MLE12 cells. Primary fetal T2 cells lacking ErbB4 expression were isolated from ErbB4 transgenic mice at embryonic day E17. ErbB4 expression was rescued by transfection with human JmaCyt1. T2 cell differentiation was determined as choline incorporation into disaturated phosphatidylcholine (DSPC) and proliferation as thymidine incorporation into DNA.
RESULTS: NRG induces proliferation primarily in Cyt2 isoforms in MLE12 cells. This appears Jm-indepenent. JmaCyt1 rescue of ErbB4-negative T2 cells decreased thymidine incorporation ~3-fold and increased DSPC synthesis ~3-fold compared to non-rescued ErbB4-negative fetal T2 cells. These results suggest that JmaCyt1 drives the switch from type II cell proliferation to cell differentiation at this time point in gestation.
CONCLUSIONS: The ErbB4 JmaCyt1 isoform, which allows ErbB4 nuclear localization plus PI3K signaling, promotes fetal mouse T2 cell differentiation. Further studies of how alternative splicing-induced ErbB4 Jm-Cyt signaling regulates lung T2 cell differentiation and proliferation are needed to determine ErbB4's exact role in lung development. Eventually, manipulation of ErbB4 JmaCyt1 expression could be used to treat neonatal surfactant deficiency.

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9:00am

Medical Student

Regulation of Alternative Splicing of ErbB4 during Fetal Mouse Type II (T2) Cell Differentiation

Dorothea Wiegel, Arlene Reyna, Christiane E.L. Dammann, Heber C. Nielsen.
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Biograduate Medicine, Tufts University, Boston, MA; Pediatrics,
Floating Hospital for Children at Tufts Med Ctr, Boston, MA.

BACKGROUND: Protein isoforms created by alternative splicing (AS) are important mechanisms regulating cell-specific function. Despite the importance of AS very little is known about AS mechanisms in the developing lung. In fetal T2 cell development, ErbB4 isoforms have specific actions. Mutually exclusive AS that excludes either exon 15b or exon 16 produces the Jma or Jmb isoforms of ErbB4, respectively. The Jma isoform contains a γ-secretase binding sequence important for T2 cell differentiation.
OBJECTIVE: Determine the identity of alternative splicing factors that may regulate AS of Erbb4 Jma and Jmb isoforms and define their developmental expression in fetal mouse T2 cells.
DESIGN/METHODS: A mouse lung mRNA expression array data base was analyzed to identify AS factors expressed in fetal lungs from embryonic (E) days E16 to E18. Erbb4 gene sequence from exon 14 through exon 18 was searched to identify intronic and exonic binding sequences for the identified factors. Four factors with binding sequences likely to regulate AS of exons 15b and 16 were identified: FOX2, CELF1, HUB and TIAR. Expression of these four factors in fetal mouse E16 to E18 T2 cell cultures was determined by western blot, quantified by densitometry and normalized to β-actin.
RESULTS: Fetal T2 cells expressed all four AS factors in developmentally regulated patterns. FOX2 and Celf1 (repressors of splicing) each decreased 5-fold from E16 to E18. Binding sequences for these factors are positioned to repress inclusion of exon 16 thereby promoting Jmb expression. HUB, an enhancer of splicing, increased 4-fold. The binding sequence for HUB is positioned to include exon 16, promoting Jma expression. These expression patterns are in agreement with our previous data, showing ErbB4Jma expression increases from E16 to E18. TIAR decreased 3-fold.
CONCLUSIONS: Splice enhancer and splice repressor proteins that regulate AS are expressed in fetal lung T2 cells. The alternative splicing proteins FOX2, CELF1, HUB and TIAR are potential regulators of Jma and Jmb isoform expression based on their known function, the presence of specific binding sequences properly located for Jma/Jmb expression, and the pattern of their developmental regulation. Mechanistic studies exploring their exact function in T2 cell development are required. Detailed knowledge of the mechanisms of alternative splicing will improve our understanding of T2 cell differentiation.

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9:15am

Medical Student

TTF1 Signals Negative Feedback to ErbB4 in Mouse Type II Epithelial Cells

Dorothea Wiegel, Elger Marten, Heber C. Nielsen, Christiane E.L. Dammann.
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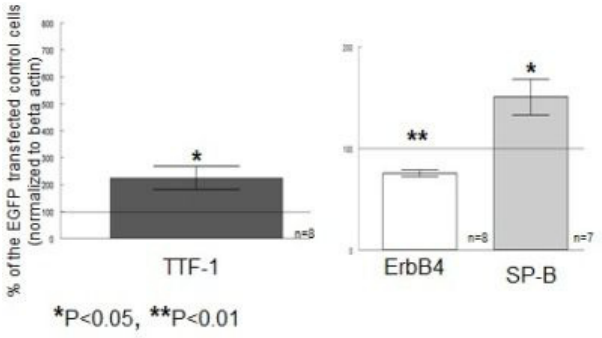
Boston, MA; Hannover Medical School, Hannover, Germany; Sackler
School for Biomedical Sciences at Tufts Medical School, Boston, MA.

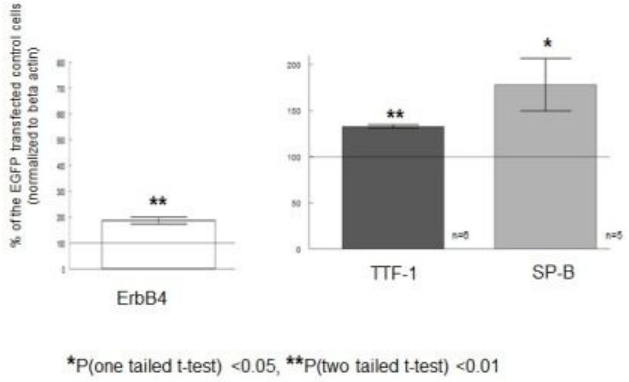
BACKGROUND: TTF-1 is an important transcription factor regulating Sftp expression in lung development. We showed that Neuregulin (NRG) initiates fetal surfactant synthesis and that its receptor ErbB4 is an upstream regulator of TTF-1 function in its regulation of Sftpb expression. We previously showed that NRG directly upregulates TTF-1 expression in type II (T2) cells. It is not known if TTF-1 has feedback regulation on ErbB4.
OBJECTIVE: We hypothesized that TTF1 interferes with NRG-induced signaling and ErbB4 expression in fetal mouse T2 cells.
DESIGN/METHODS: Studies used cultures of MLE12 cells and freshly isolated fetal mouse embryonic day (E)17 T2 cells. Cultures were transfected with EGFP, ErbB4, and TTF1 plasmids without or with NRG treatment. TTF-1, ErbB4, and Sftpb expression, determined by western blots signals, were quantified by densitometry and normalized to actin. TTF-1 expression was also studied in ErbB4-deleted adult T2 cells isolated from ErbB4 transgenic animals.
RESULTS: TTF1 overexpression decreased ErbB4 protein and downregulated NRG-induced upregulation of ErbB4 protein. However, increased Sftpb levels were maintained (Figure 1).

Figure1: TTF-1 transfected fetal T2 mouse cells



ErbB4 overexpression increased TTF1 and Sftpb expression in MLE12 and fetal T2 cells (Figure 2).

Figure 2: ErbB4 transfected fetal T2 mouse cells



Pulmonary ErbB4 deletion resulted in an upregulation of TTF-1 in the adult T2 cells.
CONCLUSIONS: There is a negative feedback loop between TTF-1 and ErbB4 in both MLE-12 and primary fetal T2 cells. We propose this is an important control element in T2 cell Sftpb production. Further studies elucidating the exact interactions are needed.

Saturday, March 23, 2013
8:00am–9:30am

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8:00am

Fellow in Training

Predictors of Completed Early Intervention Evaluation

Manuel Jimenez, James Guevara, Marsha Gerdes, Susmita Pati, Alexander Fiks.
Pediatrics, Children's Hospital of Philadelphia, Philadelphia, PA; SUNY at Stony Brook, Stony Brook, NY.

BACKGROUND: Policies recommend referral to early intervention(EI) for children with developmental delay but many referred children are not evaluated.
OBJECTIVE: To identify child, family, provider and community factors associated with completed EI evaluation.
DESIGN/METHODS: We conducted a secondary analysis of prospectively collected data on children referred to EI from urban pediatric practices. Using logistic regression, we tested whether child (age, gender), parent (age, race, income, education, depression symptoms), provider (clinic site, referral method), and community factors (trust in neighbors, neighbors willing to help, neighbors care about child) were associated with completed EI evaluation. Factors with p <0.2 were included in the multivariable model. We used the Bonferroni correction to account for multiple comparisons. We conducted subgroup analyses of children based on the type and number of developmental concerns, and assessed the impact of the referral method within these groups.
RESULTS: Of 331 subjects referred to EI, 169 (49%) were not evaluated. 85% of families were African American and 67% had income <$20k. The only significant predictor of completed EI evaluation was whether the physician faxed the referral form to EI rather than asking the family to call (AOR: 3.78, 95%CI: 2.1–6.74).

Multivariable Logistic Regression Analysis (n=331)	
	Adjusted OR (95%CI)
Referral Method	
Phone	Referent(R)
Fax	3.78(2.1-6.74)*
Clinic	
1	R
2	1.49(0.64-3.46)
3	0.62(0.32-1.22)
4	0.51(0.26-0.97)
Child Gender	
Male	R
Female	0.65(0.4-1.07)
Race	
African American	R
Other	1.6(0.71-3.6)
Income (y)	
<$20 k	R
≥$20 k	1.29(0.73-2.29)
People around my neighborhood are willing to help their neighbors.	
Agree	R
Not Agree	0.83(0.5-1.36)
Respondent Age	
<30	R
≥30	1.17(0.66- 2.07)
Child Age at 1st Referral (mos)	
≤18	R
18-24	0.68(0.38-1.2)
≥24	0.59(0.32- 1.1)

Variables with p<0.2 in bivariate analysis included in model. *Significant after Bonferroni correction(P <0.005)
When stratified by developmental domain, faxed referral was associated with completed evaluation only for children with language concern (OR: 3.08, 95%CI: 1.62–5.86). Faxed referral predicted completed evaluation for children with one developmental concern (OR: 3.48 95%CI: 1.59-7.62) but not ≥2.
CONCLUSIONS: Pediatricians may improve EI referral success by simplifying the referral process for families and faxing referral forms. This may be especially important for children with language delay and 1, as opposed to ≥2 delays.

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8:15am

Fellow in Training

Docosahexaenoic Acid Can Mitigate Some Ethanol-Induced Behavioral Changes

Finney George, Kristen A. Wellmann, Sandra M. Mooney.
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BACKGROUND: Prenatal ethanol exposure disrupts social behavior in humans and in rodents. One system that is particularly important for social behavior is the somatosensory system, and ethanol also causes alterations in the structure and function of this area. Docosahexaenoic acid (DHA), an omega-3 polyunsaturated fatty acid, is necessary for normal brain development. Ethanol inhibits the activity of desaturase enzymes that are required for generation of DHA, which may be one mechanism whereby tissue from ethanol-exposed animals (or humans) is DHA deficient. Thus, we determined whether intervention in the form of DHA supplementation in the postnatal period ameliorated the ethanol-induced behavioral deficits.
OBJECTIVE: To determine if DHA can ameliorate some of the ethanol induced changes in rat behavior.
DESIGN/METHODS: Timed pregnant Long-Evans rats were assigned to one of three groups: one received ad libitum access to an ethanol-containing liquid diet, the second was pair fed an isocaloric isonutritive non-alcohol liquid diet, and the third had ad libitum access to chow and water. Pups born to dams from these three prenatal treatment groups were assigned to one of three postnatal treatment groups: 1) received DHA (10g/kg in artificial rat milk) intragastrically once per day between postnatal day P11 and P20, 2) received artificial rat milk intragastrically, 3) were untreated (NTC). Our sample size was 5 to 9 rat pups in each of the 9 treatment groups. Social behavior was tested using a modified social interaction test that was administered on P28. Somatosensory performance was tested with a gap crossing test, performed on a single day between P30 and P35.
RESULTS: Animals exposed to ethanol prenatally showed fewer pins and tags (nape attacks) during social interaction and crossed a significantly ($p<0.05$) shorter gap than control-treated animals. DHA-treated animals did not show any improvement in the number of pins. In contrast, both number of tags and the distance crossed in the gap crossing test improved significantly ($p<0.05$) after treatment with DHA, such that the ethanol/DHA treated animals were no longer significantly ($p<0.05$) different to control-treated animals.
CONCLUSIONS: Rat pups prenatally exposed to ethanol show marked deficits in social behavior and in a test of somatosensory system function, and some of these deficits are mitigated by later administration of DHA.

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8:30am

Medical Student

Childhood Predictive Factors of Young Adult Employment in Low-SES Inner-City African Americans

Kehvon Clark, Laura M. Betancourt, Nancy L. Brodsky, Hallam Hurt.
Perelman School of Medicine of the University of Pennsylvania, Philadelphia, PA; Neonatology, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Employment is a developmental marker of successful transition to adulthood. Unemployment rates for Americans ages 20-24 are higher than rates for those ages 25-54 (15% vs 8%). Rates are even higher for African Americans ages 20-24 (25%). In a time of high unemployment, understanding factors associated with employment in young adulthood is needed.
OBJECTIVE: The aim of this project was to identify childhood factors associated with employment in young adults.
DESIGN/METHODS: Participants were 111 inner-city African American young adults ages 21-23 of low SES (59% female), enrolled at birth and followed annually in a longitudinal study of the effects of gestational cocaine exposure (GCE) (45% GCE). The dependent variable was young adult employment (YAE), defined as any employment reported at annual visits from ages 19-23. Independent variables were: age 18 IQ (WAIS - 4th Edition); adolescent employment (any employment reported at ages 15-18); caregiver employment (percentage of visits caregiver reported employment [minimum of 7 visits from ages 3-18]); caregiver receipt of public or medical assistance (PMA, percentage as above); quality of the early home environment (age 8, Elementary School Home Observation for Measurement of the Environment inventory [HOME]). Independent t-tests and Chi-square tests were used for bivariate comparisons. Backward logistic regression was used for multivariate analyses.
RESULTS: Rate of YAE was 69.4% (77/111), higher than the national average for job-seeking African Americans ages 20-24 (49.7%). Using bivariate analyses, YAE group had higher HOME scores (49.5±4 vs 46.7±4, $p<0.01$), higher rate of adolescent employment (35% vs 3%, $p<0.01$), higher rate of college experience (47% vs 18%, $p<0.01$), was more likely living with family (82% vs 59%, $p=0.01$), and less likely arrested (26% vs 47%, $p=0.03$). YAE group was similar to unemployed in sex, GCE, IQ, caregiver employment, and PMA (all $p>0.09$). By backward logistic regression, only HOME score predicted YAE ($B=0.15$, $p=0.03$). Results were similar when 6 unemployed young adults with some college were included in employed group.
CONCLUSIONS: Better childhood home environment increases the likelihood of YAE, of particular interest in the current economic climate. Caregiver employment or PMA did not affect YAE in our cohort, suggesting that unemployed caregivers who create a high quality home environment increase likelihood of YAE during the transition to adulthood.

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8:45am

Fellow in Training

Medication Management of Preschool ADHD by Pediatric Sub-Specialists: Non-Compliance with AAP Clinical Guidelines

Jaeah Chung, Suzanne Sunday, David Meryash, Alyson Gutman, Andrew Adesman.
Developmental and Behavioral Pediatrics, Cohen Children's Medical Center of New York, New Hyde Park, NY; Biostatistics, Feinstein Institute for Medical Research, Manhasset, NY.

BACKGROUND: Current clinical guidelines for pediatricians (AAP) and child psychiatrists (AACAP) recommend that preschoolers with ADHD (P-ADHD) generally receive treatment with behavioral modification (BM) before pharmacotherapy, and that methylphenidate (MPH) be used as the first line medication.
OBJECTIVE: 1. To examine to what extent pediatric subspecialists (PSs) adhere to AAP guidelines regarding pharmacotherapy for P-ADHD 2. To identify differences in treatment approach among subspecialties.
DESIGN/METHODS: The Preschool ADHD Treatment Questionnaire (PATQ) was developed and mailed to a randomized sample of 3,000 PSs nationwide. The PATQ asked how often PSs recommend parent training in BM and how often they recommend medication as a first- or second-line treatment. PSs were also asked which type of medication they typically choose first.

RESULTS: 714 (23.8%) surveys were received, and analyses were limited to 560 board-certified pediatric subspecialists who diagnose P-ADHD: 322 developmental-behavioral pediatricians (DBP), 170 child psychiatrists (CP), and 68 child neurologists (CN). 21% of PSs reported using medication as a first-line treatment *often* or *very often*. 69.5% use medication as a second-line treatment *often* or *very often*. Availability of BM (or lack thereof) was not associated with decision to use medication as a first-line treatment. Among PSs who prescribe medication for P-ADHD (first- or second-line), more than one-third (38.3%) said they prescribe a medication other than MPH initially (19.4% amphetamines; 18.9% non-stimulants). 90.7% of PSs *often* or *very often* recommend BM – even in communities with limited availability. No differences were noted across subspecialties regarding medication initiation criteria or selection. Likewise, no differences were noted between PSs who primarily treat patients with Medicaid versus private insurance. When adherence to AAP guidelines was defined as initial treatment with BM (not medication) and pharmacotherapy specifically with MPH as second-line treatment, only 12% CP, 8% DBP, and 9% CN complied with clinical guidelines. 19% of PSs stated that they expected the number of children for whom they will prescribe medication in the future will increase (vs 78% no change and 3% decrease).
CONCLUSIONS: The overwhelming majority of pediatric subspecialists deviate from current AAP guidelines for treatment of preschool ADHD regarding medication initiation and selection.

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9:00am

Fellow in Training

Implications of MRI in Children with Autism Spectrum Disorder

Alison S. Gurtman, Eron Friedlaender, Susan E. Levy, Cynthia Mollen, Karuna V. Shekdar, Andrea L. Bennett.
Pediatric Emergency Department, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: With the reported increased prevalence of autism spectrum disorders (ASD) and the impetus to better understand the diagnosis, MRI of the brain has been performed with increasing frequency. However, there are little data describing the indication for and results of MRI in these patients.
OBJECTIVE: To determine the reasons for brain MRI referral and prevalence of clinically significant findings in children with ASDs.
DESIGN/METHODS: Retrospective, descriptive chart review of patients with ASDs who underwent brain MRI from January 1st, 2010 - January 1st, 2012 at an urban tertiary care children's hospital. Inclusion criteria: diagnosis of an ASD and age 2-18 years (inclusive). Exclusion criteria: no available images. Data collected: demographics, reason for referral, and results of MRI. Results were assessed for clinical significance (Ab MRI), defined as a finding that would likely prompt follow-up, excluding sinusitis. Children were categorized based on referral reasons as: ASD alone and ASD with 1 or more of the following: an abnormal neurological exam (Ab neuro), seizure (Sz), headache (H/A), non-neurological condition (non-neuro), micro/macrocephaly/regression/tics, or referred for a study protocol.
RESULTS: Of 185 children included, the mean age was 8.4 years, and the majority (82%) were male. The rates of Ab MRI ranged from 0%(0/17), 95% CI(0-19.5%) in the 9.2% referred for an ASD study protocol to 43%(16/37), 95% CI(27.1%-60.5%) in the 21.6% referred for an ASD and Ab neuro. Of the 33.5% referred for an ASD and Sz, 37 %(23/62), 95% CI(25.2%-50.3%) had an Ab MRI, whereas of the 10.3% referred for ASD and micro/macrocephaly, regression, or tics, 42%(8/19), 95% CI(20-66.5%) had an Ab MRI. Of the 8.6% referred for ASD and H/A, 19%(3/16), 95% CI(4-45.6%) had an Ab MRI, whereas of 1.6% referred for ASD and non-neuro, 33%(1/3), 95% CI(0.8-90.6%) had an Ab MRI. Of the 26.5% of children referred solely because of a diagnosis of ASD, 4.1%(2/49), 95% CI(0.5-14%) had an Ab MRI. Of these 2 children, neither required follow-up.
CONCLUSIONS: The prevalence of abnormal MRI in healthy children with ASDs is low, suggesting that routine MRI of the brain may be unnecessary. However, in children with ASDs and neurological co-morbidities, it may be prudent to perform brain MRI, given the high frequency of abnormal findings. This study was limited by a small sample size, but we intend to expand this study to further elucidate these findings.

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9:15am

Fellow in Training

Assessment of Preterm Infants with the NICU Network Neurobehavioral Scale

Jennifer J. Bragg, Robert Green, Annemarie Stroustrup.
Pediatrics, Mount Sinai School of Medicine, New York, NY.

BACKGROUND: The Neonatal Intensive Care Unit Network Neurobehavioral Scale (NNNS) provides a neurobehavioral assessment of term infants. NNNS scores for preterm infants are difficult to interpret as the ideal timing of NNNS administration in preterm infants is unknown. No prior study has evaluated performance of preterm infants on the NNNS at a specific developmental time point.
OBJECTIVE: To compare the performance of preterm infants on the NNNS at 34-36 weeks post-menstrual age (PMA) to published scores for preterm and full-term infants.
DESIGN/METHODS: Preterm infants with birth weights less than 1500g were evaluated with the NNNS at 34-36 weeks PMA. NNNS summary scales were derived for each infant. ANOVA was used to compare performance between our cohort of preterm infants and (1) aggregate scores of infants born at 33-37 weeks gestational age (GA) evaluated at 1 month of age and (2) full-term infants evaluated at 1 day of age.
RESULTS: 40 infants were enrolled. Mean GA was 28.1 weeks, range was 22-32 weeks, and mean birth weight was 1055g. See Table 1 for results of summary scales.

NNNS Summary Scales	Term	33-37	Study Cohort	Term vs. Cohort p-value	33-37 vs. Cohort p-value
Habituation	7.91	7.07	7.17	<0.01	<0.01
Attention	5.30	5.38	3.93	<0.01	<0.01
Arousal	4.16	4.40	2.93	<0.01	<0.01
Regulation	5.00	5.00	5.52	<0.01	<0.01
Handling	0.27	0.54	0.03	<0.01	<0.01
Quality of movement	3.81	4.34	4.81	<0.01	<0.01
Excitability	4.23	4.64	1.18	<0.01	<0.01
Lethargy	6.32	3.17	6.18	NS*	<0.01
Reflexes	4.32	4.64	4.83	NS*	NS*
Asymmetry	1.93	0.91	10.8	<0.01	<0.01
Hypertonicity	0.07	0.58	0.03	NS	<0.01
Hypotonicity	0.55	0.28	0.00	<0.01	<0.01
Stress	0.15	0.18	0.08	<0.01	<0.01
*NS p>0.05					

CONCLUSIONS: Preterm infants evaluated at 34-36 weeks PMA performed differently on the NNNS than published results for preterm and full-term cohorts. It is unclear whether the timing of NNNS administration before term equivalent or underlying developmental abnormalities affected our cohort's performance. Future comparison to childhood neurodevelopmental assessments is needed.

General Pediatrics I: Obesity Platform Session

Saturday, March 23, 2013
8:00am–9:30am

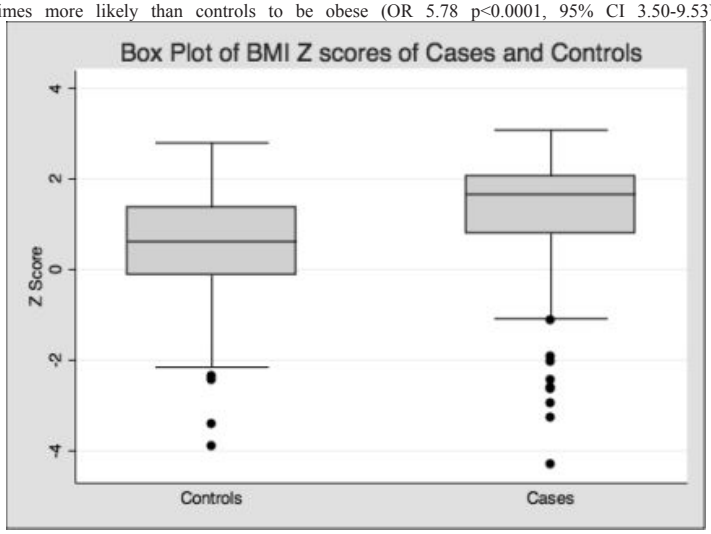
79
8:00am

House Officer

Obesity Is a Risk Factor for Symptomatic Cholelithiasis in Childhood

Kelly N.F. Fradin, Andrew D. Racine, Peter F. Belamarich.
Department of Pediatrics, Children's Hospital at Montefiore, Bronx, NY; Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Obesity is a well-known risk factor for symptomatic cholelithiasis in adults, but in children, evidence is limited. Only one recent cross-sectional study has estimated the association between obesity and cholelithiasis in the outpatient setting, and further understanding of the epidemiology of pediatric cholelithiasis requiring inpatient stay is needed.
OBJECTIVE: To estimate the strength of the association between obesity and the diagnosis of symptomatic cholelithiasis in children and adolescents without known risk factors for cholelithiasis.
DESIGN/METHODS: We conducted a retrospective, matched, case-control study. Using the discharge diagnosis, we identified children age 4-20 years with symptomatic cholelithiasis admitted between 1/2001 and 9/2011 as cases. Our control group was comprised of children admitted with appendicitis during the same time period. We excluded individuals with pregnancy, hemolytic disease, and parenteral nutrition. Each case was individually matched to a control based on age, gender, ethnicity and race. Obesity was defined as a BMI z score of 1.645 or the 95th percentile. Review of imaging records was performed to validate the discharge diagnosis.
RESULTS: There were 259 cases with an average age of 16.7 years, 76% female, 69% Hispanic, 39% Multiracial, and 19% African American. There were 259 controls with an average age of 15.8 years and similar demographics. Cases were nearly six times more likely than controls to be obese (OR 5.78 p<0.0001, 95% CI 3.50-9.53).



The relationship between obesity and cholelithiasis persisted in sensitivity analysis limited to subjects with confirmatory imaging. Despite the finding that cases were slightly older than controls, post hoc analysis showed that this age difference did not influence our primary finding. We found a significant dose-response effect placing heavier individuals at higher risk of cholelithiasis.
CONCLUSIONS: Our data show that obesity is a significant risk factor for hospital admission due to cholelithiasis in our population.

80
8:15am

Undergraduate Student

Measuring Fatness *and* Fitness: The 6 Minute Walk Test in a Pediatric Setting

Jennilyn N. Weber, Lauren M. Daley, Gary A. Emmett.
Department of General Pediatrics, Nemours Foundation, Philadelphia, PA.

BACKGROUND: The 6 Minute Walk Test (6MWT) calculates fitness, or functional capacity, by measuring the distance walked in 6 minutes along with cardiac measures. Fitness is equally as important as the measure of "fatness," or Body Mass Index (BMI). Since BMI adjusts poorly to the variation in body types found in children, as compared to adults, the 6MWT may be a better method to identify children at risk of being unhealthy.

OBJECTIVE: By observing pre- & post-test heart rate (HR)and heart rate one minute post-exercise (heart rate recovery (HRR)), the 6MWT may allow practitioners to quickly determine the fitness level of children during a visit. We hypothesize that healthier children's heart rates will have a smaller increase between pre-& post-test measurements and will recover more quickly one minute post-test, as compared to unhealthy children.

DESIGN/METHODS: Healthy children from ages 6 to 17 were recruited from visits at Nemours Pediatrics, Philadelphia between Jun '07 and Aug '12. The 6MWT is an IRB-approved, investigator-designed protocol. Pulse and blood pressure were measured pre- & post-6MWT, and one minute post-6MWT. Other data was extracted from medical records. Children were classified according to BMI percentile range. Healthy children were compared as a group to an unhealthy group, both overweight and obese children. Other analyses examined children by age; pre-pubescent children were < 11 while post-pubescent children were > 12. Analysis of Variance was used to analyze data.

RESULTS: When analyzed by sex, post-6MWT heart rate (HR) and HRR were significantly elevated in unhealthy females compared to healthy females, p=0.017 and p=0.008, respectively. When analyzed by age, unhealthy pre-pubescent children displayed significantly elevated HR, p=0.047 and HRR, p=0.017, when compared to healthy pre-pubescent children. No significant differences were observed in males or post-pubescent children.

CONCLUSIONS: As expected, HRR and HR were significantly elevated for unhealthy children. However, results demonstrate that these children experience more exertion than their healthy counterparts. Although the 6MWT may not be an effective tool for measuring fitness in the entire pediatric population, it may prove useful as a measure of fitness in the office for children in the pre-pubescent years, when intervention is most important.

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8:30am

Effect of a School Based Intervention on Parents' Nutrition and Exercise Attitudes and Behaviors

John C. Rausch, Evelyn Berger-Jenkins, Andres Nieto, Mary McCord, Dodi Meyer.
Pediatrics, Columbia University Medical Center, New York;
Ambulatory Care Network, NewYork-Presbyterian Hospital, New York; Pediatrics, Medical College of Wisconsin, Milwaukee.

BACKGROUND: Obesity disproportionately affects young children in underserved and minority communities. Further, parents exert a significant effect on children's eating behaviors and physical activity levels. It is imperative, therefore, to find successful obesity prevention programs that target whole families in underserved communities in order to exert lasting changes on children's behaviors.

OBJECTIVE: To assess the impact of a school based intervention in an underserved community on parents' nutrition and exercise knowledge, attitudes and behaviors.

DESIGN/METHODS: Healthy School's Healthy Family is a Coordinated School Health Program that includes family and community involvement in health promotion in an underserved New York City community. As part of this program parents receive interactive workshops that promote healthy nutrition and physical activity. Parents completed bilingual self-administered surveys prior to the program and then yearly for 2 years. Questions were multiple choice and included demographic data and information on dietary choices and physical activity. Questions were combined to form scales regarding healthy diet and physical activity, including knowledge, self-efficacy, and reported dietary actions and levels of physical activity. Pre-survey scores were compared with post-survey scores after year 1 and year 2 using paired t-tests.

RESULTS: There were 277 parents completing the initial survey with 149 (54%) of the same parents completing the survey after year 1 and 126 (45%) completing the survey after year 2. There was an increase in parent's self-efficacy for physically active lifestyles that was statistically significant (t-value 2.62, p 0.01) and a healthy diet that was almost statistically significant (t-value 1.76, p 0.08) at the end of year 1, but these were not statistically significant at the end of the year 2. While healthy nutrition behaviors did not change, unhealthy behaviors were significantly lower at the end of both year 1 (t-value 2.00, p 0.05) and year 2 (t-value 2.07, p 0.04). Physical activity behavior improved and almost reached statistical significance after both year 1 (t-value 1.85, p 0.07) and year 2 (t-value 1.79, p 0.08).

CONCLUSIONS: Coordinated school based obesity prevention programs may have an effect on parental nutrition and physical activity attitudes and behaviors. This will be essential if healthy changes in behavior are to be adopted and sustained by the entire family.

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8:45am

House Officer

Association between Neighborhood Physical Activity Resources en Route to School and Time Outdoors in Inner-City Minority Children

Leigh Goldstein, Maida P. Galvez, Kathleen McGovern,
Susan Teitelbaum, Barbara Brenner, Mary Wolff.
Department of Preventive Medicine, Mount Sinai School of Medicine, New York, NY; Department of Internal Medicine, Eastern Virginia Medical School, Norfolk, VA; Department of Pediatrics, Mount Sinai School of Medicine, New York, NY.

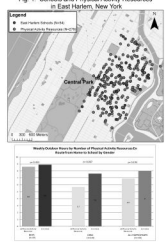
BACKGROUND: Neighborhood physical activity resources may play a role in promoting healthy behaviors. Geographic Information Systems (GIS) provides a unique opportunity to examine the resources children frequently encounter.

OBJECTIVE: Describe the number of physical activity resources passed by children on the shortest path between home and school and examine the association with time outdoors.

DESIGN/METHODS: School/home location and outdoor activity time were collected for 178 children. Physical activity resources data were collected by walking survey. Shortest paths between home and school and number of resources passed en route were determined with GIS. Two-sided t-tests with a Type I error of 0.05 were used to identify statistically significant differences in outdoor time between children passing 2 or fewer physical activity resources and those passing 3 or more.

RESULTS: Shortest paths between home and school were calculated, mean 447m. 279 physical activity resources were identified in East Harlem. (See Figure 1.)

Fig. 1. Schools and Physical Activity Resources in East Harlem, New York



Range of resources passed along shortest route was 0-37, mean 5.5, median 4. Six children (2.0%) did not pass any. Mean unscheduled weekly outdoor activity hours was 7.7, median 6. While no association was observed between number of physical activity resources passed and time spent in outdoor activity for all participants (n=178) or boys alone (n=59), girls exhibited a trend toward more outdoor activity time among those passing 3 or more physical activity resources vs those passing 2 or less (n=119, 7.6 vs 5.7 hours, p=0.067).

CONCLUSIONS: Data suggest the presence of physical activity resources along frequently encountered neighborhood routes may contribute to girls' unscheduled outdoor time. Additional research is needed to inform community level obesity interventions targeting physical activity.

83
9:00am

House Officer

Modifiable Cardiovascular Risk Factors in Middle and High School Students in Quito-Ecuador

Ramiro W. Lizano Santamaria, Marco Fornasini, Ivan Sisa.
Pediatrics and Adolescent Medicine, Einstein Medical Center, Philadelphia, PA;
School of Medicine, Universidad de las Americas, Quito, Pichincha, Ecuador;
School of Medicine, Universidad San Francisco de Quito, Quito, Pichincha, Ecuador.

BACKGROUND: Mortality in developing countries is transitioning from infectious diseases to other conditions, including chronic cardiovascular (CV) disease. Modifiable risk factors for CV disease may become detectable during childhood and adolescence.

OBJECTIVE: To assess the prevalence of modifiable risk factors for CV disease in middle and high school students in Quito, Ecuador.

DESIGN/METHODS: We conducted a cross-sectional study of a city-wide representative sample of middle and high school students attending 8th to 10th grades in Quito, Ecuador. We used a school-based stratified sample proportional to the size of the geographic sector within the Metropolitan District of Quito. Students completed the WHO Global School Based Health Survey modules on diet, physical activity and tobacco use. We measured participants' weight, height, and blood pressure (BP) and estimated body mass index (BMI).

RESULTS: 469 students were surveyed: 47% males; mean age 12.5+1 (SD) years (range 11-16 years); 16% in public school, 84% in private school. Based on BMI percentiles, one third of students were overweight or obese (overweight 15%, obese 18%), 7% had high systolic BP and 4% had high diastolic BP. Identified modifiable risk factors included: dietary factors (less than 5 fruits/vegetables a day, 92%; one or more fatty meals a day, 69%; one or more sugary soft drinks a day, 67%); behavioral factors (physical activity less than 30 minutes 3 times per week, 53%; ever smoked, 37%, smoking in the last month, 12%). The prevalence of risk factors was similar for students in public and private schools, with the exception of ever smoked, which was higher among students in private school,47%, compared to those in public school,33% (p <0.001).

CONCLUSIONS: Middle and high school students in Quito, Ecuador had a high prevalence of modifiable cardiovascular risk factors, with rates comparable to those of U.S. students. These findings indicate that is as important to implement interventions aimed at modifying these risk factors early in life in both developed and developing countries.

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9:15am

House Officer

To Assess the Correlation between Obesity and Risk for Urinary Tract Infections in the Pediatric Population

Richard A. Jack, Fernanda Kupferman, Kelly Cervellione, Susana Rapaport, Sonia Patel, Shirley Pinero.
Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Research, Jamaica Hospital Medical Center, Flushing, NY.

BACKGROUND: In 2009-2010, 9.7% of infants and toddlers had a high weight-for-recumbent length, and 16.9% of children and adolescents from 2 through 19 years of age were obese. In an adult study, the presence of obesity was associated with a 2.5-fold increased likelihood of being diagnosed with a urinary tract infection (UTI) compared to being of normal weight. In the pediatric population, no such association has been shown.

OBJECTIVE: To investigate any association between obesity and increased likelyhood of UTI in the pediatric population.

DESIGN/METHODS: This was a retrospective, case-control study. A chronological list of urine cultures performed at Flushing Hospital Medical Center in calender year 2011 for patients 0-18 years of age was reviewed. Patients were deemed to have a true positive urine culture if there was > 50 000 colony-forming units of a single organism; those patients were considered cases. Medical records were reviewed on prospective cases for underlying conditions that would predispose to them UTI, including structural renal abnormalities, immunodeficiency and pregnancy.Prospective cases with those conditions were excluded. Once a case patient was included, the control patient was selected from the said list as the next chronological negative urine culture, with an expectation that controls would match cases for age and gender at the end of the selection process. Patients were then classified as having body mass index (BMI) <85% (normal), BMI > to 85% to 94% (overweight) or BMI > 95% (obese). SPSS software was used for statistical analyses. Descriptive statistics were analyzed with the BMI percentages, and the relationship between overweight/obesity and UTI was analyzed with Pearson chi-square. A p-value of <0.05 was considered significant.

RESULTS: A total of 152 subjects were included in this study. There were 76 cases (55 females) and 76 controls (47 females). There were no significant differences between cases and controls for age or gender. Of the cases with UTI, 21 (28%) were overweight and 8 (11%) were obese; among controls, 15 (20%) were overweight and 9 (12%) were obese. There was no statistically significant difference between body habitus and the presence of UTI (p=0.52).

CONCLUSIONS: These results suggest that, despite an association between overweight/obesity and UTI in the adult population, a similar association does not exist in the pediatric age group.

General Pediatrics II: Underserved Platform Session

Saturday, March 23, 2013
8:00am–9:30am

85
8:00am

Fellow in Training

The Effect of Regular Exercise on Exposure to Violence in Inner City Youth

Noe D. Romo, Melissa Dupont-Reyes, Deborah Fry, Leslie Davidson.
Division of Child & Adolescent Health, Columbia University, New York, NY; Pediatrics, New York-Presbyterian Hospital, NY, NY; Epidemiology, Columbia University, New York, NY.

BACKGROUND: Community violence causes huge costs in death and disability to youth. Research suggests regular exercise provides psychological benefits to self-esteem and reduces depression, but little data exists on whether it decreases exposure to violence. Studies analyzing whether team sports prevent violence in urban youth have shown mixed results.

OBJECTIVE: To determine if regular exercise in inner city adolescents is associated with decreased exposure to violence.

DESIGN/METHODS: This is a secondary analysis of the cross-sectional Partners and Peers Study in 4 NYC high schools using questions from Youth Risk Behavior Survey and the Child Health Illness Profile-Adolescent Edition conducted in 2007-8. 1,312/1454 (90.2%) students completed the survey (56% female; 73% Latino, 19% Black). We coded 4 exercise variables: Exercise frequency, past 4 weeks (>10d, <10d); number sit-ups, past 4 weeks (>20, <20); longest run, past 4 weeks (>20mins, <20 mins); playing on an organized team, past 12 months (0 months, 1-2, 3+). Outcomes were: Carrying a weapon, past 30 days (>1 day, 0); being in a physical fight, last 12 months (>1 times, 0); being in a gang, last 12 months. Separate logistic regressions were adjusted for potential confounders including race, ethnicity, age, self-esteem and pregnancy.

RESULTS: Because of an interaction, we stratified by gender. Exercise frequency, sit-ups, running and being on a team were all significantly associated with decreased violence outcomes for females. Only being on a team was significant for males with increased odds of not being in a fight.

Table 1

	Not Carrying a Weapon (AOR, [95% CI])		Not in a Fight (AOR, [95% CI])		Not in a Gang (AOR, [95% CI])	
Variables	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Exercise frequency	1.9 [0.9,3.7]	1.2 [0.7,1.9]	1.1 [0.7, 1.8]	1.4 [0.9,2.2]	2.4[1.2,4.9]*	1.2 [0.7, 1.9]
Sit-ups	2.2[1.5,5.3]*	1.4[0.9,2.3]	1.2 [0.7, 1.8]	1.2 [0.8,1.8]	2.1[1.0,4.1]*	0.9 [0.5, 1.5]
Running	2.7[1.3,5.6]*	.81[0.4,1.5]	1.4 [0.8, 2.4]	1.0[0.6,1.7]	1.2 [0.5,3.2]	0.9 [0.5, 1.7]
Team	1.62[1.1,2.3]*	1.3[0.95,1.7]	1.4[1.1,1.8]*	1.3[1.0,1.7]*	1.8[1.2,2.6]*	1.0 [0.8, 1.4]

*= significant

CONCLUSIONS: In this study, exercising regularly (measured by four variables), was associated with decreased violence exposure in females. Although further studies are needed, these findings offer possible insight into interventions to protect female adolescents that could also improve other health outcomes, like obesity.

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8:15am

Socioeconomic Status and Hospitalization Costs for Common Pediatric Conditions

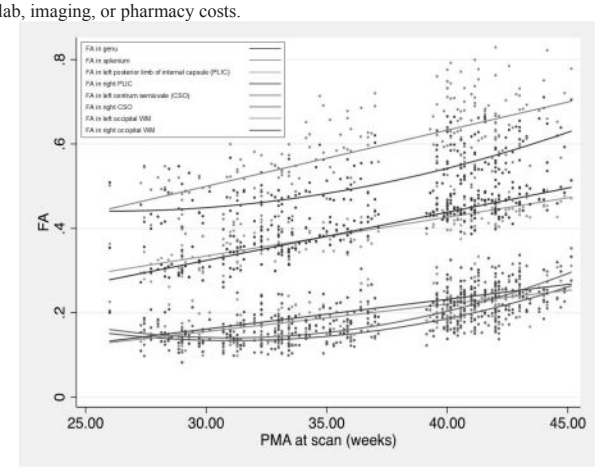
E. Fieldston, I. Zaniletti, M. Hall, J. Colvin, L. Gottlieb, M. Macy, E. Alpern, R. Morse, P. Hain, M. Sills, G. Frank, S. Shah.
Pediatrics, The Children's Hospital of Philadelphia, Philadelphia, PA; Children's Hospital Association, Overland Park, KS; Pediatrics, University of Missouri-Kansas City School of Medicine, Kansas City, MO; University of California, San Francisco, San Francisco, CA; University of Michigan, Ann Arbor, Ann Arbor, MI; Children's Medical Center, Dallas, TX; Children's Hospital Colorado, Aurora, CO; Pediatrics, Emory University School of Medicine, Atlanta, GA; Pediatrics, University of Cincinnati College of Medicine, Cincinnati, OH.

BACKGROUND: Child health and development are influenced by biomedical and socioeconomic factors. Few studies have explored the relationship between socioeconomic factors, such as income, and inpatient resource utilization for children.

OBJECTIVE: To analyze inpatient costs of care for children with common medical and surgical conditions at freestanding children's hospitals in relation to their home ZIP code's median annual household income (MA-HHI).

DESIGN/METHODS: Retrospective cohort study of hospitalizations at 32 freestanding children's hospitals from 2010-2011 in the Pediatric Health Information System (PHIS). Analyses focused on 6 common All Patient Refined Diagnostic Related Groups (APR-DRG): asthma, bronchiolitis & RSV pneumonia, pneumonia, kidney & urinary tract infections, diabetes, and appendectomy. Main exposure of interest was MA-HHI, divided into 4 groups (based on multiples of federal poverty level) (Table 1). Standardized costs of hospitalization care were modeled using mixed-effects methods built independently for each APR-DRG. Costs were adjusted for severity of illness. Post-hoc tests compared the adjusted standardized costs of patient in the lowest (HHI1) and highest (HHI4) household income groups.

RESULTS: There were 139,083 hospitalizations: 4 of 6 diagnosis groups had higher costs of care for the lowest MA-HHI group compared to the highest MA-HHI group: asthma ($205 difference, p=0.001), diabetes ($539 difference, p<0.001), bronchiolitis ($240 difference, p<0.001), and appendectomy ($684 difference, p<0.001) (Table 1). Higher costs were typically for room costs, not for lab, imaging, or pharmacy costs.



CONCLUSIONS: Lower MA-HHI is associated with higher inpatient costs of care for 4 of 6 common pediatric conditions. These findings highlight the need to consider socioeconomic status in healthcare system design, care delivery, and reimbursement calculations.

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8:30am

House Officer

Pediatric Readmission within 1 Month of Discharge: An Insight from an Inner City Community Hospital in New York

R. Basak, U. Mahat, I. Sivaraman, L. Kin.
Pediatrics, Flushing Hospital, New York, NY; Pediatrics, Bronx-Lebanon Hospital, New York, NY.

BACKGROUND: Hospital readmission is an outcome measure for assessing performance in healthcare systems. They are often unavoidable due to complex medical conditions, recurrences of illnesses, or scheduled readmissions. Studies have shown that readmission rates are more in males, increasing age, and patients with Medicaid insurance. It can however be minimized by effective communication and planned discharge.

OBJECTIVE: To study the incidence of readmission within 1 month of discharge from the Pediatric floor of Bronx- Lebanon Hospital and to analyze associated diagnosis, seasonal variation, insurance status, ethnicity, length of stay, compliance to medications, and follow up appointments.

DESIGN/METHODS: Retrospective chart review of admitted children in our hospital from January 2009 to December 2010, including newborns discharged and readmitted within 30days after discharge from our hospital.

RESULTS: The total number of admissions during the study period was 3964. The total number of readmissions was 104 (2.6%). Readmissions with the same diagnosis comprise 66% (69/104.) Readmissions within one week of discharge comprised 44% (46/104) of total readmissions. The most common diagnoses with readmissions were acute asthma exacerbations (26%), bronchiolitis (13%), sickle cell disease with crisis (13%) and fever (7%). There was a peak in readmission during July, August and September. One to two year old children were most likely to get admitted (28%). The average length of stay during first admission was 3 days but averaged 4.1 days when readmitted. 49 out of 104 (50%) of readmitted patients missed follow up visits after their initial discharge, and 32 (30.7%) did not fill their prescriptions after discharge. Compliance to medications was an issue in 67/104(65%) patients. Of all the readmitted patients, 97 % had active insurance at the time of first discharge whereas only 3 % had no insurance. Amongst the insured patients, 25.7% had Medicaid, 66.33 % had Managed care and 1% had private insurances.
CONCLUSIONS: This study gives an insight into the demographic data with factors related to possible readmissions and subsequent increase overall health care cost. It emphasises the impact and need of patient education at the time of discharge which will lead to better compliance and lesser readmission rates. Our study shows insurance is not a factor for failure to keep appointments or to fill up prescriptions.

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8:45am

House Officer

Disparities in Functional Outcomes by Race, Ethnicity, and Insurance Status Following Injury-Related Inpatient Rehabilitation

Jennifer N. Fishe, Margaret G. Stineman, Mark R. Zonfrillo.
Department of Pediatrics, Children's Hospital of Philadelphia, Philadelphia, PA; Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA; Center for Injury Research and Prevention, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Recent studies have highlighted racial/ethnic and insurance status disparities in pediatric acute injury outcomes. It is unknown whether similar disparities exist in functional outcomes after inpatient injury rehabilitation.
OBJECTIVE: To determine if racial/ethnic or insurance status disparities exist in pediatric physical functional outcomes after inpatient injury rehabilitation.
DESIGN/METHODS: This study was a retrospective analysis of patients 7-18 years old identified from the Uniform Data System for Medical Rehabilitation (UDSMR) who completed inpatient injury rehabilitation from 2002-2011. Functional outcomes were measured by the validated, categorical grading of the Functional Independence Measure (FIM) motor scale, which categorizes disability into clinically relevant stages. Patients were grouped by race/ethnicity (White/non-Hispanic, African-American/non-Hispanic, Latino/Hispanic) and insurance status (commercial, public, uninsured).
RESULTS: A total of 13,798 patients were included in the analysis. There were significant differences in the proportion of patients with discharge physical FIM grades signifying full functionality to mild disability versus moderate to severe disability amongst racial/ethnic ($p<0.0001$) and insurance ($p<0.001$) groups. White/non-Hispanics and those with private insurance had the highest percentage of patients attaining FIM grades of full functionality to mild disability.

	Discharge Physical Grade 1-3 (Moderate-Severe disability) Mean % (SD)	Discharge Physical Grade 4-7 (Mild disability to full functionality) Mean % (SD)	P-Value
White/non-Hispanic	42 (41-43)	58 (57-59)	P<0.0001
African-American/non-Hispanic	52 (50-55)	48 (45-50)	
Latino/Hispanic	44 (42-47)	56 (53-58)	
Private Insurance	42 (41-43)	58 (57-59)	P<0.001
Public Insurance	46 (45-48)	54 (52-55)	
Uninsured	44 (42-47)	56 (53-58)	

CONCLUSIONS: There are racial/ethnic and insurance status disparities in attainment of higher grades of physical functionality following inpatient rehabilitation for injuries in children. The etiology of such disparities is unknown, and it is unclear whether race/ethnicity or insurance status has the greater association with functional outcomes. Future work should explore other potential factors related to poor outcomes such as injury severity and the quality and quantity of rehabilitation services.

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9:00am

Infant Sleeping Practices at Nap and Night Time in an Inner City Population

Barbara A. Kelly, Matilde Irigoyen, Monique M. Mondesir, Natalia Isaza Brando.
Pediatric & Adolescent Medicine, Einstein Medical Center Philadelphia, Philadelphia, PA.

BACKGROUND: Sudden unexplained infant death (SUID), including sudden infant death syndrome (SIDS), is more prevalent in African American populations and is associated with unsafe sleeping practices. Infants are at risk for SUID/SIDS at any time of day or night. However, it is not known whether parents use different sleeping practices for their infants during day time naps and night time.
OBJECTIVE: To assess infant sleeping practices at nap and night time.
DESIGN/METHODS: We conducted a secondary analysis of a longitudinal cohort study of sleeping practices in infancy. A convenience sample of postpartum mothers of healthy term newborns was recruited in the nursery of an inner city hospital. Mothers were given routine education on safe sleeping practices, taught about swaddling, and followed for 4 months. Mothers were asked in what position they placed their infants to sleep and where they placed the infants to sleep, for both nap and night time.
RESULTS: 70 mothers were enrolled: mean age 24 yrs; 84% African American; 21% <high school; 90% Medicaid; 59% primipara; 60% initially breastfed; 21% lost to follow up. Use of safe sleeping practices was disappointing and decreased over time. Mothers reported placing infants on their backs to sleep at night more often than at nap time, although the difference was not statistically significant. The use of the crib or bassinette was also higher at night vs nap time ($P<0.001$ at 1 week and 2 months). 10% of babies at 1-week of age and 13% of babies at 2-months of age were placed in a carseat or bouncy seat at nap time but not at night time.

			AGE	
		1 week % (N=59)	2 months % (N=40)	4 months % (N=43)
Sleep position night time	Back	88	74	72
	Side	10	21	19
	Belly	2	5	9
Sleep position naptime	Back	81	72	68
	Side	2	18	20
	Belly	17	10	12
Sleeps location night time	Crib/bassinette	90	85	74
	Mother's bed	10	15	26
	Car seat/bouncy seat	0	0	0
Sleeps location naptime	Crib/bassinette	69	62	67
	Mother's bed	21	25	33
	Car seat/bouncy seat	10	13	0

CONCLUSIONS: In a minority, low income patient population, the use of safe sleeping practices was more common at night than nap time and decreased over the first 4 months of life. Some babies were placed to sleep in a carseat or bouncy seat and the safety of this practice is unknown. Ongoing educational strategies need to be implemented to ensure safe sleeping practices for both nap and night time sleeping throughout the first year of life.

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9:15am

Can You Fill This out? Caregiver, Clinician and Staff Perspectives on Pre-Visit Questionnaires Prior to Well-Child Care

Sara R. Slovin, Tashi L. Rowe, Kristin Mmari, Ashish Joshi, Cynthia S. Minkovitz.
Pediatrics, AI duPont Hospital for Children/Nemours, Wilmington, DE; Pediatrics, Johns Hopkins School of Medicine, Baltimore, MD; Population, Family & Reproductive Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; Health Services Research and Administration, University of Nebraska Medical Center, Omaha, NE.

BACKGROUND: Child health experts suggest using pre-visit questionnaires (PVQ) to identify caregiver priorities and concerns for well-child care (WCC). Little is known regarding their feasibility in low-income populations and preferences for electronic or paper format are unknown.
OBJECTIVE: 1) To identify caregiver, clinician and staff perspectives regarding processes, facilitators and barriers for implementing PVQs in WCC for low-income families; and 2) examine stakeholder preferences for paper or touch-screen PVQ formats.
DESIGN/METHODS: We conducted 15 in-depth interviews with caregivers and 5 focus groups of clinicians, residents and staff, each with 6-10 participants, at 2 urban clinics serving low-income families. After stakeholders reviewed both paper and touch-screen PVQ formats, a trained interviewer elicited their perspectives using a structured interview guide. Interviews and focus groups were audiotaped, transcribed and independently double-coded with Atlas.ti software. We identified common themes using framework analysis, with discrepancies discussed until consensus was reached.
RESULTS: Caregivers (n=15), clinicians (n=16), staff (n=13) and residents (n=10) were aged 21-72 years. Five recurrent themes common to stakeholder groups emerged: 1) PVQ's utility for identifying caregiver needs and priorities, facilitating communication, and preparing all stakeholders for WCC visit; 2) Logistical considerations (e.g., linking PVQ to medical records, timing/location of PVQ completion and review, and touch-screen maintenance); 3) Acceptance, with PVQ's ease of use, non-invasive questions and child-focus 4) Unintended effects of PVQ, with medical-legal implications and possible overreliance on PVQ; 5) Potential barriers to accurate completion, including literacy level, time, distractions and perceived burden. All participant groups preferred the touch-screen format; for clinicians, staff, and residents, this preference was tied to logistical considerations for implementation.

CONCLUSIONS: Stakeholders endorse the utility of PVQ's in WCC, with preference for a touch-screen format. Clinicians, residents, and staff preferences were linked primarily to logistical considerations and barriers for implementation. While feasible to implement, evaluation of PVQ use in clinics serving low-income families is needed.

Infectious Diseases Platform Session

Saturday, March 23, 2013
8:00am–9:30am

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8:00am

House Officer

Hepatitis B Vaccination Practices in the NICU for Term and Late Preterm Short-Stay Infants

Erica Kehler, Shreya Patel, Erin Rescoe, Ben H. Lee.
General Pediatrics, Goryeb Children's Hospital at Atlantic Health Systems, Morristown, NJ; Neonatology, MidAtlantic Neonatology Associates, Morristown, NJ.

BACKGROUND: Routine newborn hepatitis B vaccination (HBVax) is a standard hospital practice associated with >95% reduction in pediatric hepatitis B attack rates. The nursery is the first opportunity for HBVax administration but infants admitted to the NICU with anticipated or actual short term NICU hospitalization represent a subpopulation at risk for missed opportunities for HBVax.

OBJECTIVE: To describe the practices and identify influencing factors affecting HBVax patterns for neonates admitted to the NICU with hospitalization for less than 28 days.

DESIGN/METHODS: A nested case-control, IRB approved, study design was utilized to study infants born between 7/1/2009 and 10/31/2012 at ≥ 34.0 weeks, ≥ 2000g, to HBsAg negative mothers, nonintubated upon NICU admission ≤ 1 day of life (DOL), and discharged (DC) alive ≤ DOL28 from two NICUs (Level 2 and 3).

RESULTS: 1083 infants were studied.

Infant characteristics	
Birthweight	3055±667g
SGA (10%ile)	7%
Birth EGA	37.6±2.3 wks
≥37wks	59%
Male	59%
CS	55%
Inborn	92%
Level 3	68%
Admit on room air	70%
Admit as NPO	55%
Circumcised in NICU (males)	55%
DOL on NICU DC	6.4±5.2d
NICU DC ≤DOL3	39%
NICU DC ≤DOL7	66%
HBVax in NICU	61%

Maternal characteristics	
Age	32±5y
Age ≥35y	33%
Gravida 1	34%
Living children	57%
White	68%
Hispanic	12%
Asian	8%
Black	8%
Prenatal care ≥3 visits	99%

61% of study infants received HBVax prior to NICU DC, ranging from 12% on <DOL1 to 80% on >DOL7. On average, HBVax was given on DOL 4.9±4.3d and 2.9±3.5d prior to NICU DC. There were differences in HBVax rates ($p<0.05$) between NICU Levels (65% at Level 2 vs 58% at Level 3), maternal age (63% for < 34y vs 57% for ≥ 35y), and race (71% for nonwhite vs 56% for white). Adjusting for NICU stay > DOL3, interestingly, infants admitted on room air were less likely to receive HBVax (75% vs 82%). In a multivariate logistic regression analysis adjusting for NICU DC ≤ DOL3, increased HBVax rates persisted for Level 2 NICU (OR 2.2), maternal age < 35y (OR 1.6), circumcision among males (OR 2.9), vaginal delivery (OR 1.6), and nonwhite race (OR 1.9) but not for respiratory support on admission.

CONCLUSIONS: HBVax receipt in the NICU for low morbidity infants was poor overall; however, certain institutional and demographic factors were associated with increased NICU HBVax rates, indirectly suggesting that systematic improvement in NICU HBVax rates is possible with targeted actions in this population.

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8:15am

National Trends and Resource Utilization in the Management of Infants with Urinary Tract Infections

Katherine O'Connor, Alyssa H. Silver, Lindsey C. Douglas, Joanne Nazif, Nora Esteban-Cruciani, Sage R. Myers.
Pediatrics, Children's Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY; Pediatrics, Children's Hospital of Philadelphia, University of Pennsylvania School of Medicine, Philadelphia, PA.

BACKGROUND: The increasing availability of national data sets allows for examination of trends in resource utilization. Urinary tract infection (UTI) accounted for 2% of pediatric hospitalizations and $520 million in aggregate costs during the years 2000-2006. To date, national trends and resource utilization for the management of infants less than 60 days admitted with UTI has not been assessed in a large data set including all-payers across multiple inpatient settings.

OBJECTIVE: To analyze national trends in length of stay (LOS) and total charges in the management of UTI in infants <60 days of age from 2000-2009 in a nationally represented cohort.

DESIGN/METHODS: We utilized the Healthcare Cost and Utilization Project Kids Inpatient Database (KID), weighted to allow for production of national estimates. We included all inpatient admissions for infants less than 60 days old with a primary or secondary diagnosis of UTI defined by ICD-9 codes for UTI and acute pyelonephritis. Exclusions: patients with codes for elective admission, transfer in, age>2 months, and hospital birth. Data were analyzed to assess the primary outcome of trends in LOS and total charges. Secondary outcome predictors of increased LOS were analyzed using weighted logistic regression to evaluate OR for LOS by hospital location, gender, teaching status and age < 30 days.

RESULTS: See Tables.

Trends in LOS and Total Charges by year

Year	Mean LOS (days)	Standard Error (SE)	Mean Total Charges (dollars)	SE
2000	4.37	0.09	9187	406
2003	4.17	0.10	11,248	480
2006	4.12	0.09	14,119	553
2009	4.05	0.12	16,508	590

Odds Ratios for LOS (95% CI)

Year	Hospital Location urban v. rural	Gender F v. M	Teaching status teaching v. non-teaching	Age >30 days v. <30 days
2000	0.7 (0.1-5.4)	0.8 (*)	0.8 (0.3-2.9)	0.8 (0.2-4.0)
2003	8.8 (3.2-24.7)	0.7 (0.3-1.9)	5.8 (1.9-18.0)	0.6 (*)
2006	1.8 (0.5-6.2)	0.6 (0.2-1.2)	5.7 (2.4-13.7)	0.8 (0.3-2.1)
2009	2.9 (0.7-8.5)	1.4 (0.5-3.7)	6.8 (1.9-23.6)	0.5 (*)

*Missing CI: includes stratum with single sampling unit

CONCLUSIONS: There is a trend toward decreased LOS and increased total charges for infants <60 days hospitalized with UTI from 2000-2009. Hospital location, gender and age < 30 days did not predict longer length of stay, but hospitalization in a teaching hospital was significantly associated with longer length of stay after 2000. Further research evaluating factors influencing LOS and charges is warranted.

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8:30am

House Officer

The Incidence and Clinical Characteristics of Acute Bronchiolitis with Urinary Tract Co-Infection among Children under 2 Years of Age Admitted to Urban Inner City Community Hospital

Stanka Madhu Kankipati, Chukwuma Mmuo, Nkiruka Ezenwa, Stefan Hagmann, Ayoade Adeniyi, Richard Neugebauer, Savita Manwani.
Pediatrics, Bronx Lebanon Hospital Center, Bronx, NY.

BACKGROUND: Studies have shown that febrile children with acute bronchiolitis do not have a higher risk of serious bacterial infection (SBI) but a slightly higher incidence of urinary tract infection about 1-5%. It is not clear whether the risk of SBI is altered in a meaningful way with clinical evidence of viral infection.

OBJECTIVE: a. To determine the incidence of UTI co-infection in patients with acute bronchiolitis; b. To identify the clinical characteristics of patients with acute bronchiolitis and UTI co-infection.

DESIGN/METHODS: A retrospective chart review of children 0-2 years hospitalized for acute bronchiolitis in a Pediatric inpatient at Bronx-Lebanon Hospital Center between January, 2006 - January, 2012. Fisher exact and chi-square tests were used for evaluating the association of two categorical variables; ANOVA for associations between categorical and continuous variables.

RESULTS: During this study period 1458 patients were admitted with acute bronchiolitis. We collected data for every 10th patient, 146 patient charts were analyzed. Out of 146 patients, 44 (30%) had urine culture done, of which 11 (7.5%) had a positive culture. We looked at various potential correlates of UTI co-infection status in this sample of patients with urine cultures done including sex, race and circumcision status. Urine culture was sent for 24 males and 20 females, 3 (12.5%) of males were positive as compared to 8 (40%) of females were positive ($p<0.08$). Urine culture was sent for 12 Hispanics and 18 African Americans, 5 (41.7%) of Hispanics were positive as compared to none positive for African Americans ($p<.005$). Amongst 8 circumcised males 0 had a positive urine culture as compared with 3 (42.9%) amongst 7 uncircumcised males ($p<0.08$). Children with positive and negative urine cultures did not differ on age, birth weight, gestational age, temperature, respiratory rate, O2 saturations and activity levels at the time of admission, RSV and influenza status, WBC or, ANC.

CONCLUSIONS: Our results suggest that the incidence of UTI co-infection with bronciolitis may be elevated in our patient population as compared with that reported in other studies. The data also suggest that female patients, Hispanics and uncircumcised patients with acute bronchiolitis are at increased risk for UTI co-infection.

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8:45am

Frequency of *APOL1* Risk Alleles among a US Cohort of Children with Perinatal HIV-1 Infection and Associations with Renal Phenotypes

Murli U. Purswani, Kunjal Patel, Jeffrey B. Kopp, Cheryl Winkler, Stephen A. Spector, Rohan Hazra, George R. Seage III, George K. Siberry, Lynne M. Mofenson, Gwendolyn B. Scott, Russell B. Van Dyke. Bronx-Lebanon Hospital Center, Albert Einstein College of Medicine, Bronx, NY; Harvard School of Public Health, Boston, MA; NIDDK, NIH, Bethesda, MD; CCR, NCI, Frederick, MD; University of California San Diego, San Diego, CA; Eunice Kennedy Shriver NICHD, NIH, Bethesda, MD; Miller School of Medicine, University of Miami, Miami, FL; Tulane University Health Science Center, New Orleans, LA.

BACKGROUND: African Americans (AA) have a four-fold increased risk for chronic kidney disease (CKD), attributed to two independent sequence variants G1 and G2 in the *APLO1* gene on chromosome 22. These alleles are common in certain African populations, particularly those of West African origin. In adult studies, 2 *APOL1* risk alleles are highly associated with focal segmental glomerulosclerosis, hypertension-attributed end stage kidney disease and HIV-associated nephropathy.

OBJECTIVE: To estimate the frequency of *APOL1* risk alleles in AA in a US cohort of children with perinatal HIV-1 infection (PHIV); and to examine associations of these alleles with proteinuria and CKD.

DESIGN/METHODS: Participants with PHIV had history obtained and urine and blood collected annually in the Pediatric HIV/AIDS Cohort Study. Proteinuria was defined as at least one urine protein/creatinine ratio (uPCR) ≥0.2; CKD as ≥2 sequential uPCR ≥0.2, eGFR <60 mL/min/1.73 m^2 with no resolution or clinical diagnosis not contradicted by a normal uPCR. In children ‹18 yrs, eGFR was calculated with the updated Schwartz equation and for those ≥18, with the CKD EPI equation. Salivary DNA was amplified, genotyped for *APOL1* risk alleles, and categorized as having 0-1 or 2 risk alleles. Associations between risk alleles and CKD and proteinuria were estimated using Fisher's exact test. Renal outcomes were extended to include uPCR ≥0.5 and eGFR <60 and <80 mL/min/1.73 m^2.

RESULTS: 406 of 448 subjects had *APOL1* genotyping performed; 295 (73%) self-identified as AA. Their mean age was 11.5±2.5 yrs. The frequency of 1 and 2 risk alleles was 43% (127/295) and 13% (38/295) respectively in AA, and 34% and 9% respectively in the whole cohort. All 38 participants with 2 risk alleles self-identified as AA; only 11 with 1 did not. In AA children, CKD was present in 17 (5.8%), proteinuria ≥0.2 in 58 (20.3%), proteinuria ≥0.5 in 18 (6.3%), eGFR <60 in 11 (3.7%) and eGFR <80 in 54 (18.3%). Two *APOL1* risk alleles compared to 0-1 was not associated with these renal phenotypes in AA children and the whole cohort.

CONCLUSIONS: *APOL1* risk alleles are common in AA in this US cohort of children with PHIV, with a frequency of 13% for two risk alleles. However, no association with CKD, proteinuria or reduced eGFR was observed.

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9:00am

Medical Student

Assessing Current Physician Practices in the Management of Children Hospitalized for Community-Acquired Pneumonia

Zunaira Choudhary, Russell J. McCulloh, Crystal-Rose Cuellar, Michael Koster, Brian K. Alverson. Warren Alpert Medical School, Brown University, Providence, RI; Pediatrics, Rhode Island Hospital/Brown University, Providence, RI.

BACKGROUND: There remains considerable variability in how pediatricians diagnose and manage community-acquired pneumonia (CAP). In order to address this variability and improve outcomes for children hospitalized with CAP, national guidelines were released in August 2011. These guidelines recommend routine blood cultures for children admitted to intensive care units (ICUs), narrow-spectrum antibiotics for fully-immunized children with uncomplicated pneumonia, and third-generation cephalosporins for children underimmunized for Haemophilus influenzae and pneumococcus.

OBJECTIVE: To assess physician practice patterns for children hospitalized for CAP in the setting of an academic pediatric hospital without a local CAP clinical practice guideline, and compare these practices to national guidelines recommendations.

DESIGN/METHODS: Retrospective chart review of patients aged 3 months to 18 years with admit or discharge diagnosis of CAP January 2011-April 2012 at Hasbro Children's Hospital. Researchers obtained data regarding length of stay (LOS), demographics, past medical history, vital signs, physical exam findings, and diagnostic and therapeutic interventions. Data were analyzed using chi-squared analysis for categorical variables, Mann-Whitney testing for continuous variables.

RESULTS: A total of 314 charts were reviewed. When evaluating diagnostic testing rates for procedures recommended as routine studies for hospitalized children, blood cultures were performed in 51.0% of children hospitalized with CAP overall and in 70.0% of children admitted to the ICU. Sputum cultures, urine pneumococcal antigen testing, and virologic testing were rarely performed. A complete blood count was done in 68.5% of children hospitalized with CAP overall and 77.5% of children admitted to the ICU. Chest radiography (CXR) was done in 304/314 (96.8%) of patients, with 8% of CXR results being read by the radiologist as normal. Use of narrow-spectrum antibiotic therapy in fully immunized children occurred in 63.1% of children, and third generation cephalosporin use occurred in 25.0% of under-immunized children.

CONCLUSIONS: Physician practice at a single children's hospital varied significantly from national guidelines recommendations. This demonstrates a significant potential to improve practice through development of local clinical practice guidelines for diagnosis and management of CAP at our institution.

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9:15am

House Officer

Does Viral Coinfection Impact Bronchiolitis Severity?

Kelly N.F. Fradin, Gabriella Azzarone, Nora Esteban-Cruciani, Joanne Nazif. Pediatrics, Children's Hospital at Montefiore, Bronx, NY; Pediatrics, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Acute viral bronchiolitis is responsible for over 150,000 admissions per year in the United States. With increased accessibility of viral polymerase chain reaction (PCR) testing, we are increasingly aware of specific causative virus(es). However, the implications of viral coinfection on severity of illness have been inconsistently reported in the literature.

OBJECTIVE: To assess whether children with more than one detected viral agent experience a more severe course of bronchiolitis as measured by length of stay (LOS), oxygen use, or admission to the intensive care unit (ICU), when compared with children without detected coinfection.

DESIGN/METHODS: We conducted a retrospective cohort study involving electronic chart review of patients 0-24 months of age hospitalized between January 2007 and December 2010 for bronchiolitis, as determined by ICD-9 codes, in an inner city tertiary children's hospital. We excluded children with neuromuscular conditions, congenital heart disease, immunodeficiencies, chronic lung disease due to prematurity, tracheostomy, sickle cell, cystic fibrosis, and without laboratory testing of the virus by viral culture or PCR. Our viral PCR detects respiratory syncytial virus, influenza, metapneumovirus, rhinovirus, parainfluenza virus, and adenovirus. At our institution, viral testing is done routinely for cohorting purposes. Chi square and t-tests were used to compare patients who tested positive for zero or one virus with those who tested positive for more than 1 virus, to assess various markers of illness severity. Data was analyzed using Stata.

RESULTS: 424 children met inclusion criteria. Of those, 46 (10.8%) had more than 1 virus detected on PCR or culture. Although there was a trend towards increased rates of ICU stay amongst these children, there were no statistically significant differences between children with and without coinfection.

Detected viruses	0 or 1	2 or more	
% with ICU stay	9.8%	17.4%	p=0.11
% with supplemental O2	45.8%	50%	p=0.59
Mean length of stay in days (median)	3.5 (2.8)	3.6 (3.1)	p=0.77

CONCLUSIONS: We found no differences in severity between children with and without coinfection in terms of LOS, oxygen use, or ICU admission. If confirmed, this study may be relevant to cohorting practices during hospitalization. Yet, our population exhibited a lower rate of viral coinfection than that reported in the literature, which may have precluded us from detecting potential differences.

Neonatology I Platform Session

Saturday, March 23, 2013
8:00am–9:30am

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8:00am

Trials of Persistent Pulmonary Hypertension of the Newborn Are Heterogeneous and Often Stopped Early

Annie Giaccone, Elizabeth Foglia, Haresh Kirpalani. Department of Pediatrics and Division of Neonatology, The Children's Hospital of Philadelphia and the University of Pennsylvania, Philadelphia, PA.

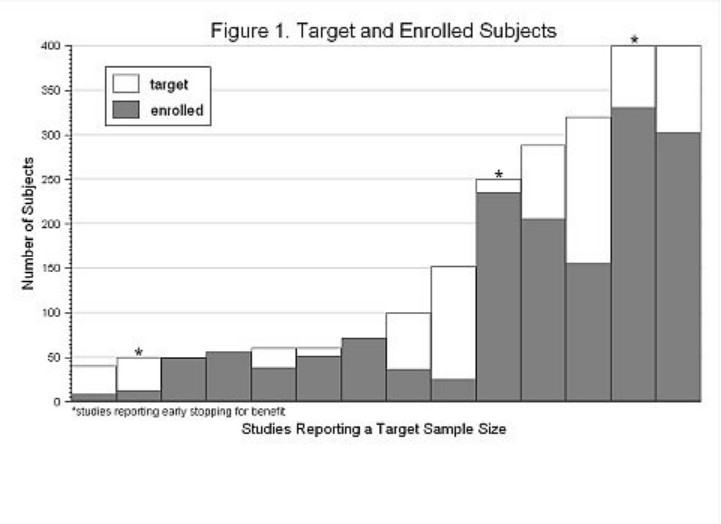
BACKGROUND: Persistent pulmonary hypertension of the newborn (PPHN) continues to have high mortality and morbidity. PPHN is challenging to study due to the severity and volatility of the clinical condition.

OBJECTIVE: (1) To assess the variability of inclusion criteria for clinical trials of PPHN; (2) To examine early stopping of trials in PPHN.

DESIGN/METHODS: All PPHN prospective intervention trials published or registered (clinicaltrials.gov) from 1997-2011 were reviewed for inclusion. Key trial characteristics, eligibility criteria, and enrollment data were abstracted and summarized.

RESULTS: 31 studies (24 published and 7 unpublished) were eligible (inter-rater agreement κ=0.86). **(1) Variable Inclusion Criteria:** Criteria varied but oxygenation index and echo parameters were the most common. The eligibility value for a given criteria was also highly variable (Table 1). **(2) Early Stopping:** Only 14/24 (58%) published studies reported a target sample size. Of these, 79% were stopped early after enrolling only 69% of the target population (Figure 1). Of unpublished studies, 29% reported being stopped early. The most common reasons for stopping early were low enrollment (36%) and benefit (26%).

Table 1.		
Criterion (used by >1 study)	**Number of studies (%) N=31**	**Eligibility value, median (range)**
Oxygenation index	20 (65)	20 (10-40)
Echocardiographic parameters	18 (52)	
Percent inspired oxygen (%)	13 (42)	100 (40-100)
Partial pressure of oxygen (mm Hg)	10 (32)	100 (50-100)



CONCLUSIONS: There are two serious methodologic problems in studies of PPHN. Stopping early is common and highly variable inclusion criteria make study populations heterogeneous and unable to be pooled. These methodologic issues increase the potential for bias. Consensus needs to be obtained on inclusion criteria to aid in designing future clinical trials.

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8:15am

Fellow in Training

Natural History of Pulmonary Artery Pressure (PAP) Changes in Preterm Infants

Hussnain Mirza, James Ziegler, Sara Ford, Richard Tucker, James Padbury, Abbot R. Laptook.
Pediatrics, Women & Infants Hospital/Brown University, Providence, RI; Pediatric Cardiology, Hasbro Children's Hospital/Brown University, Providence, RI.

BACKGROUND: PAP normalizes by 2 wks of life in preterm infants. Severe respiratory disease can be associated with pulmonary hypertension (PH). Changes in pulmonary artery pressure are understudied in preterm infants.

OBJECTIVE: To define the temporal profile of PAP in preterm infants with and without early pulmonary hypertension (early PH) between 10-14 days of age.

DESIGN/METHODS: Subjects were a subset of infants <28wks admitted to the Women & Infants Hospital NICU and enrolled in a prospective study to find associations between early PH and BPD. Exclusion criteria were major congenital heart disease, pulmonary anomaly or genetic syndromes. First study echocardiogram (echo) was between 10-14d of life. Infants with early PH were matched by gestational age (GA) with 2 infants with no early PH. Serial echoes were done every 7-10 days until 36 wks post-menstrual age (PMA) and were reviewed by pediatric cardiologists. Systolic PAP was estimated by measuring TR jet or PDA gradient, or from end systolic ventricular septal configuration (normal-No/Mild PH, flat-Moderate PH, reverse bowing-Severe PH) in the absence of TR/PDA. Findings were grouped as no or mild PH (sPAP [sPAP] < 50% of systolic blood pressure [sBP]), moderate PH (sPAP >50% but <100% of sBP), and supra-systemic PH (sPAP > sBP).

RESULTS: From 3/11 to 10/12, 97 of 104 eligible infants were enrolled in the primary study. Eight had early PH. Matched infants (n=14) were similar to early PH group for % male (42% vs 50%), GA (25.3±0.2 Vs 25.1±1.4wks) and birth weight (806±178 Vs 821±164 g). Infants with early PH had 61 serial echoes (Median 7/infant, range: 6-9) and matched infants had 97 echoes (median 6/infant, range: 6-11). All infants with early PH had moderate PH which was resolved by a median age (range) of 31 d (20-47-d) and PMA of 30.3 wks (27.1-32wks). Five infants without early PH developed PH, 2 of whom had moderate PH detected on day 19 and 20 (28.5 and 26.3wks PMA) associated with large PDAs. Their PH resolved by day 37 and 49 respectively. At 36wks PMA two infants had severe PH and 1 had moderate PH all associated with BPD. Among these 3 infants, 1 died of sepsis, 1 required prolonged ventilation, iNO and sildenafil, and 1 was weaned to room air.

CONCLUSIONS: We confirmed different temporal profiles of PAP in preterm infants. Early PH resolves prior to 36wks PMA. However, PH may occur associated with concurrent neonatal morbidities during the NICU hospitalization.

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8:30am

Fellow in Training

Pulmonary Hypertension in Preterm Infants: Prevalence and Associations with BPD

Hussnain Mirza, James Ziegler, Sara Ford, Richard Tucker, James Padbury, Abbot Laptook.
Pediatrics, Women & Infants Hospital of Rhode Island, Providence, RI; Pediatric Heart Center, Rhode Island Hospital, Providence, RI.

BACKGROUND: Alveolar growth arrest and pulmonary vascular hypoplasia characterize new Bronchopulmonary Dysplasia (BPD). Vascular injury secondary to Pulmonary Hypertension (PH) could be an etiology for new BPD. The prevalence and associations of PH with BPD have been understudied.

OBJECTIVE: Early PH (10-14 d) is associated with moderate/severe BPD and/or PH at 36 wks post menstrual age (PMA) in Extremely Low Gestational Age Newborns (ELGAN).

DESIGN/METHODS: This was a prospective observational cohort study of infants < 28wks gestation. Exclusion criteria were major congenital heart disease, pulmonary anomaly, genetic syndrome or death prior to the first study echocardiogram (echo). Echoes were performed between 10-14 d of life and at 36 wks PMA to determine PH. Echoes were read by either of two pediatric cardiologists for the presence and severity of PH. BPD and its severity was determined by the NIH consensus definitions using an O_2 room air challenge reduction. Maternal, perinatal and neonatal variables were compared among infants with moderate/severe PH and with mild or no PH (no PH). Associations between PH and BPD were expressed as a relative risk (RR) and 95% confidence interval (CI). Calculated sample size is 125 infants and enrollment is ongoing.

RESULTS: From March 2011 to Sept 2012, 98 infants were eligible, 4 died before initial echo, 4 denied consent and 90 were enrolled. On initial echo, 8 infants had early PH (<10%) and 82 had no PH. Male gender (50% vs 61%), gestational age (25.1±1.4 Vs 25.6± .2 wks), birth weight (806±178 Vs 834± 204g) and SGA (13 vs. 12%) were similar among PH and no PH infants. Groups were similar for maternal race, smoking, hypertension, diabetes, chorioamnionitis, SSRI or NSAIDs intake. PH infants were more likely to require > 0.3 FiO_2 by 10 DOL (62% Vs 32%, p<0.05). Moderate or severe BPD was higher among infants with early PH (88%) compared to no PH (57%) RR 1.5, 95%CI 1.09-2.51. PH at 36wks occurred in 4 infants with moderate or severe BPD (5%), 2 of whom died within a month of PH detection. Early PH was not associated with PH at 36 wks (RR 1.03, 95% CI 0.99 – 1.08).

CONCLUSIONS: Early pulmonary hypertension occurs in <10% of ELGANs and is associated with moderate/severe BPD. PH does occur with BPD at 36 wks PMA, but early PH does not predict PH at 36 wks PMA.

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8:45am

Near-Infrared Spectroscopy (NIRS) Evaluation of Sodium Bicarbonate ($NaHCO_3$) Corrections in Very Low Birth Weight (VLBW) Neonates

Jonathan P. Mintzer, Boriana Parvez, Michael Chelala, Gad Alpan, Edmund F. La Gamma.
Department of Pediatrics, Division of Neonatal-Perinatal Medicine, Stony Brook Long Island Children's Hospital, Stony Brook, NY; Department of Pediatrics, Division of Newborn Medicine, Maria Fareri Children's Hospital at Westchester Medical Center, Valhalla, NY.

BACKGROUND: In VLBW neonates during the first postnatal week, urine bicarbonate losses from immature renal tubules can result in significant metabolic acidosis. To ensure the optimal homeostatic benefits of a normal blood pH, $NaHCO_3$ correction is occasionally undertaken to replace lost renal bicarbonate. It is unknown whether $NaHCO_3$ corrections confer a measurable benefit on oxygen delivery and consumption parameters in this population.

OBJECTIVE: To determine the effects of $NaHCO_3$ replacement of renal bicarbonate losses on cardiopulmonary, laboratory, and tissue oxygenation parameters in VLBW neonates.

DESIGN/METHODS: Data were collected in an observational NIRS survey of 500-1250 g neonates during the first postnatal week. A before-after analysis of $NaHCO_3$ corrections (0.3 x weight [kg] x base deficit [mmol/L]; infused over 30 minutes) of suspected renal bicarbonate wasting was conducted upon cardiopulmonary, laboratory, and cerebral, renal & splanchnic NIRS data.

RESULTS: Twelve subjects received a total of 17 $NaHCO_3$ corrections. Gestational age was 27 ± 1 wk (mean ± SEM) and birth weight was 912 ± 45 g. All subjects were in stable clinical condition with normal blood pressure and heart rate. $NaHCO_3$ corrections delivered a mean fluid bolus of 4.5 mL/kg and shifted the base excess from -7.6 ± 0.4 to -3.4 ± 0.5 ($p < 0.05$) with an increase in median pH from 7.23 to 7.31 ($p < 0.05$). No significant changes were observed in systolic or diastolic blood pressure, pulse oximetry, pCO_2, lactate, sodium, BUN, creatinine, or hematocrit. Cerebral, renal, and splanchnic rSO_2 were 74, 66, and 44% respectively at baseline and were unchanged in response to $NaHCO_3$ correction. Cerebral, renal, and splanchnic fractional tissue oxygen extractions were 0.21, 0.29, and 0.52 respectively at baseline and were also unchanged following $NaHCO_3$ infusion.

CONCLUSIONS: Correcting metabolic acidosis attributed to renal bicarbonate wasting in this cohort of VLBW neonates produced no discernible effects on cardiopulmonary parameters including rSO_2 and FTOE. A definitive benefit of $NaHCO_3$ correction cannot be supported by this analysis. We speculate that real-time changes in rSO2 and/or FTOE may aid in distinguishing renal bicarbonate wasting from metabolic acidosis caused by oxygen delivery/consumption imbalance, thus potentially enabling greater precision in promptly directing appropriate therapies to specific mechanisms.

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9:00am

Medical Student

Toluene Disruption of L1-Mediated Neurite Outgrowth

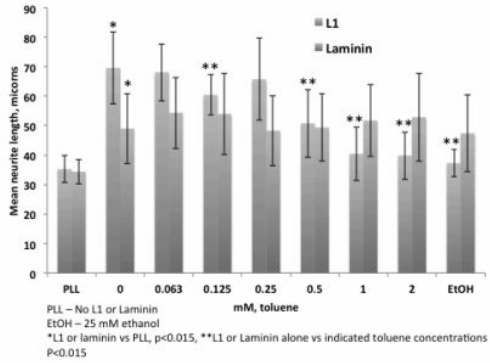
Kimberly M.R. White, Penny Bamford, Min He, Ningfeng Tang, Cynthia F. Bearer.
Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

BACKGROUND: Toluene is a neurotoxicant used as an organic solvent in industry, found in many household cleaning products, and is the main component in spray paint, glues, and other inhalants used by solvent abusers. Toluene exposure during pregnancy can lead to fetal solvent syndrome, which is phenotypically similar to fetal alcohol syndrome. The mechanism by which toluene affects fetal neurodevelopment is still unknown, but recent work has shown that other solvents, such as ethanol, disrupt protein-lipid raft interactions. This disruption leads to reduced neurite outgrowth (NOG) on a lipid raft dependent substrate, such as L1 cell adhesion molecule (L1), but not on a lipid raft independent substrate such as laminin.

OBJECTIVE: Our hypothesis is that toluene, like ethanol, disrupts protein-lipid raft interactions.

DESIGN/METHODS: Pharmacologically relevant concentrations of toluene (0.063 to 2 mM toluene) are used, similar to blood concentrations routinely found in solvent abusers and in

individuals in environments with high concentrations of toluene. Cerebellar granule neurons (CGN) are plated on tissue culture plates prepared with poly L-lysine (PLL) or with either laminin or L1. CGN are cultured overnight in a toluene containing serum free defined media, then fixed and neurite length measured by a blinded investigator.
RESULTS: L1 and laminin significantly increased mean neurite length over PLL. Toluene significantly reduced mean neurite length of CGNs grown on L1 but not laminin. Toluene concentrations down to 0.125 mM significantly reduced mean neurite length of neurons grown on L1.



CONCLUSIONS: Toluene significantly reduced L1-mediated NOG but not laminin. These results suggest that toluene acts on lipid raft-protein interactions at environmentally relevant concentrations.

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9:15am

Alteration of Nitric Oxide Pathway in Preterm Ovine Fetal Mesenteric Arteries with Antenatal Betamethasone, Enteral Feeds and Packed Red Cell Transfusions

Jayasree Nair, Sylvia F. Gugino, Lori Nielsen, Bobby Mathew, Satyan Lakshminrusimha.
Neonatology, University at Buffalo, Buffalo, NY.

BACKGROUND: Antenatal betamethasone (beta) is associated with decreased incidence of NEC. We have previously shown that beta and enteral feeds decrease constriction to norepinephrine (NE) and enhance relaxation to nitric oxide (NO) donor in 134d ovine mesenteric arteries (MA) (Nair et al PAS 2011). Packed red cell (PRBC) transfusions increase mesenteric vasoconstriction in fed preterm ovine MA (Nair et al PAS 2012). NO is an important regulator of vasomotor tone in MA.
OBJECTIVE: To determine the effects of beta, feeds and PRBC transfusions on the NO pathway in preterm ovine fetal MA.
DESIGN/METHODS: Time dated pregnant ewes were injected with beta(n=6) or placebo(n=6) at 132 & 133d GA(term-145d), delivered by C-section at 134d and sacrificed at birth. Eight additional 134d lambs were ventilated for 24h and fed expressed breast milk(5 ml/kg q3h) from 6h of age. Five of these lambs received 3 PRBC transfusions(10ml/kg) at 9, 15 and 21h of life. qRTPCR assays and western blots for protein were performed for eNOS, soluble guanyl cyclase(sGC) and phosphodiesterase 5(PDE5). Functional assessment of basal NO activity was done by measuring increased contractile activity following pretreatment of MA rings with L-nitro-arginine(LNA, 10^{-3}M).
RESULTS: Antenatal beta increased expression of eNOS, sGC and PDE5 mRNA and protein in fetal MA. eNOS mRNA and protein expression increased with feeds but reduced with transfusions.

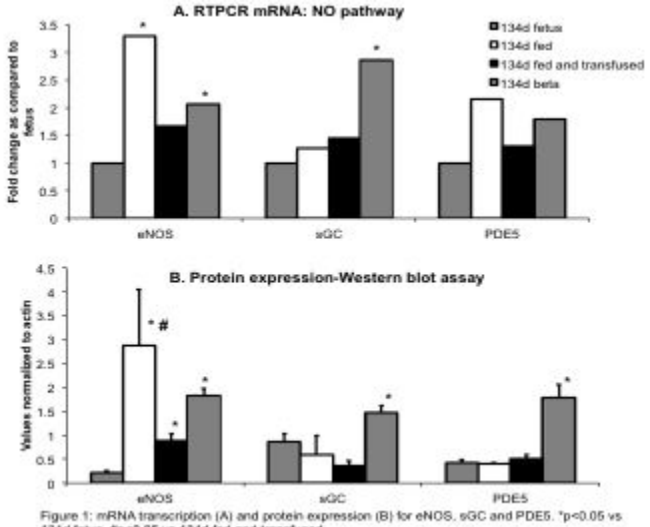

Figure 1: mRNA transcription (A) and protein expression (B) for eNOS, sGC and PDE5. *p<0.05 vs 134d fetus #p<0.05 vs 134d fed and transfused

Pretreatment with LNA enhanced constriction to NE 10^{-5} in fetal and fed (51.76% and 71.03%) but not the transfused group (6.57%) suggesting impaired basal NOS activity.
CONCLUSIONS: Beta, enteral feeds and transfusions modify the NO pathway and alter the delicate vasoconstrictor-vasodilator balance in ovine preterm MA. We speculate that the beneficial effects of beta and trophic feeds on NEC and the association of PRBC transfusions with gut injury may in part be mediated by this alteration of the NO pathway.

Adolescent Medicine Platform Session

Saturday, March 23, 2013
9:45am–10:45am

103
9:45am

House Officer

Nutritional Knowledge, Attitude towards Weight and Dietary Practice (KAP) in Adolescents and Their Association with Body Habitus

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BACKGROUND: The prevalence of childhood obesity has risen markedly in recent decades. Knowledge about nutrition is essential for developing healthy dietary habits. It is important to dertermine if obesity is due to poor dietary habits or to lack of proper nutritional knowledge.

OBJECTIVE: To determine KAP among adolescents aged 13 to 18 years and to find if there are any associations with actual body habitus.
DESIGN/METHODS: This was a descriptive, cross-sectional study. Adolescents aged 13-18 years visiting FHMC were enrolled. They were administered a questionnaire assessing KAP, along with demographic data. Nutritional knowledge was scored on a scale from -20 to 20; frequencies of responses were tabulated for attitudes towards weight and dietary practices. Weight and height of participants were measured to determine body mass index (BMI). Exclusion criteria were chronic disease, being on medications, or having a BMI < 5%ile. According to their BMI, participant were grouped as G1 (BMI 5-85 %ile) or G2 (BMI > 85 %ile). Descriptive statistics included frequencies, means and SD. Comparisons between independent variables and BMI groups were evaluated with chi-squares and t-tests, using SPSS software.
RESULTS: Data from 60 participants (30 participants in G1 and 30 participants in G2)were analyzed. In G2, 63% considered themselves overweight or obese, while only 20% of G1 participants considered themselves as such ($p < 0.05$). G2 participants thought more often about losing weight than G1 ($p < 0.05$), and had better dinner portion size control ($p < 0.01$). There were no differences in the amount of soda/sweet drink consumption, snacks consumed daily, frequency of fast food consumption, fruit or vegetable portions, the reading of nutrition labels on food packages, or habitual eating behaviors. Nutritional knowledge was poor in both groups with no difference between groups.
CONCLUSIONS: The majority of overweight and obese adolescents had correct body weight perceptions and were motivated to lose weight. However, nutritional knowledge was poor among most adolescents in our study irrespective of BMI; education about nutrition would be an important step towards healthy dietary practices in this population. While overweight and obese adolescents had better control of dinner portion size, that alone is not sufficient for weight control, and other important measures might need to be implemented for better outcomes.

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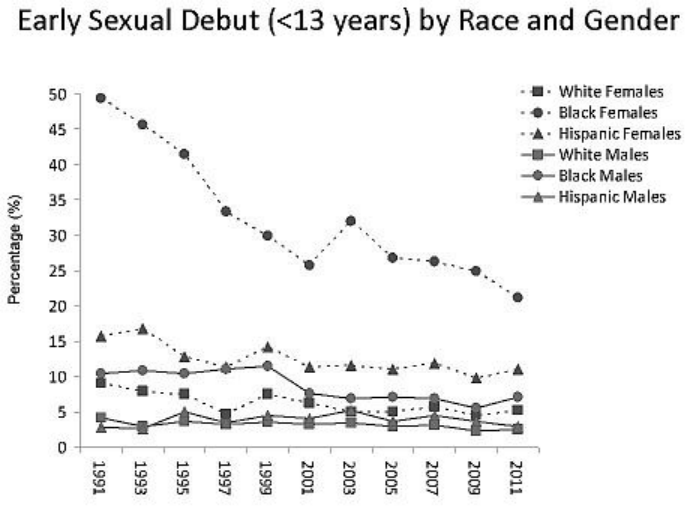
Other

Early Sexual Debut in the United States: Longitudinal Analysis of National Data from the Youth Risk Behavior Surveillance System from 1991 – 2011

Karen Ginsburg, Suzanne Sunday, Andrew Adesman.
Developmental & Behavioral Pediatrics, Cohen Children's Medical Center of New York, New Hyde Park, NY; Biostatistics Unit, Feinstein Institute for Medical Research, Manhasset, NY.

BACKGROUND: Sexual intercourse at a young age puts teenage girls at increased risk for sexually transmitted diseases and unplanned pregnancies.
OBJECTIVE: To characterize longitudinal trends in pre-teen sexual intercourse in the U.S.
DESIGN/METHODS: The CDC collects national data every two years through its Youth Risk Behavior Surveillance System (YRBSS), which uses independent, cross-sectional, 3-stage cluster samples to produce a representative sample of students attending public and private high schools in the U.S. A weighting factor is applied to adjust for oversampling of Black and Hispanic students and for non-responses. Age of first sexual intercourse ("sexual debut", SD) from the 1991 to 2011 YRBSS was dichotomized into ≤12 years (pre-teen) and ≥13 years (teen) and analyzed using SAS survey procedures. Prevalence of pre-teen SD was compared between 1991 and 2011 for Black, Hispanic and White males and females using Wald chi-squares.
RESULTS: Within each racial/ethnic group, pre-teen SD was more prevalent among females than males across all 11 surveys.



Patterns for White and Hispanic males were similar throughout, with about 3-4% self-reporting pre-teen SD. There was a small but significant decrease for White males from 1991 to 2011 (4% to 2.5%). Black males had higher levels of pre-teen SD in 1991 than 2011 (10% vs. 7%), and higher levels than White and Hispanic males at both time points. While all 3 groups of females showed longitudinal declines in pre-teen SD, the largest decline was among Blacks, from ~50% in 1991 to 21% in 2011 (Hispanics: 16% to 11%; Whites: 9% to 5%). Pre-teen SD was significantly more frequent in Black females than all other ethnic groups in both 1991 and 2011.
CONCLUSIONS: Pre-teen SD has declined for some groups of US teens since 1991; however, the prevalence is still alarmingly high for females, especially Black females. Future efforts to delay sexual activity in youth needs to focus especially on minority females.

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10:15am

House Officer

Exploring Medical Homes and Social Needs of Pregnant and Parenting Teens in Northern Virginia

Kristine H. Schmitz, Carmen M. Gill Bailey, Sanda S. Chelliah, Natalie G. McKnight, Riva Kamat.
Dept. of Pediatrics, Inova Children's Hospital, Falls Church, VA; VCU School of Medicine, Inova Fairfax Campus, Falls Church, VA.

BACKGROUND: Northern Virginia is home to a diverse metropolitan population that may be demographically similar to other suburban communities. We hypothesize that while newborn health needs are largely met, teen mothers have unmet health needs.
OBJECTIVE: To examine current teen mothers' strategies of obtaining health care in Northern Virginia and identify unmet medical and psychosocial health care needs of pregnant and parenting teens.
DESIGN/METHODS: A survey was administered to pregnant and parenting teens ages 14-19 years from 4 Northern Virginia communities. Three focus groups were conducted with 2-12 participants ages 15-19 and were recorded, transcribed, and analyzed for themes.
RESULTS: 41 surveys were completed. Participants had a mean age of 17 and were primarily Hispanic (73%), followed by Black (19%) then White (11%). 43% of participants lacked a primary care doctor. Of these, 50% received care at an emergency department and 28% at an urgent care clinic. Almost all mothers (97%) reported first-trimester prenatal care. 80% of the children had a primary care doctor compared to only 57% of mothers. Condoms were the preferred method of contraception (75% pre-pregnancy vs 64% currently), while mothers reported an increase in IUD/implant use post-pregnancy (3% vs 21%). Only 23% of mothers reported sexual health education by their pediatrician. The most common needs identified by mothers include baby supplies, medical care for themselves, and employment. 19 mothers participated in the focus groups and the following health care access themes were identified: 1. **Access Strategies**: Most mothers accessed prenatal care via Medicaid or parental insurance but many lost insurance in the post-partum period. They accessed care using multiple avenues including school-based programs, community-based programs, and maternal family resources. 2. **Health-Seeking Behaviors:** Routine prenatal visits were often the mothers' only regular health care, motivated by their baby's health rather than their own. 3. **Contraception**: Motivation, cost, and lack of communication with their pediatrician regarding contraception led to inconsistent birth control use. Post-pregnancy guidance from their obstetrician increased use among some.
CONCLUSIONS: Pregnant and parenting teens of Northern Virginia face barriers to much needed medical and social interventions due to their lack of access to a medical home.

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10:30am

Other

Electronic Bullying and Recreational Video/Computer Time in U.S. High School Students

Karen Ginsburg, Andrew Adesman.
Developmental & Behavioral Pediatrics, Cohen Children's Medical Center of New York, New Hyde Park, NY.

BACKGROUND: Electronic bullying (EB) is a growing problem. Between 2000 and 2005, there was a 50% increase in 10-17 year old computer users saying that they were a victim of "on-line harassment".
OBJECTIVE: To evaluate new national data regarding teen self-report of: 1) being the victim of EB (VEB) and 2) using computers/video devices ≥3 hours daily.
DESIGN/METHODS: Every 2 years, the CDC's Youth Risk Behavior Surveillance System (YRBSS) uses independent, cross-sectional, 3-stage cluster samples to produce a representative sample of high school (HS) students attending public and private schools in the U.S. In 2011, for the first time, the YRBSS asked 15,425 high school students whether in the past 12 months they have ever been a VEB (including e-mail, chat rooms, instant messaging, Web sites, and texting). Students were also asked "*how many hours do you play video or computer games or use a computer for something that is not school work?*"; analyses focused on students who reported spending on average ≥3 hours daily (3+V/C). Responses were examined for the entire cohort and separately by gender, grade, and ethnicity.
RESULTS: 16.2% of HS students self-reported being a VEB in the past 12 months. VEB was twice as common in females compared to males (22.1% vs. 10.8%; p<.01). This female predominance was noted across ethnic sub-groups [blacks: 11.0% vs. 6.9%, p=0.01; Hispanics: 18.0% vs. 9.5%, p<0.01; whites: 25.9% vs. 11.8%, p<0.01.; Asians: 18.3% vs. 11.2%, p=.08] and across all 4 grades [9th Grade: 22.1% vs. 10.8%, p<0.01; 10th grade: 24.2% vs. 12.6%, p<0.01; 11th grade: 19.8% vs. 12.4%, p<0.01; 12th grade: 21.5% vs. 8.8%, p<0.01]. VEB was twice as common in whites than blacks (18.6% vs. 8.9%; p<.01); 13.6% Hispanics and 14.4% Asians reported VEB. Some differences in VEB across grades were found: 9th - 15.5%; 10th - 18.1%; 11th - 16.0%; 12th - 15.0%. Almost 1/3 of HS students (31.1%) reported ≥ 3 hours daily of video/recreational computer use; this was more common in males than females (35.3% vs. 26.6%; p<.01). 3+V/C was most common in Asians and least common in whites (42.1% vs. 28.1%; p<.01). Some differences were noted across grades: 9th - 32.5%; 10th - 31.6%; 11th - 30.7%; 12th grade - 28.8%.
CONCLUSIONS: Analysis of the first nation-wide CDC survey reveals electronic bullying is relatively common across all HS grades. EB is twice as common in females (vs. males) and whites (vs. blacks). These demographic trends need to be considered in future interventions to reduce electronic bullying.

Cardiology Platform Session

Saturday, March 23, 2013
9:45am–10:45am

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House Officer

Impact of Adolescent Age on Graft Survival in Patients with Congenital Heart Disease Versus Myocarditis

Jill J. Savla, Kimberly Y. Lin, Debra S. Lefkowitz, Stephen M. Paridon, William Gaynor, Rachel Hammond, Robert E. Shaddy, Joseph W. Rossano.
Division of Cardiology, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Adolescents often fare poorly after heart transplantation (HT) compared to other age groups. However, it is unknown if the impact of age varies across diseases leading to HT.
OBJECTIVE: We tested the hypothesis that age-related HT outcomes are different in patients with congenital heart disease (CHD) vs myocarditis.
DESIGN/METHODS: A retrospective analysis of the United Network of Organ Sharing database was performed for patients with myocarditis (n=709) and CHD (n=1,631) undergoing HT from 1987-2011, to assess the effect of age on graft survival. Age was categorized as children (6-12 years), adolescents (13-18 years), younger adults (19-30 years), and older adults (31-50 years).
RESULTS: Adolescents comprised 28% of CHD patients and 14% of myocarditis patients (p<0.001). Compared to older patients, adolescents were more likely to be listed as Status 1A, were less likely to have diabetes, and spent fewer days on the transplant wait list (p<0.05 for all). For CHD, the median graft survival for adolescents was 7.4 years (95% CI 6.4-8.3), which was not significantly different from other ages [9.0 years (95% CI 7.4-10.6) for children (p=0.4), 11.2 years (95% CI 8.6-13.7 for younger adults (p=0.4), and 11.3 years (95% CI 8.0-14.6) for older adults (p=0.3)]. For myocarditis, the median graft survival for adolescents was 6.9 years (95% CI 4.8-8.9), which was significantly lower than other age groups [14.1 years (95% CI 9.8-18.4) for children (p=0.01), 11.8 years (95% CI 8.8-14.8) for younger adults (p=0.08), and 12.0 years (95% CI 10.3-13.7) for older adults (p=0.005)]. On multivariable analysis, adjusting for donor and recipient characteristics, adolescent age was independently associated with worse survival for patients with myocarditis (p=.01), but not for CHD.
CONCLUSIONS: Adolescents with myocarditis have significantly worse graft survival after HT, but adolescents with CHD have similar outcomes to other patients with CHD. Further study is needed to improve outcomes in this vulnerable population.

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10:00am

House Officer

Care for Infants with Hypoplastic Left Heart Syndrome: A Shift in Provider Attitudes between 1995 and 2012

Erin A. Paul, Kristina Orfali, Thomas J. Starc.
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BACKGROUND: Despite improved outcomes for infants with hypoplastic left heart syndrome (HLHS), approximately half of infants in the US still receive comfort care. Factors that influence the advice healthcare providers give to families with HLHS and how attitudes have changed over time are not well understood.

OBJECTIVE: We hypothesized that enthusiasm for surgery for infants with HLHS increased at Columbia University Medical Center (CUMC) between 1995 and 2012 and that more providers now recommend surgery. We sought to identify factors that influence those changes.

DESIGN/METHODS: Confidential surveys were distributed to nurses, cardiologists and intensivists in the neonatal and pediatric ICUs at CUMC in 1995 and 2012 and results were compared. Factors influencing enthusiasm for surgery for HLHS were examined. Surgical preference scores (range 0-70) are presented as mean±SD or %±95%CI. Student t- and chi-square tests were performed as appropriate.

RESULTS: Surveys were completed by 99/176 providers (56% response rate) in 1995 and 134/244 (55%) in 2012. The average surgical preference score increased from 34±14 in 1995 to 42±13 in 2012 ($p<0.001$). Surgical preference scores increased for MDs (36±14 to 44±11, $p<0.02$), RNs (33±13 to 39±14, $p<0.02$), NICU RNs (28±13 to 38±13, $p<0.02$) cardiologists (38±13 to 45±12, $p<0.05$) and neonatologists (31±16 to 43±10, $p<0.05$). 63±8% of respondents recommended surgical intervention for a ward of the court in 2012 compared to 43±10% in 1995 ($p<0.02$). In 2012, 64±11% of respondents reported being more likely to recommend surgery than 10 years prior. 84±6% of respondents in 2012 had seen a patient with a good outcome following three-stage repair compared to 49±11% in 1995 ($p<0.001$). The majority believed that parents should have the option of comfort care, 91±6% in 1995 and 85±6% in 2012, $p=0.2$. In both eras, providers were more likely to recommend surgery for a newborn of older parents who have no other children and used IVF for the pregnancy while prematurity and other surgical problems dissuaded providers from recommending surgical intervention.

CONCLUSIONS: As outcomes have improved over the past 17 years, there has been a significant shift in provider attitudes at CUMC toward surgical intervention for newborns with HLHS. In addition, more providers have now seen good three-stage surgical outcomes. Despite these findings, the majority of providers still believe that the option of comfort care should be provided to families.

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10:15am

Doppler Parameters of Pulmonary Vascular Resistance in the Mid and Third Trimester Fetus: A Study of 51 Prospectively Studied Pregnancies

Yuka Yamamoto, Akiko Hirose, Winnie Savard, Venu Jain, Lisa K. Hornberger.
Fetal & Neonatal Cardiology Program, Pediatric Cardiology, University of Alberta, Edmonton, AB, Canada; Department of Obstetrics and Gynecology, University of Alberta, Edmonton, AB, Canada; Department of Obstetrics and Gynecology, Juntendo University Faculty of Medicine, Tokyo, Japan.

BACKGROUND: Various Doppler-based parameters have been used to assess pulmonary vascular resistance (PVR) in adults with pulmonary vascular disease. Short acceleration to ejection time ratio (AT/ET), high peak early diastolic reversal flow (PEDRF) and high pulsatilty index (PI) of the branch pulmonary arteries (PA) have all been associated with high PVR. In the fetus, pulmonary blood flow has been shown to be 13% of the combined cardiac output increasing to 25% in the late 3rd trimester and remaining unchanged through the remainder of gestation.

OBJECTIVE: The aim of the present study was to investigate changes in fetal PVR using Doppler derived PA flow parameters.

DESIGN/METHODS: Ninety-five fetal echocardiograms were performed in 51 prospectively recruited healthy pregnancies without maternal or fetal disease. Doppler interrogation of both branch PAs was performed from which AT/ET, PEDRF and PI were measured. Data was compared between 3 gestational age periods: Group 1 ≤26 weeks, Group 2 27-31 weeks and Group 3 ≥32 weeks gestation for changes in these PA Doppler parameters. The data were presented as mean±SD and $p<0.05$ was statistically significant.

RESULTS: From the mid to the early third trimester, AT/ET significantly increased and PEDRF, whereas, there was no significant change in either parameter from the early to late third trimester. PA-PI flow did not significantly change from the mid through the late third trimester.

	Group 1 (n=27)	Group 2 (n=30)	Group 3 (n=38)
GA (weeks)	22.5±3.1	29.6±0.8	34.4±1.4
RPA: AT/ET	0.17±0.02	0.19±0.02**	0.20±0.02***
RPA: PEDRF (cm/s)	9.6±2.8	15.3±5.5***	17.1±6.2***
RPA: PI	3.3±0.63	3.3±0.72	3.2±0.83
LPA: AT/ET	0.15±0.02	0.17±0.02**	0.18±0.03***
LPA: PEDRF (cm/s)	8.6±0.05	13.9±6.0***	16.9±5.6***
LPA: PI	3.2±0.72	3.2±0.77	3.0±0.72

** vs Group 1, $p<0.01$, *** vs Group 1, $p<0.001$.

CONCLUSIONS: From the mid trimester to the early third trimester, AT/ET increases which could be in keeping in reduction in PVR that results in increased pulmonary blood flow. That PEDRF increases suggests there may be other factors that influence this parameter including flow. Finally, PA PI may be further influenced by changes in fetal systemic and placental vascular resistance, the latter of which is known to decrease with gestation.

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10:30am

Fellow in Training

The Effect of Modified Ultrafiltration on Angiopoietins in Pediatric Cardiothoracic Surgery

Sean M. Lang, Mansoor Syed, James Dziura, Vineet Bhandari, John Giuliano, Jr..
Pediatrics, Yale School of Medicine, New Haven, CT.

BACKGROUND: Cardiopulmonary bypass (CPB) subjects a patient's blood to hemodilution and nonphysiologic conditions which result in a systemic inflammatory response. Modified ultrafiltration (MUF) counteracts hemodilution, but may also improve outcomes by pro-inflammatory cytokine removal. Vascular growth factors angiopoietin-1 (ang-1) and ang-2 play opposing roles in the capillary leak syndrome seen in patients following cardiac surgery.

OBJECTIVE: We hypothesize that the benefits of MUF include the removal of pro-inflammatory mediators, such as ang-2.

DESIGN/METHODS: We performed a prospective cohort study. All patients ≤ 18 years of age undergoing cardiac surgery with CPB were offered enrollment. Three serum samples were obtained from each patient: 1. preoperatively, 2. following CPB, and 3. upon intensive care unit (ICU) admission. A final fluid sample from the MUF effluent was also analyzed. Ang-1 and ang-2 levels were determined using sandwich ELISA. The MUF effluent was used to calculate ang-2 and ang-1 percent extraction. The serum sample trends where analyzed by repeated measures ANOVA and paired t tests. The percent extraction was analyzed using the Wilcoxon Signed Rank Test.

RESULTS: To date, 24 subjects have been enrolled. Ang-2 concentrations were significantly elevated at ICU admission when compared to both pre and post CPB levels (preoperative 7,425 ± 3,811 ng/mL, post CPB 6,430 ± 3,373 ng/mL, ICU admission 11,126 ± 7914 ng/mL; $p<0.01$,). Ang-1 levels significantly decreased across all time points (preoperative 2,987 ± 3,012 ng/mL, post CPB 1,635 ±1,046 ng/mL, ICU admission 1,036 ± 559 ng/mL; $p<0.01$). There was no significant difference between the ang-2 or ang-1 percent extraction within MUF effluent (mean 1.1% ±3.2%, 1.8% ±0.1%; $p=0.34$). In addition, the ang-2/1 ratio significantly increased across all time points (mean 3.65 ± 2.41, 5.84 ± 6.58, 16.16 ± 17.87; $p<0.01$).

CONCLUSIONS: Ang-2/1 ratios significantly increase following CPB in children. The process of MUF removes both ang-1 and ang-2 equally. While data collection is ongoing, our preliminary results suggest that the clinical benefits of MUF cannot be attributed to the removal of larger quantities of ang-2 compared to ang-1.

Fetal Nutrition Platform Session

Saturday, March 23, 2013
9:45am–10:45am

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9:45am

Intravenous Fat Emulsion (IFE) for the Prevention of Parenteral Nutrition Associated Liver Disease (PNALD) in Preterm Neonates

Orly L. Levit, Kara L. Calkins, Lorraine I. Kelley-Quon, Leena C. Gibson, Daniel T. Robinson, David A. Elashoff, Tristan R. Grogan, Matthew J. Bizzarro, Richard A. Ehrenkranz.
Pediatrics, Yale University School of Medicine, New Haven, CT; Pediatrics, David Gefen School of Medicine-UCLA, Los Angeles, CA; Statistics, David Gefen School of Medicine-UCLA, Los Angeles, CA; Pediatrics, Feinberg School of Medicine, Northwestern University, Chicago, IL.

BACKGROUND: Intravenous fat emulsion (IFE) is a component of parenteral nutrition(PN) usually prescribed to promote growth and prevent essential fatty acid deficiency.Use of PN in preterm infants has been associated with PNALD.Data suggest that the development of PNALD might be related with both the type and the amount of IFE.

OBJECTIVE: To test the hypothesis that low dose IFE is a safe and effective preventive strategy for PNALD.

DESIGN/METHODS: Multicenter randomized unblinded controlled trial in preterm infants with GA ≤ 29 weeks who were enrolled in the first 48 hours of life and randomized to receive either standard amount of IFE (3gm/kg/day) or limited amount of IFE (1gm/kg/day). Primary outcome was presence of PNALD at the age of 28 days or when full feeds were reached, whichever was later. PNALD was defined as hyperbilirubinemia with serum direct bilirubin (DB) ≥ 15 % of the total bilirubin, when other causes were excluded and PN was used for at least 14 days. Secondary outcomes were related to safety and included growth parameters (weight at 28 days and at discharge, growth, length and head circumference velocity at discharge), presence of BPD, NEC, ROP, late onset sepsis, length of stay and mortality in both groups.

RESULTS: Between May 2009 and November 2012, 136 infants were enrolled.The two groups were similar with respect to race, gender, GA, BW, antenatal steroids exposure, presence of SGA and NEC. Data are available for 129;there was no difference in the primary outcome, growth parameters at 28 days of life or discharge or other safety outcomes.

Variable	Arm Mean(SD,%)		p-value
	1gm/kg/d(N=63)	3gm/kg/d(N=66)	
BW(gm)	884 (278)	930 (288)	0.34
GA(weeks)	26.4 (1.7)	26.4 (1.7)	0.79
Male gender	40(64)	40(61)	0.73
SGA	17(27%)	11 (17%)	0.16
NEC	11(18%)	9 (14%)	0.52
Weight at 28 days	1120 (356)	1210 (362)	0.17
Weight velocity at discharge	20.0(4.3)	20.1(4.4)	0.86
Duration of TPN	25.5(20.4)	24.7(19.7)	0.83
TB at full feeds	2.7(2.4)	3 (2.7)	0.55
DB at full feeds	0.9(1.4)	0.7(1)	0.56
PNALD	41 (71%)	37 (62%)	0.30
Length of stay	96.5 (53.0)	86.7(34.0)	0.22

Primary outcome and variables for the 1 gm/kg/day and 3 gm/kg/d group.
CONCLUSIONS: Lower amount of IFE was not associated with a reduction in the incidence of PNALD and did not adversely affect growth.
Supported in part by T32/HD-07094 and UL1TR000124.

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10:00am

Graduate Student

Early Parenteral to Enteral Nutritional Transition Does Not Affect Weight Growth Velocity or Length of Hospitalization in Very Low Birth Weight Infants

Eleanor Estebanez, Lakshmi Vaithilingam, Inga Gukhman, Lisa Saiman, Rakesh Sahni.
Pediatrics, Columbia University College of Physicians & Surgeons, New York, NY.

BACKGROUND: Nutritional management of very low birth weight (VLBW) infants (Birth weight <1500g) remains challenging despite improved neonatal survival. In many NICU's despite concerns for infection the transition from parenteral-to-enteral nutrition is often delayed for the fear of suboptimal growth, longer duration of hospitalization and increased incidence of gastrointestinal morbidity in the form of necrotizing enterocolitis (NEC) leading to prolonged use of percutaneous central venous catheter (PCVC). The practice of timely discontinuation of total parenteral nutrition (TPN) and PCVC once adequate enteral nutrition is established is highly variable and inconsistent.
OBJECTIVE: In an ongoing quality improvement initiative addressing catheter linked blood stream infection reduction in VLBW infants, we addressed the issue of timely discontinuation of TPN and removal of PCVC by standardizing early transition from parenteral-to-enteral nutrition and evaluated its effect on the weight growth velocity, length of hospitalization and NEC.
DESIGN/METHODS: The electronic medical records of 153 VLBW infants born between Jan 2011 and Dec 2011 were evaluated. During this period parenteral-to-enteral nutrition transition guidelines were developed and initiated. 110 infants who utilized PCVC and qualified for the study were divided into two groups based on enteral intake volume (<100 ml/kg.d (n=25) and ≥ 100mg/kg.d (n=85)) when the PCVC was removed. Data for weight growth velocity, length of hospitalization and incidence of NEC were compared between the two groups.
RESULTS: Earlier transition from parenteral-to-enteral nutrition and PCVL discontinuation at <100 ml/kg/d enteral intake had no effect on weight growth velocity from birth to discharge (12.5±2.0 vs. 12.1±2.9 g/kg/d, p=NS), weight growth velocity from full enteral intake to discharge (14.4±3.1 vs. 14.1±4.1g/kg/d, p=NS), total length of hospitalization (71.4±33.9 vs. 75.9±32.4 d, p=NS) or incidence of NEC (0 vs. 1.3%, p=NS) compared to when the transition and PCVL discontinuation was delayed beyond 100ml/kg/d enteral intake.
CONCLUSIONS: Our data demonstrates that early parenteral-to-enteral nutritional transition does not affect weight growth velocity or length of hospitalization in VLBW infants. Further research into evaluating barriers towards adherence to standardized nutritional protocols is needed to improve outcome.

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10:15am

Graduate Student

Quality of Diet and Central Nervous System Activity in Low Birth Weight Infants

Jacquelyn Piraquive, Philip Grieve, Kashyap Sudha, Michael Myers, Raymond Stark, Rakesh Sahni.
Pediatrics, Columbia University College of Physicians & Surgeons, New York, NY.

BACKGROUND: Variations in diet are known to influence brain function. It remains unknown whether qualitative and quantitative differences in diet, particularly fat and carbohydrate (CHO) intake, during periods of rapid growth and development can alter central nervous system (CNS) activity.
OBJECTIVE: To evaluate the effects on the brain of variations in non-protein energy substrate, we measured electrocortical (EEG) activity in low birth weight (LBW) infants with different fat and CHO intakes.
DESIGN/METHODS: 62 healthy LBW infants (Bwt=750-1600g) were randomized to receive 1 of 5 formulas differing in quality and quantity of non-protein energy. These formulas provided fixed intakes of protein (4 g/kg/d), but different intakes of fat (4.3-9.5 g/kg/d) and CHO (9.1-20.4 g/kg/d). 6-h studies were performed at 2-wk intervals from the time of full enteral intake until discharge. Infants were randomly assigned to prone or supine sleeping position for the first 3-h postprandial period; the position was reversed during second 3-h. 2-channels of EEG and EKG were recorded continuously and sleep state was coded every minute. Power spectral analysis was performed on EEG data; and total EEG power was segregated into 5 frequency bands: 0-1Hz, 1-4Hz, 4-8Hz, 8-12Hz and 12-24Hz. Total EEG power, absolute (AP) and relative power in each band, spectral edge frequency (SEF), heart rate (HR) and heart rate variability (HRV) were calculated and averaged for each minute by state and posture. Maturational, sleep state, posture changes in EEG and cardiac activity were evaluated in relation to dietary intake.
RESULTS: Increasing fat intake (FI) was associated with increased SEF ($F(4,56)=1.57$,$p=0.03$). Higher AP in the 1-4Hz band was observed at FI >6 g/kg/d vs. ≤6 g/kg/d ($r=0.3$,$p=0.03$). The higher FI group also exhibited increased HRV [$F(4,57)=3.17$,$p=0.02$ (quiet sleep); $F(4,57)=2.97$,$p=0.03$ (active sleep)] and trends for slower HR relative to the low FI group. No significant effect of CHO intake on EEG activity was observed.
CONCLUSIONS: Results aligned with previous reports of maturational changes and sleep state effects by posture in LBW infants. The data demonstrate increased EEG Power in 1-4Hz band and increased HRV (increased parasympathetic activity) at higher FI. This suggests that the effects of nutrition on CNS activity are complex and involve the interplay of a variety of systems and may be manipulated to optimize short and long-term outcomes.

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10:30am

Resting Energy Expenditure in Survivors of Congenital Diaphragmatic Hernia

Heather B. Howell, Christiana Farkouh-Karoleski, Rakesh Sahni.
Pediatrics, New York University, New York, NY; Pediatrics, Columbia University, New York, NY.

BACKGROUND: Infant survivors of Congenital Diaphragmatic Hernia (CDH) are at risk for growth failure from inadequate caloric intake and high catabolic stress. Currently there is no available data on energy expenditure in this population.
OBJECTIVE: To assess caloric intake and Resting Energy Expenditure (REE) in neonates with CDH and compare the values to historical normative data in healthy term neonates.
DESIGN/METHODS: A prospective cohort study of patients with CDH, medically and surgically managed in the neonatal period at the Children's Hospital of New York Presbyterian, was performed. Patient demographics, clinical course and daily caloric intake from parenteral and enteral nutrition during hospitalization were recorded. Fifteen 2-hour bedside REE studies were performed via indirect calorimetry (ParvoMedics, Inc) prior to discharge when infants were on full enteral feeds and without any respiratory support. Minute-by-minute measurements of oxygen consumption, carbon dioxide production and REE were obtained. Data were compared to postnatal REE values obtained in healthy term infants (1) using t-test and the effect of post-natal age (PNA) on REE was evaluated using linear correlation analysis. 1, Bauer J et al. Metabolic rate analysis of healthy preterm and full-term infants during the first weeks of life. Am J Clin Nutr 2009;90:1517-24.
RESULTS: Of the 15 patients who underwent REE studies 53% were male, 73% had left sided defects and the average gestational age was 38.6 weeks with average birth weight of 3.2kg. At the time of the REE the average PNA was 4.1 weeks (1-12) and the average caloric intake, based upon three-day count, was 99.7kcal/kg/d (58.2-127.4). The average REE in infants with CDH was compared to the REE obtained in healthy term infants at various PNA and was not significantly different ($df=3$, $p= 0.29$). Caloric intake by week were similar to the healthy term infants ($df\ 3$, $p=0.4$). The REE in our group increased with increasing PNA ($r=0.51$, $p<0.05$).

PNA (wk)	Energy Intake (kcal/kg/d)		REE (kcal/kg/d)	
	CDH	Healthy Term[1]	CDH	Healthy Term[1]
1	96.6 ± 20.4	57 ± 5	45.9 ± 4.4	42 ± 4
2	92.6 ± 20.6	87 ± 12	46.7 ± 7.3	51 ± 5
4	105.0 ± 0	104 ± 11	51.4 ± 0	60 ± 8
5	105.0 ± 19.6	112 ± 8	57.3 ± 10.9	62 ± 9

CONCLUSIONS: Our data demonstrates that during early infancy REE in infants with CDH increases with increasing PNA and is comparable to that of healthy term infants at various PNA. Further longitudinal studies are needed to evaluate growth failure in these infants.

Medical Education Platform Session

Saturday, March 23, 2013
9:45am–10:45am

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9:45am

Helping Medical Students Use Their HEADDSS: Improving Encounters with Adolescent Patients Using OSCEs

Hai Jung H. Rhim, Ilir Agalliu, Miriam Schechter.
Pediatrics, Children's Hospital at Montefiore, Bronx, NY; Epidemiology and Population Health, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Interviewing an adolescent patient is one of the APA/COMSEP General Pediatric Clerkship Curriculum's skills competencies. Clerkships must teach students the unique aspects of the adolescent interview and, more importantly, provide a means for students to practice. An Objective Structured Clinical Exercise (OSCE) may be a method to ensure this process.
OBJECTIVE: To determine if an OSCE designed to practice the HEADDSS paradigm will improve students' performance in obtaining an adolescent social history.
DESIGN/METHODS: At the end of 3rd year, all students at the Albert Einstein College of Medicine take a Clinical Skills Assessment (CSA) exam during which they have multiple clinical encounters with standardized patients (SP). They generally perform poorly on social history items specific to adolescent patients, as shown by post-encounter checklists for a case of a teenager coming in for a pre-participation sports physical. We instituted two interventions to address this deficiency. First, we incorporated a small group workshop (WS) into the pediatrics clerkship orientation. It focuses on unique aspects of the adolescent interview, including confidentiality and the HEADDSS paradigm. A year later, we implemented a formative OSCE during which students practice these new skills by interviewing SPs who portray a quiet, apathetic adolescent patient. We compared the proportions of students who addressed each HEADDSS item among the 3 cohorts

(pre-interventions, WS only, and WS & OSCE) using chi-square tests.
RESULTS: We collected CSA results on 513 students over 3 years. All numbers represent % of students who addressed each HEADDSS item.

	Pre-interventions	WS only	WS & OSCE	p-value
	N=173	N=174	N=166	
Home	72	85	91	<0.0001
Education	53	71	71	<0.0001
Activities	30	45	66	<0.0001
Drugs				
Cigarettes	78	75	60	<0.0001
Alcohol	84	86	81	0.47
Marijuana	76	79	78	0.73
Depression	39	57	60	<0.0001
Sexuality	60	58	74	0.005
Safety	42	54	61	0.002
Confidentiality	75	75	95	<0.0001

CONCLUSIONS: The addition of an OSCE improved the establishment of confidentiality and all aspects of the HEADDSS exam, except education and drugs. This is on top of improvements due to the implementation of the WS. This highlights the importance of practicing concepts learned in the classroom. An OSCE is the ideal setting for this and can help ensure learners acquire competency in interviewing teenagers.

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10:00am

House Officer

An Educational Intervention on Patient Handoffs

Hannah Stinson, Catherine Skae.
Pediatrics, The Children's Hospital at Montefiore, Bronx.

BACKGROUND: ACGME regulations limiting resident work hours have increased the number of patient hand-offs. Numerous studies have demonstrated that sign-out related issues directly contribute to adverse patient effects. Despite this, sign-out remains unregulated with little to no formal resident training. At our institution,the content of patient handoff information has always been left to the discretion of the house officer providing sign-out.
OBJECTIVE: To determine if the resident sign-out process could be improved by providing residents with formal education on the topic and a standardized tool to guide the sign-out process.
DESIGN/METHODS: We conducted an IRB-approved study in which we recorded nighttime sign-outs on our pediatric inpatient units. Post-call residents completed a survey modeled after an instrument designed by O'Toole (Cincinnati Children's) to measure unanticipated patient occurrences that overnight residents felt could have been prevented by more thorough sign-outs. Mid-way through the residents' rotation, we conducted a workshop on proper sign-out techniques with the introduction of a new sign-out sheet and mnemonic, **CHAMPS**, to serve as a framework: (**C**ondition, **H**PI, **A**larming events, **M**andatory to do list, **P**erson in charge and **S**cenarios). We continued to record and collect post-call surveys for the remainder of the rotation. A total of 105 surveys were analyzed.
RESULTS: The incidence of unanticipated patient occurrences went from 9% pre-intervention to 6% post-intervention (p= .069, Pearson's Chi Square). Residents were more likely to appropriately report abnormal vital signs or physical exam findings 8.3% unreported pre vs. 0% unreported post (p= .03). The time residents spent during an overnight shift searching for information that they felt they should have received during sign-out decreased from 26.8 minutes pre-intervention to 11.4 minutes post-intervention.
CONCLUSIONS: We feel that this pilot study represents a better resident awareness of essential components of a complete sign-out resulting in decreased unanticipated patient occurrences overnight.

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10:15am

Fellow in Training

Communication Skills Utilized by Pediatric Residents When Conducting a Difficult Conversation

Gail S. Cameron, Alexander Agthe, Brenda Hussey-Gardner, Pamela Donohue, Alison J. Falck.
Pediatrics, University of Maryland School of Medicine, Baltimore;
Pediatrics, Johns Hopkins School of Medicine, Baltimore.

BACKGROUND: Conducting difficult conversations is an important skill for pediatricians; parents value knowledgeable and empathetic exchange when receiving difficult news. The ACGME has identified interpersonal and communication skills as a core competency for residents. Clinical training is varied; pediatric residents express lack of confidence in advanced communication skills such as giving bad news.
OBJECTIVE: To determine communication patterns used by pediatric residents when conducting difficult conversations with a simulated parent, and describe the relationship between confidence and communication patterns.
DESIGN/METHODS: During 2011-12, pediatric residents at University of Maryland Medical Center were enrolled. Residents completed a 5-point Likert survey validated by Rider et al, assessing confidence with communication skills. Residents then participated in a video and audio taped encounter with a simulated parent during which the diagnosis of Trisomy 21 in a newborn was disclosed. After debriefing, a post-encounter survey was completed. Roter Interaction Analysis System (RIAS) was utilized to analyze communication patterns by documenting the frequency of verbal exchanges and assigning resident talk to predefined and validated categories. ANOVA was used to compare confidence level with communication patterns.
RESULTS: 35/42 residents participated (PGY1=14, PGY2=11, PGY3=10). 46% were highly confident with responding to emotion, 65% with building rapport, and 80% with showing empathy. However, RIAS data demonstrated that only 22% of resident talk was social-emotional such as building rapport or empathy, and 78% was task-focused, such as providing information or data gathering. There was no relationship between confidence and communication patterns or differences based on PGY. On post-encounter survey, 3 major self-reported strengths were information exchange, social-emotional support, and building rapport. 91% reported a positive experience that highlighted strengths and weaknesses, reinforced skills, and provided a safe practice environment.
CONCLUSIONS: Residents express confidence with social-emotional communication skills, but utilized task-focused communication during the simulated scenario. Curricula should focus on all aspects of effective communication. Simulation may be used as adjunct to clinical experience when teaching and evaluating this important competency. Funded by Mead Johnson Nutr. training grant.

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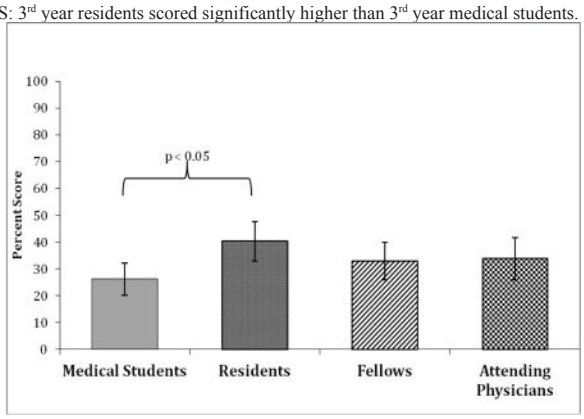
10:30am

Fellow in Training

Using Technology To Study the Art of Medicine

Heather M. French, Katherine A. Durrwachter, Leonard J. Levine, Edward J. Gracely, Keri N. Fugarolas.
Pediatrics, St Christopher's Hospital for Children, Philadelphia, PA; Pediatrics, University of Pennsylvania School of Medicine, Philadelphia, PA; Family, Community and Preventative Medicine, Drexel University College of Medicine, Philadelphia, PA.

BACKGROUND: Advancing medical technology coupled with work hour restrictions has led to physicians spending less time at the bedside of patients. Therefore, the important skill of clinical observation may not be developing in trainees.
OBJECTIVE: This novel study compares observational skills of medical students, residents, fellows, and attending physicians in a simulated inpatient environment in order to assess whether clinical observational skills improve as level of experience increases.
DESIGN/METHODS: 59 participants completed a session in the simulation laboratory at St.Christopher's Hospital. Participants were instructed to write down any visual observations deemed important in 7 minutes. Three investigators preselected 20 key data points from the clinical case and scored the participants' observations, giving points when preselected data points were written. ANOVA with Tukey post hoc testing was used to determine which group means were significantly different from one another. Inter-rater reliability was assessed with intraclass correlation coefficients, calculated using mixed and random-effects models.
RESULTS: 3rd year residents scored significantly higher than 3rd year medical students.



The scores of fellows and attendings were not statistically different from residents. Reliability of the three independent raters was assessed using intraclass correlation coefficients with a two-way random effects model. All correlation coefficients were ≥ 0.95, indicating good reliability.
CONCLUSIONS: The resident mean score was the highest of all groups and significantly higher than medical students. Surprisingly, attending physicians did not score the highest, suggesting clinical observation skills may not improve with experience. Possibly, individual attending physicians develop a personal practice style that biases what they view as important in a patient's environment. This pilot study suggests that the simulated patient environment can be used to further study observational skills.

Neonatal Pharmacology Platform Session

Saturday, March 23, 2013
9:45am–10:45am

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9:45am

Fellow in Training

Long-Term Effect of Src Kinase Inhibition on Caspase-8 Activity Following Hypoxia in the Newborn Piglet Brain

Tania D. Fontanez-Nieves, Dimitris Angelis, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
Dept. of Pediatrics, Drexel University and St. Christopher's Hospital for Children, Philadelphia, PA.

BACKGROUND: Previous studies have shown that activation of caspase-8 is mediated by a non-receptor protein tyrosine kinase, Src Kinase. Hypoxia increases caspase-8 activation in the cerebral cortex of the newborn piglet. It is not known how long does hypoxic activation of caspase-8 persist and whether Src kinase continues to mediate long-term activation of caspase-8 after hypoxia.
OBJECTIVE: The present study tests the hypothesis that increased caspase-8 activity persists at day 1 and 14 after hypoxia in the cerebral cortex of newborn piglets and that inhibition of Src kinase will reduce the activation of caspase-8 up to 2 weeks after the hypoxia.
DESIGN/METHODS: Piglets were divided in 7 groups: Normoxia (Nx, n=4), acute hypoxia (Hx, n=5), hypoxia followed by 1 day (Hx-D1, n=3) and 14 days (Hx-D14, n=3) in FiO_2 0.21, hypoxia pretreated with selective Src kinase inhibitor (PP2, 1 mg/kg, IV 30 min prior to hypoxia, Hx+PP2, n=5) and followed by 1 day (Hx+PP2-1D, n=2) or 14 days (Hx+PP2-D14, n=3) in FiO_2 0.21. Hypoxic piglets were exposed to FiO_2 0.07 for 1 hr then returned to FiO_2 0.21 for 1-14 days. Hypoxia was determined by levels of ATP and phosphocreatinine (PCr). Caspase-8 activity was measured in the cytosol spectrophotometrically.
RESULTS: ATP (µmol/g brain) was 5±0.7 in Nx, 1.94±0.5 in Hx ($p<0.05$ vs Nx), and PCr (µmol/g brain) was 3.4±0.5 in Nx, 1.23±0.38 in Hx ($p<0.05$ vs Nx). Caspase-8 activity (nmols/mg protein/hr) was 1.83±0.73 in Nx, 3.38±0.47 in Hx ($p<0.05$ vs Nx), 2.05±0.45 in Hx+PP2 ($p<0.05$ vs Hx, p=NS vs Nx), 2.53±0.16 in Hx-1D ($p<0.05$ vs Nx; $p<0.05$ vs Hx), 0.91±0.44 in Hx+PP2-1D ($p<0.05$ vs Hx; $p<0.05$ vs Nx), 3.10±0.95 in Hx–14D ($p<0.05$ vs Nx, p=NS vs Hx), 1.43±0.05 in Hx+PP2-14D ($p<0.05$ vs Hx, p=NS vs Nx). The data shows that caspase-8 activity was increased by 38% 1 day after Hx and by 69% 14 days after hypoxia compared to Nx. Caspase-8 activity remained comparable to normoxic level acutely,1 and 14 days after hypoxia when Src kinase inhibitor was administered prior to hypoxia.
CONCLUSIONS: We conclude that Src Kinase inhibition prior to hypoxia abolishes hypoxia-induced activation of caspase-8 in the acute phase of hypoxia and that this effect is sustained up to 2 weeks. We propose that Src kinase inhibition following hypoxia will block both the extrinsic as well as intrinsic mitochondrial mechanisms of cell death and therefore it is a potential strategy for neuroprotection. (NIH 20337).

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10:00am

House Officer

Mechanism of Caspase-2 Expression during Hypoxia in Cerebral Cortex of Newborn Piglets

Bhavi Patel, Dimitrios Angelis, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
Dept. of Pediatrics, Drexel University and St. Christopher's Hospital for Children, Philadelphia, PA.

BACKGROUND: Caspase-2, a cysteine protease, is required for cell death receptor-mediated programmed cell death. Caspase-2 is a developmentally regulated initiator caspase, which poorly cleaves other caspases but can initiate mitochondrial outer membrane permeabilization. We have previously shown that hypoxia results in increased expression of caspase-2 and increased activation of Src kinase, a protein tyrosine kinase in the newborn piglet brain.
OBJECTIVE: The present study tests the hypothesis that hypoxia-induced increased expression of caspase-2 protein in the cerebral cortex of newborn piglets is Src kinase-mediated.
DESIGN/METHODS: Ten newborn piglets were divided into normoxic, (Nx, n=3), hypoxic, (Hx, n=3), and hypoxia pretreated with Src kinase inhibitor, PP2 (4-amino-5-(4-chlorophenyl)-7-(dimethylethyl)pyrazolo[3,4-*d*] pyrimidine, 1 mg/kg, i.v., 30 min prior to hypoxia, Hx+PP2, n=4) groups. Hypoxia was induced by exposing newborn piglets to FiO_2 of 0.07 for 1 hr. Tissue levels of ATP and phosphocreatine (PCr) were determined to document cerebral hypoxia. Cytosol was isolated and expression of caspase-2 determined by Western Blot using a specific caspase-2 antibody. Protein bands were detected by chemiluminescence, analyzed by imaging densitometry and density expressed as OD/mm^2.
RESULTS: ATP (µmoles/g brain) was 4.4±0.4 in Nx, 1.57±0.3 in Hx ($p<0.05$ vs. Nx) and 1.7±0.4 in Hx+PP2 ($p<0.05$ vs. Nx). PCr (µmoles/g brain) was 3.5±0.2 in Nx, 1.3±0.3 in Hx ($p<0.05$ vs Nx) and 1.2±0.3 in Hx+PP2 ($p<0.05$vs Nx). Expression of caspase-2 was 129.31±27.73 in Nx and 258.27±36.73 in Hx ($p<0.05$ vs. Nx) and 119.56±26.81 in Hx+PP2 ($p<0.05$ vs. Hx). The data show that hypoxia resulted in increased expression of caspase-2 in the cytosolic fraction of the cerebral cortex of newborn piglets. Administration of selective inhibitor of Src kinase, PP2 prevents the hypoxia-induced increased caspase-2 expression.
CONCLUSIONS: We conclude that the hypoxia-induced increased expression of caspase-2 in cytosol is mediated by Src kinase. The increased expression of caspase-2 is potentially due to Src kinase mediated phosphorylation of calmodulin that leads to activation of CaM kinase IV and results in CREB protein mediated transcription. The increased caspase-2 activation during hypoxia would lead to increased neuronal death by cell death receptor-mediated mechanism. (NIH 20337).

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10:15am

Fellow in Training

Long Term Effect of Hypoxia on Caspase-1 Activation in the Newborn Piglet Brain

Dimitrios Angelis, Tania D. Fontanez-Nieves, Qazi M. Ashraf, Maria Delivoria-Papadopoulos.
Dept. of Pediatrics, Drexel University and St. Christopher's Hospital for Children, Philadelphia, PA.

BACKGROUND: It is known that caspase-1 activation leads to pyroptosis and the formation of the inflammasomes with end products the induction of IL-1, IL-18 and TNFa. In previous studies we showed that caspase-1 activity and expression is increased during hypoxia. However the long term effect of hypoxia on caspase-1 activation and the inflammatory pathway is not known.
OBJECTIVE: The present study tests the hypothesis that hypoxia induced increased activity and expression of caspase-1 in the cytosol of the cerebral cortex of newborn piglets persists for 14 days.
DESIGN/METHODS: Piglets were divided into 4 groups: Normoxia (Nx, n=5), acute hypoxia (Hx, n=5), hypoxia followd by 1 day (Hx-1D, n=5) and 14 days (Hx-14D, n=5) in FiO_2 0.21. Hypoxic piglets were exposed to FiO_2 0.07 for 1 hr then returned to FiO_2 0.21. Tissue hypoxia was documented by ATP and phosphocreatine (PCr) levels. Cytosol was isolated and caspase-1 activity was determined by spectrophotometry, using a specific substrate (Ac-Trp-Glu-His-Asp-AMC) for caspase-1. Capsase-1 expression was determined by western blot using p-10 light chain rabbit polyclonal antibody. Results were expressed as autoradiographic values (OD/mm_2) as percent of the control (Nx) at the band with molecular weight of 45kd, which corresponds to the precursor caspase-1 molecule.
RESULTS: ATP (µmoles/g brain) was 5.05±0.72 in Nx and 1.94±0.5 in Hx ($P<0.05$ vs Nx), and PCr (µmoles/g brain) was 3.45±0.51 in Nx, 1.23±0.38 in Hx ($P<0.05$ vs Nx). Caspase-1 activity (nmols/mg protein/hr) was 0.74±0.10 in Nx, 1.20±0.14 in Hx ($p<0.05$ vs Nx), 1.23±0.07 ($p<0.05$ vs Nx, NS vs Hx) in Hx-1D, 1.14±0.22 in Hx-14D ($p<0.05$ vs Nx, NS vs Hx). Caspase-1 expression as percent of the control was 94±8.5 in Nx, 114.8±6.4 in Hx ($p<0.05$ vs Nx), 107.3±7.6 in Hx-1D ($p<0.05$ vs Nx, NS vs Hx), 112.3±4.9 in Hx-14D ($p<0.05$ vs Nx, NS vs Hx). The data show that caspase-1 activity and expression are increased in the hypoxic group and this increase is maintained up to 14 days post the hypoxic insult.
CONCLUSIONS: We concluded that the mechanism of increased activation of caspase-1 persists for 14 days following hypoxia, indicating that hypoxia-induced neuroinflammation may be sustained by the synthesis of proinflammatory cytokines such as IL-Iß for a long period after a short hypoxic insult. We propose that the hypoxia-induced activation of caspase-1 is due to both the transcription-dependent as well as transcription-independent mechanisms.

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10:30am

House Officer

Long Term Effect of Src Kinase Inhibition on Phosphorylation of CaM Kinase IV Folowing Hypoxia in the Cerebral Cortex of Newborn Piglets

Matthew Furst, Olha Lynch, Anli Zhu, Maria Delivoria-Papadopoulos.
Dept. of Pediatrics, Drexel University and St. Christopher's Hospital for Children, Philadelphia, PA.

BACKGROUND: We have previously shown that hypoxia results in increased activity of CaM kinase IV in the neuronal nuclei of newborn piglets. CaM kinase IV has been shown to phosphorylate cyclic-AMP response element binding (CREB) protein and regulates the transcription of a number of genes. We also have shown that administration of Src kinase inhibitor prevents the increase in CaM kinase IV activity, an essential step for activation of CREB protein that triggers CREB protein-mediated transcription, during hypoxia.
OBJECTIVE: The present study investigates the long-term inhibitory effect of Src kinase on phosphorylated CaM kinase IV in neuronal nuclei after hypoxia.
DESIGN/METHODS: Sixteen piglets were divided into 6 groups: normoxia (Nx, n=3), acute hypoxia (Hx, n=2), hypoxia followed by 1 day (Hx-1D, n=3) and 14 days (Hx-14D, n=3) in FiO_2 0.21, hypoxia pretreated with Src kinase inhibitor (PP2, 1mg/kg IV 30 min prior to hypoxia) and followed by 1 day (Hx+PP2-1D, n=3) and 14 days (Hx+PP2-14D, n=2) in FiO_2 0.21. Hypoxic piglets were exposed to 1 hour of FiO_2 0.07 and then returned to FiO_2 0.21. Neuronal nuclei were isolated and phosphorylated (active form) CaM kinase IV was immunoprecipated with anti-tyrosine phosphorylated antibody and Western blot analysis performed using a CaM kinase IV antibody. The band density was expressed as absorbance (OD/mm^2).
RESULTS: The average band density in Nx was 228.7, 364 in Hx ($p<0.05$), 489.8 in Hx-1D ($p<0.05$), 582.6 in Hx-14D ($p<0.05$), 180.9 in Hx+PP2-1D, 374 in Hx+PP2-14D. The data show that there is sustained increase in tyrosine phosphorylated-CaM kinase IV expression over a 2 weeks period following hypoxia with a 35% increase after 1 day and 60% increase after 14 days. Administration of Src kinase inhibitor prior to hypoxia significantly decreases p-CaM kinase expression by 63% 1 day after hypoxia, and by 36% 14 days after hypoxia.
CONCLUSIONS: We conclude that tyrosine phosphorylated-CaM kinase IV expression during hypoxia is Src kinase mediated, within effected neurons up to 2 weeks following hypoxia. The data demonstrate the long-term effects of hypoxia on CaM kinase IV mediated cascade of cell death. These results suggest that the CaM kinase IV mediated pathway can be driven by using its activations/inhibitors. We speculate that the inhibition of this pathway with the use of a Src kinase inhibitor prior to hypoxia will decrease the hypoxia-induced cell death.

Saturday, March 23, 2013
9:45am–10:45am

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9:45am

Fellow in Training

Umbilical Catheter Placement without Formulas

Ashish O. Gupta, Morarjee Peesay, Jayashree Ramasethu.
Division of Neonatal-Perinatal Medicine, Medstar
Georgetown University Hospital, Washington, DC.

BACKGROUND: There is currently no universal formula or measurement for accurate placement of umbilical arterial (UAC) and venous (UVC) catheters. Commonly used birth weight (BW) based formulas are inexact: Shukla (1986) UAC= 3xBW+9, UVC=UAC/2+1 and Wright (2008) (BW<1500g) UAC= 4xBW+7. Hypothesis: External morphometric measurements correlate with internal anatomy, obviating the need for formulas.

OBJECTIVE: To determine a new method of estimating an appropriate insertion length of UAC and UVC using morphometric measurements, applicable to all neonates.

DESIGN/METHODS: A prospective study was conducted in NICU infants with UAC/UVC from Mar to Oct 2012. UAC/UVC were placed using Shukla or Wright formulas, and adjusted to appropriate positions: UAC tip between T6-T10 and UVC tip at diaphragm (±0.5cm). After CXR confirmation, final catheter insertion length was recorded. Umbilicus to left nipple (UN) and umbilicus to symphysis pubis (USP) distances were measured. Exclusion: Infants with major congenital anomalies; Stat Test: Fisher's exact test, Pearson's correlation coefficient.

RESULTS: Seventy two infants with UVC and 49 infants with UAC were included. Compared to final appropriate insertion length of UVC, morphometric measurement (UN-1cm) was more accurate and showed significantly better correlation than Shukla formula.

Table 1A: Correlation Coefficient comparing final appropriate insertion length of UVC to morphometric measurements (UN-1cm) and Shukla formula.

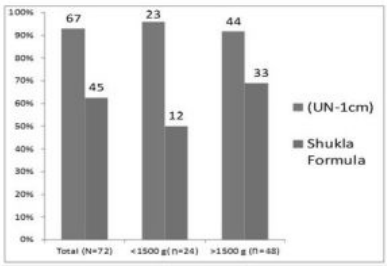
Category	Number of UVCs	UN-1cm	Shukla Formula	p value
Total	N=72	0.98415	0.89831	<0.0001
<1500 g	n=24	0.96476	0.90198	<0.08
>1500 g	n=48	0.95900	0.79173	<0.0001

Table 1B: UVC positions on x-ray related to morphometric measurements (UN - 1cm) and Shukla formula.

Category	Number of UVCs	Correct Position At Diaphragm (±0.5cm)		Over Insertion		Under Insertion	
		UN-1cm	Shukla	UN-1cm	Shukla	UN-1cm	Shukla
Total	N=72	67 (93)*	45 (62.5)	4 (5.6)*	20 (27.8)	1 (1.4)	7 (9.7)
<1500 g	n=24	23 (95.8)*	12 (50)	1 (4.2)*	11 (45.8)	0	1 (4.2)
>1500 g	n=48	44 (91.7)*	33 (68.8)	3 (6.2)	9 (19.7)	1 (2.1)	6 (12.5)

Data shown as n (%) * P<0.01 comparing UN-1cm to Shukla formula.

Figure 1: Comparison of accuracy of placement of UVC using morphometric measurement (UN-1cm) versus Shukla formula.



Compared to final appropriate insertion length of UAC, morphometric measurement (UN+2USP-1cm) was more accurate and showed significantly better correlation than Shukla and/or Wright formulas.

Table 2A: Correlation Coefficient comparing final appropriate insertion length of UAC to morphometric measurements (UN + 2USP - 1cm) and Shukla and Wright formulas.

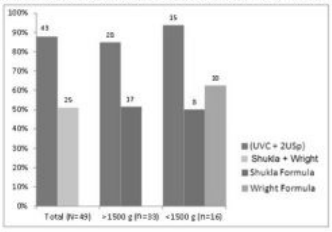
Category	Number of UACs	UN + 2 USP – 1cm	Shukla or Wright (Total)	Shukla	Wright	p value
Total	N=49	0.98615	0.92140	-	-	<0.0001
>1500 g	n=33	0.95720	-	0.78749	-	<0.001
<1500 g	n=16	0.97789	-	0.92011	0.91580	<0.08

Table 2B: UAC positions on x-ray related to morphometric measurements (UN + 2USP - 1cm) and Shukla and Wright formulas.

Category	Number of UACs	Correct Position (Between T6-T10)			Over Insertion			Under Insertion		
		UN + 2 USP – 1cm	Shukla	Wright	UN + 2 USP – 1cm	Shukla	Wright	UN + 2 USP – 1cm	Shukla	Wright
Total	N=49	43 (87.8)*	25 (51)	-	5 (10.2)*	19 (38.8)	-	1 (2)	5 (10.2)	-
>1500 g	n=33	28 (84.9)*	17 (51.5)	-	4 (12.1)*	13 (39.4)	-	1 (3)	3 (9.1)	-
<1500 g	n=16	15 (93.8)*	8 (50)	10 (62.5)	1 (6.2)	6 (37.5)	0	0	2 (12.5)	6 (37.5)

Data shown as n (%) *P<0.02 comparing UN+2USP-1cm to Shukla and Wright formulas

Figure 2: Comparison of accuracy of placement of UAC using morphometric measurement (UN + 2USP - 1cm) versus Shukla and Wright formulas.



CONCLUSIONS: Simple morphometric measurements (UN and USP) are more accurate than formulas for UAC and UVC placement, regardless of birth weight.

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10:00am

Fellow in Training

Quality of Neonatal Chest Compressions in a Simulated Environment

Elizabeth E. Foglia, Jay Patel, Dana Niles, Per Helge Aasland, Anne Ades.
Children's Hospital of Philadelphia, Philadelphia, PA;
Laerdal Medical, Stavanger, Norway.

BACKGROUND: The Neonatal Resuscitation Program (NRP) recommends targeted parameters for neonatal chest compressions. How well NRP providers follow these recommendations is unknown.

OBJECTIVE: To determine the quality of neonatal chest compressions performed by NRP providers in a simulated environment.

DESIGN/METHODS: Fifty NRP providers performed coordinated chest compressions for 3 minutes using the 2-thumb encircling technique on a Sim NewB manikin (Laerdal Medical). A study investigator provided ventilations when instructed by the subject. A compression sensor was placed under the subjects' thumbs, and a commercial monitor/defibrillator system (Heartstart 4000; Laerdal Medical) was used to monitor and record compression data. Data recorded included ratio of compressions to ventilations, delivered chest compressions per minute (CC/min), and length of ventilation breaks. CC/min was compared between the first 30 seconds and the final 30 seconds to assess for provider fatigue.

RESULTS: Of 50 subjects, 48 (96%) performed chest compressions and ventilations in the recommended 3:1 ratio. Analysis was limited to these subjects. Delivered CC/min ranged from 61 to 136. The mean CC/min (99.3, SD 16) was significantly higher than the NRP-recommended value of 90 (p=0.002). Of 48 subjects with the proper ratio, 23 (48%) delivered CC/min within 10 compressions of the NRP-recommended value. Three subjects delivered <80 CC/min, and 22 subjects delivered >100 CC/min. Delivered CC/min did not differ from the first 30 seconds to the last 30 seconds of compressions (p=0.71). Ventilation breaks ranged from 0.28 to 1.1 seconds, with a median of 0.54 seconds. Longer ventilation breaks were observed with lower CC/min, but the percent of time spent in ventilation breaks was consistent across subjects (median 30.5%; IQ range 27%, 32%).

CONCLUSIONS: The number of delivered CC/min and seconds spent in ventilation breaks are highly variable among NRP providers. Further studies should focus on determining if real time feedback improves the consistency of delivered CC/min among NRP providers. Most providers deliver more CC/min than recommended by NRP. This may negatively impact the quality of chest compressions with regard to depth of compressions and allowance of full chest recoil between compressions. More data are needed to assess the impact of number of delivered CC/min on these performance metrics.

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10:15am

In-Hospital Outcomes after Implementation of Evidence-Based Guidelines for the Delivery Room Management of Very Preterm Infants

Sara B. DeMauro, Kelley Karp, Michael Posencheg.
The Children's Hospital of Philadelphia and University of Pennsylvania,
Philadelphia, PA; Hospital of the University of Pennsylvania, Philadelphia, PA.

BACKGROUND: Delivery room interventions can significantly impact outcomes of very preterm infants. We developed guidelines to prevent heat loss, reduce oxygen (O_2) exposure, and better manage respiratory failure in the delivery room, in order to improve outcomes of infants with birth weight <1250 grams.

OBJECTIVE: To report in-hospital outcomes after implementation of evidenced-based guidelines for initial management of very preterm infants.

DESIGN/METHODS: A multidisciplinary team developed and ensured implementation of the guidelines. The new protocol standardizes heat loss prevention, recommends starting supplemental O_2 at 30% and advises a trial of CPAP for all infants. This quality improvement (QI) study compares a historical cohort born 01/09-06/10 (n=80) with a prospective cohort born 10/10-11/11 (n=80), after implementation of the guidelines, to evaluate the impact of the guidelines on patient relevant in-hospital outcomes. We used standard bivariable techniques to compare the two groups.

RESULTS: Baseline characteristics between the groups were similar. We previously reported a significant improvement in the primary outcome of NICU admission temperature (97.5+/-1.4°F vs. 98.1+/-0.7°F, p<0.001) and reduction in exposure to supplemental O_2. We observed significant decreases in duration of ventilation, steroid use for lung disease, and length of stay after the QI initiative.

	Before (n = 80)	**After (n = 80)**	**p-value**
Death	15%	14%	0.80
Supplemental O_2 at 36w	24%	22%	0.76
Steroid treatment for lung disease	17%	3%	*0.004*
Pneumothorax	4%	4%	0.99
Duration of invasive ventilation, days	5 [1, 31]	1 [0, 3]	*0.008*
Duration of non-invasive ventilation, days	26 [8, 39]	18 [3, 30]	*0.04*
Grade III/IV IVH	17%	9%	0.16
PDA	42%	37%	0.55
Necrotizing enterocolitis	14%	11%	0.55
Length of stay, days	80 [59, 100]	60 [50, 80]	*0.02*
Data are displayed as % or median [IQR]. Results are for patients who survived to have the outcome assessed and for whom the outcome is known.			

There was no evidence for harm associated with the QI initiative.

CONCLUSIONS: We have demonstrated significantly improved in-hospital outcomes for very preterm infants at our institution after implementation of a delivery-room based QI initiative. We continue to monitor adherence to the guidelines and seek to continually improve the process of delivery room resuscitation. In next steps, we will expand the intervention to standardize delivery room management of larger infants.

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10:30am

Fellow in Training

National Variability in Neonatal Resuscitation Practices at the Limit of Viability

Bonnie H. Arzuaga, William Meadow.
Pediatrics, Section of Neonatology, University of Chicago Medicine, Chicago, IL.

BACKGROUND: Delivery room management of extremely premature infants is historically not regulated by professional organizations or regulations. In the United States legal definitions of human viability and statutes regarding elective abortions vary by state and are at times intentionally vague, placing providers in an often dubious position of whether to attempt resuscitation when faced with the delivery of an infant of 22-25 weeks gestation.

OBJECTIVE: To delineate any variations in delivery room resuscitation practices of periviable infants.

DESIGN/METHODS: Electronic survey sent to members of AAP Section of Perinatal Medicine. Multivariate logistic regression performed.

RESULTS: 637 completed surveys were returned. The majority (68%) of providers consider 23 weeks to be the youngest age that should be resuscitated at the parents' request, while 25 weeks is considered by 51% to be the youngest age of obligatory resuscitation even if the parents refuse. This did not vary based on age, years of practice, practice setting, religion, political views, or viability laws of providers' State of employment. Significant differences in responses were found when providers were separated into geographical regions based on the US Census Bureau. When provided with delivery room scenarios, what the parents wanted significantly affected resuscitation attempts of 22-25 week, but not 26 week infants. When parental wishes were unknown, birth weight and "how the baby looked" were important factors (Figure 1A). In scenarios of periviable elective terminations, providers' personal belief systems influenced management of aborted fetuses (Figure 1B).

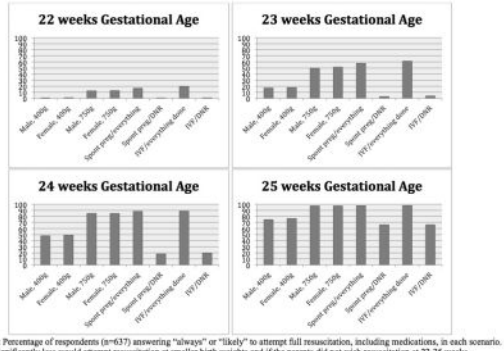

Figure 1A: Percentage of respondents (n=637) answering "always" or "likely" to attempt full resuscitation, including medications, in each scenario. Significantly less would attempt resuscitation at smaller birth weights and if the parents did not wish resuscitation at 22-25 weeks.
*Everything: Parents want "everything done" *DNR: Parents do not wish resuscitation

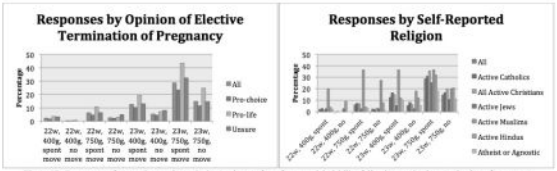

Figure 1B: Percentage of respondents, when asked to evaluate a fetus for potential viability following an elective termination of pregnancy, who answered "always" or "likely" to attempt full resuscitation, including medications.
*spont move: Fetus exhibits spontaneous movement and/or respiratory effort
*no move: Fetus does not exhibit any spontaneous movement and/or respiratory effort

CONCLUSIONS: Significant regional practice variation exists throughout the United States independent of specific state laws. Parental request is the most important factor to providers when faced with resuscitation of 22-25 week infants. Providers personal belief systems, including religion and political views, influence infant management in some situations.

Plenary Session II: Trainee Young Investigator Plenary Session

Saturday, March 23, 2013
2:15pm–3:00pm

127
2:15pm

Fellow in Training

Potential Applications of Multiplex Amplification Respiratory Viral Panel (RVP) Testing in Antimicrobial Stewardship: A Retrospective Analysis

Russell J. McCulloh, Sarah Andrea, Steven Reinert, Kimberle Chapin.
Pediatrics, Rhode Island Hospital/Brown University, Providence, RI;
Pathology, Rhode Island Hospital/Brown University, Providence, RI;
Information Services, Lifespan Healthcare, Providence, RI.

BACKGROUND: Multiplex RVP testing offers enhanced test performance characteristics compared to antigen-based assays, Direct Fluorescent Antibody (DFA) or culture. However, the potential impact of RVP testing on physician antimicrobial prescription practices remains unclear.

OBJECTIVE: To assess the potential impact of RVP testing on physician treatment practices for children hospitalized with acute respiratory illness (ARI).

DESIGN/METHODS: Retrospective chart review of children hospitalized for ARI during peak respiratory viral infection prevalence 2009-2011. Demographics, diagnostic testing, antimicrobial use, and clinical outcomes were abstracted from the electronic medical record. Rates of antimicrobial use were compared to RVP testing data. Respiratory viral panel testing was conducted using the Luminex X-tag RVP (Luminex, Austin,TX.).

RESULTS: A total of 1731 patients met inclusion criteria. Of these, 860 (49.7%) children hospitalized for ARI received antibiotics; 255 (14.7%) received oseltamivir. More children receiving oseltamivir were positive for influenza by RVP (77.1% vs 17.9%, p<0.0001). Children undergoing RVP testing more often received antibiotics than those not tested for respiratory viruses (53.9% vs 46.0%, p=0.001), but children diagnosed with a viral pathogen less often received antibiotics (51.8% RVP vs 67.3%, p=0.003). More children positive for a viral pathogen by RVP had antibiotics discontinued (6.0% vs 0.0%). Additionally, fewer children had antibiotics started after RVP testing was performed (10.9% vs 100.0%, p<0.0001).

CONCLUSIONS: RVP testing was associated with more appropriate oseltamivir use in children hospitalized with ARI. Physicians more often started antibiotics on children with a negative RVP test result than those with positive results and occasionally discontinued antibiotics in children diagnosed with a viral pathogen. These results suggest that RVP testing may enhance physician decision-making when prescribing antimicrobials in children hospitalized with ARI.

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2:30pm

Fellow in Training

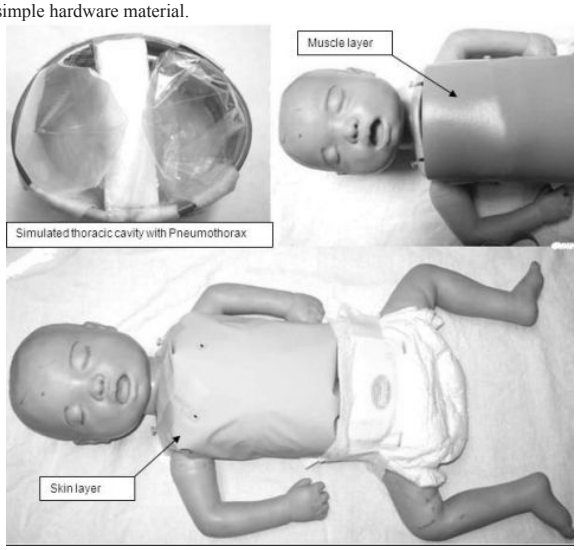
Novel Non-Animal Simulation Trainer for Chest Tube Insertion in Infants

Ashish O. Gupta, Jayashree Ramasethu.
Division of Neonatal-Perinatal Medicine, Medstar
Georgetown University Hospital, Washington, DC.

BACKGROUND: Competence in chest tube insertion procedure (CTP) is vital for practitioners who take care of critically ill infants. Pediatric residents rarely have opportunities to perform CTP. There are no realistic simulation models available for CTP in infants. Ethical and logistic concerns prevent the use of animals for training.

OBJECTIVE: To assess the effectiveness of teaching CTP using an easily constructed, non-animal model.

DESIGN/METHODS: An inexpensive infant CTP model (patent pending) was constructed using simple hardware material.



The model was validated by eight neonatologists. A prospective cohort study with pre-post intervention design was conducted. Pediatric residents completed questionnaires about their experience (E), knowledge (K), self evaluation of knowledge (SEK), comfort (SEC) and skills (SES) three times: pre, post and 1 month after an individual teaching session with video and step by step demonstration of CTP by the preceptor (AOG). Clinical skills (CS) were assessed using a procedure checklist when residents performed the procedure on the model immediately after training and 1 month later. Statistical Test: ANOVA (SAS 9.3).
RESULTS: Of the 47 residents (17 PGY1, 14 PGY2, 16 PGY3), 3 had prior CTP experience and 3 did not repeat 1 month test. All residents had significant improvement in K, SEK, SEC and SES scores immediate post training and after 1 month ($p<0.001$)

	Maximum Scores	Pre (47) Mean ± sd	Post (47) Mean ± sd	1 Month (44) Mean ± sd
K	10	4.8 ± 1.5	8.9 ± 1.1*	8.4 ± 0.9*
SEK	6	1.9 ± 0.9	4.1 ± 0.8*	4.2 ± 0.9*
SEC	8	0.9 ± 1.2	3.8 ± 1.1*	3.9 ± 0.9*
SES	8	0.5 ± 0.8	3.1 ± 1*	3.2 ± 1*
CS	32	NA	29.1 ± 2.1	27.5 ± 1.8

* $p<0.001$ Compared to pre training
sd=Standard Deviation
There was a non-significant decline in CS scores from immediate post-training to after 1 month ($p<0.13$). Scores were not significantly different between the training levels of the residents.
CONCLUSIONS: An easily constructed and inexpensive CTP model is effective in improving knowledge, comfort and skills in trainees. The model can be used repeatedly to maintain proficiency.

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2:45pm

Fellow in Training

Neutralizing IL-4 Rescues Inflammation in Neonatal Islets and Prevents β-Cell Failure in Adult IUGR Rats

Lane J. Jaeckle Santos, Rebecca A. Simmons.
Pediatrics, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Intrauterine growth retardation (IUGR) is linked to the later development of type 2 diabetes (T2D). We have developed an animal model of IUGR, which leads to the development of T2D in adulthood. Inflammation is associated with T2D in both human and experimental models, but it is unknown whether inflammation is causal or secondary to the abnormal metabolic state.
OBJECTIVE: To test the hypothesis that IUGR induces fetal inflammation in the islet which in turn leads to decreased islet vascularity and impaired insulin secretion.
DESIGN/METHODS: Gene expression was measured using microarrays in control and IUGR animals e19 and post-natal day (PD) 14. Pancreas histology and analysis of cytokine and hormone levels were also performed at e19 and PD14. Insulin secretion was measured at 11 weeks of age using perifusion ramp studies.
RESULTS: Microarray analysis of fetal and PD14 IUGR islets showed marked changes in expression of genes regulating immune mediated inflammation, macrophage activation and angiogenesis. Histological examination of fetal and PD14 IUGR islets show decreased capillary density, and invasion by T-lymphocytes and macrophages. Levels of IL-2, IL-4 and IL-10 were significantly elevated in fetal islet lysates, consistent with T-helper 2 immune response. Mcp1 and RANTES levels were also significantly increased in serum from PD14 IUGR rats, consistent with increased monocyte and macrophage recruitment. To determine whether inflammation is responsible for the abnormal ß-cell phenotype, animals received neutralizing IL-4 antibody treatment or vehicle at PD day 1-5. Neonatal neutralizing IL-4 treatment rescued inflammation, restored islet capillary density by PD14, and normalized insulin secretion at 11 weeks.
CONCLUSIONS: Our results demonstrate that adult-onset diabetes secondary to IUGR is both preceded by and caused by fetal islet inflammation, resulting in immune cell invasion, inflammatory cytokine release, decreased islet vascularity and beta cell mass, and increased insulin resistance. Administration of neutralizing IL-4 antibodies at the neonatal stage suppresses inflammatory cytokine levels, normalizes islet vascularity, and permanently restores insulin sensitivity, demonstrating a novel role for Th2 immune responses in the induction and progression of T2D. At the neonatal stage, inflammation and vascular changes are reversible, and may define an important developmental window for therapeutic intervention to prevent adult onset diabetes.

Plenary Session II: Faculty Young Investigator Plenary Session

Saturday, March 23, 2013
3:15pm–4:00pm

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3:15pm

Can Capnography Improve Pediatric Sedation Safety in the Emergency Department?

Melissa L. Langhan, Veronika Shabanova.
Department of Pediatrics, Section of Emergency Medicine, Yale University School of Medicine, New Haven, CT; Yale Center for Analytical Sciences, Yale School of Public Health, New Haven, CT.

BACKGROUND: Children in the emergency department (ED) frequently receive procedural sedation. However, there is a risk of respiratory depression during sedation. Capnography, a continuous noninvasive monitor of ventilation, has been shown to detect hypoventilation and apnea earlier than standard monitoring and thus could improve patient safety.
OBJECTIVE: 1) To determine if adding capnography to standard monitoring for procedural sedation will increase staff interventions in response to apnea and hypoventilation, such as verbal or physical stimulation and airway repositioning. 2) To determine if this will in turn decrease the frequency of oxygen desaturations <95%.
DESIGN/METHODS: This is an ongoing randomized controlled trial of children age 1-20 years who receive procedural sedation in an urban, tertiary care pediatric ED. All staff were trained on interpretation of capnography. Subjects receive both standard monitoring and capnography via a nasal-oral cannula, then are randomized as to whether staff see the capnography monitor (cases) or are blinded to the monitor (controls). Vital signs including end-tidal carbon dioxide ($ETCO_2$) are recorded every 30 seconds and all interventions are recorded regardless of time. Hypoventilation is defined as $ETCO_2$ >50mmHg or <30mmHg without crying or hyperventilation.
RESULTS: Preliminary data is presented for 139 eligible subjects, 68 controls and 71 cases. Mean age was 8.4 years, 59% were male, and 57% white with no significant differences between groups. Mean length of sedation was 33 minutes. While a similar proportion of cases and controls hypoventilated (46% vs. 45%), a significantly higher rate of events occurred over time among controls ($p=.01$). Interventions were performed significantly less often among cases (OR 0.4, 95% CI 0.2, 0.8), but were more likely to occur in response to hypoventilation (OR 2.4, 95% CI 1.2, 4.7). Overall, when interventions were in response to hypoventilation, the odds of oxygen desaturation were significantly less (OR 0.2, 95% CI 0.1, 0.5).
CONCLUSIONS: Providers with access to capnography provided fewer, but more appropriate interventions for their patients, which led to fewer episodes of hypoventilation and oxygen desaturations. Capnography may increase patient safety during sedation by providing staff with a more sensitive monitor of ventilation. This may provide more accurate recognition of hypoventilation as compared with pulse oximetry and clinical examination and allow for effective interventions to take place.

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3:30pm

Identification of RNA Biosignatures in Adolescent Girls with Pelvic Inflammatory Disease Presenting to a Pediatric Emergency Department: A Pilot Study

Fran Balamuth, Zhe Zhang, Eric Rappaport, Katie Hayes, Cynthia Mollen, Kathleen Sullivan.
Pediatrics, Division of Emergency Medicine, The Children's Hospital of Philadelphia, Philadelphia, PA; Children's National Medical Center, Washington, DC; University of Pennsylvania School of Medicine, Philadelphia, PA.

BACKGROUND: Adolescents are at high risk for pelvic inflammatory disease (PID). Because PID is difficult to diagnose accurately, and the complications of untreated PID can be significant, the development of novel methods to improve the diagnosis is essential.
OBJECTIVE: To determine if patients with PID have unique RNA expression patterns compared to controls.
DESIGN/METHODS: Peripheral blood was collected from adolescent females diagnosed clinically with PID in the ED, as well as from a similarly-aged control group presenting to the OR for elective non-abdominal surgery. RNA was isolated and subjected to microarray analysis. Initial analysis was performed on a training set of 18 patients (9 PID patients with either Neisseria gonorrhea (GC) or Chlamydia trachomatis (CT) infection and 9 control patients). Supervised and unsupervised cluster analysis was performed, followed by network analysis using Ingenuity software. The training set was used to classify a set of 15 additional patients with clinical PID who did not have GC or CT and 2 controls.
RESULTS: Supervised cluster analysis of the training set revealed 170 genes (FDR=0.04) which were differentially expressed in PID patients vs. controls. Network analysis indicated that several of the differentially expressed genes are involved in immune activation. Analysis of the additional PID patients based on the training set findings revealed that patients with positive testing for Trichomonas vaginalis partitioned with the PID group, while patients with no organism identified partitioned with both groups. In order to investigate the fraction of gene expression variability which might be explained by known clinical and laboratory values, we evaluated the association of a composite gene expression profile variable with white blood cell count, duration of symptoms, urinary tract infection, and c-reactive protein (CRP). These results demonstrate possible contribution from CRP.
CONCLUSIONS: Collecting RNA samples from adolescents in an ED setting is feasible. 170 genes were identified that were differentially expressed in PID patients compared to controls, many of which are involved in the inflammatory process. Future studies should confirm the training set findings on a larger sample and perform further analysis on select genes. Ultimately, we hope these findings will lead to improved accuracy of diagnosis of PID.

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3:45pm

Optimal Heart Rate Cut-Off for Initiation of Chest Compressions during Neonatal Resuscitation

Bobby Mathew, Jayasree Nair, Daniel D. Swartz, Changxing Ma, Vinay Sharma, Sylvia F. Gugino, Carmon Koenigsknecht, Satyan Lakshminrusimha.
Department of Pediatrics, University of Buffalo, Buffalo, NY; Department of Biostatistics, School of Public Health and Health Professions, University of Buffalo, Buffalo, NY; Department of Physiology, University of Buffalo, Buffalo, NY.

BACKGROUND: The current neonatal resuscitation program guidelines recommend initiation of chest compressions for heart rate < 60 beats per min (BPM). The heart rate at which coronary perfusion pressure and cerebral blood flow decrease significantly is not known. Coronary perfusion pressure is dependent on diastolic BP.
OBJECTIVE: To study the relationship of the changes in mean and diastolic BP and carotid blood flow with heart rate during asphyxiation in neonatal piglets.
DESIGN/METHODS: Neonatal piglets (0-3d old, n=17) were intubated and anesthetized with isoflourane. Right carotid arterial, jugular venous and right femoral lines and a left carotid artery flow probe were placed. Piglets were asphyxiated by endotracheal tube occlusion to the point of asystole. The heart rate range at which significant drop in mean and diastolic BP and CBF was estimated. The change point was calculated by the MCMC method using SAS statistical

software.
RESULTS: There is a gradual declince in BP and carotid blood flow with decreasing heart rate with most precipitous drop occuring at < 80 BPM. Carotid blood flow significantly decreases below 130 and 120 BPM [figure 1] The change point for the heart rate (the heart rate at which the slope of the trend line in a scatter-plot changes) with reference to diastolic BP is at 59 BPM (IQR 57-61), 69 BPM (IQR 69-71) for mean BP and 49BPM (IQR 44-54) for carotid blood flow.
CONCLUSIONS: A marked decrease in BP and carotid flow occurs at heart rate < 80 BPM in neonatal piglets. Anesthesia prior to asphyxiation may have influenced the results of this study. It is also not known if hemodynamic changes during the process of asphyxiation are similar to those during resuscitation. Further research performed during the resuscitation phase is required to precisely determine the optimal cut-off for initiation of chest compressions. The current study suggests that it may be higher than the currently recommended heart rate of <60 BPM.

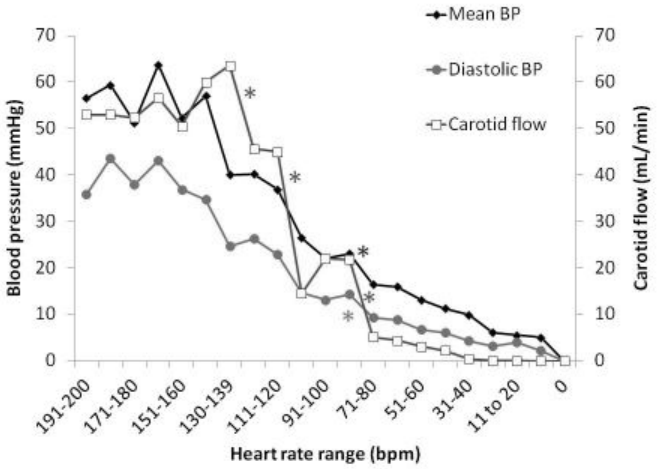

Figure. Change in median blood pressure (mean and diastolic) and left carotid flow in piglets following asphyxiation by ETT occlusion plotted against heart rate. (* p < 0.05 compared to next higher heart rate range).

Breastfeeding Platform Session

Saturday, March 23, 2013
4:15pm–5:45pm

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4:15pm

Impact of Natural Breast Milk Oligosaccharides on the Premature Infant Microbiota and Adaptive Immunity

M. Susan Latuga, J. Christopher Ellis, Lars Bode, C. Micheal Cotten, Ronald Goldberg, Yiting Yu, Robert B. Jackson, Patrick C. Seed.
Pediatrics, Albert Einstein College of Medicine, Bronx, NY; Biology, Duke University, Durham, NC; Pediatrics, University of California at San Diego, San Diego, CA; Pediatrics, Duke University, Durham, NC; Epidemiology and Population Health, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Extremely preterm infants experience significant inflammation-related morbidities which are reduced with breast milk feedings. Using culture methods in term infants, oligosaccharides in breast milk promote the growth of specific bacteria in breast milk and infant stool. Molecular methods for identifying bacteria may more accurately represent the microbiota present in a premature infant's intestinal tract. Variations in intestinal bacteria may influence development of the peripheral immune system.
OBJECTIVE: To assess associations between oligosaccharides in breast milk, bacterial composition in breast milk and infant stool, and cytotoxic response cell abundance.
DESIGN/METHODS: During the first 4 weeks of feeding, weekly breast milk and infant stool samples were collected from premature infants (n=8). Oligosaccharide content of breast milk was determined using high performance liquid chromatography. 16s rDNA amplification of DNA was applied to breast milk and infant stool samples using universal primers. Amplicons were sequenced using 454 Titanium FLX sequencing. During week 4 of feeding, a peripheral blood sample was obtained from infants for immune cell profiling. Multi-gated fluorescence-activated cell sorting was used to determine immune phenotype. Correlations were calculated using Spearman's correlation coefficient.
RESULTS: Mean gestational age and birthweight were 27 weeks and 771 grams, respectively. Oligosaccharide 3FL was negatively associated with a *Staphylococcus* genetic signature ($p<0.01$) in breast milk. 2'FL, 3FL, 3'SL, LNFPI, and LNFPII all had significant correlations with abundance of specific bacterial genetic signatures in infant stool. The proportion of *Enterobacteriaceae* genetic signatures found in the intestinal tract during week 1 of feeding was negatively associated with CD8 cell counts during week 4 of feeding ($p=0.03$).
CONCLUSIONS: Specific oligosaccharide fractions in breast milk may affect bacterial composition in breast milk and the premature infant intestinal tract. Varying infant immune profiles associated with specific composition of intestinal microbiota suggest a possible means for enhancing immune development in these infants.

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4:30pm

Fellow in Training

Do Thawing and Warming Affect the Integrity of Human Milk?

Deepali Handa, Ali Faraghi Ahrabi, Champa N. Codipilly, Syed A. Shah, Samantha Ruff, Debra Potak, Richard J. Schanler.
Neonatal-Perinatal Medicine, Cohen Children's Medical Center of New York, New Hyde Park, NY; Lilling Family Neonatal Research Lab, Feinstein Institute for Medical Research, Manhasset, NY; Pediatrics, Hofstra North Shore-LIJ School of Medicine, Hempstead, NY.

BACKGROUND: As most neonates in the NICU are fed human milk, efforts to ensure quality control of the milk are receiving renewed interest. Since most of this milk is frozen, it is common to thaw and warm human milk prior to feeding. There are 2 methods available to thaw and warm human milk but no comparison data are available.
OBJECTIVE: To evaluate the integrity of human milk subjected to 2 methods of thawing and warming and to evaluate the integrity of the milk after freezer storage, thawing, warming, and waiting to be fed.
DESIGN/METHODS: Mothers in the NICU donated 100 mL of milk. One sample was stored immediately at-80°C (baseline), and the remainder was frozen at -20°C for 7 days. Subsequently, the frozen milk was subjected to two methods of thawing and warming (tepid water and waterless methods). After each process, an aliquot was stored at -80°C. Thawed milk also was maintained at refrigerator temperature of 4°C x 24 h prior to warming. Lastly, warmed milk was maintained in room temperature (RT) x4 h to simulate the length of a feeding session. Milk integrity was described as the overall effect of processing on milk pH, the contents of protein, sIgA, lactoferrin, fat, free fatty acids, oxidant activity, and bacterial colony counts (total, TBCC; Gram positive, GPCC; Gram negative, GNCC). Data were analyzed by repeated measures ANOVA and paired t test.
RESULTS: There were no differences in milk integrity between tepid water and waterless thawing and warming methods (n=41). There were no changes in total protein, sIgA, and lactoferrin with thawing and warming. There was a significant change in pH between baseline (mean pH 7.12), thawing (7.00), and warming (7.00), $p < 0.001$. TBCC did not change significantly between baseline ($9.4x10^4$), thawing (7.9), and warming (8.4). GPCC and GNCC did not change significantly from baseline to thawing and warming. When thawed milk was stored in the refrigerator x24 h and then warmed the only change was a further decline in pH (6.75). When warmed milk was maintained at RT x4 h there was an increase in TBCC (12.5), GPCC (8.2), and GNCC (6.7), all $p < 0.01$.
CONCLUSIONS: Thawing and warming do not affect the integrity of previously frozen human milk adversely. The integrity of the milk is affected similarly by the two methods of thawing and warming. Concerns about maintaining warmed milk at RT need to be explored.

135
4:45pm

House Officer

Prevalence and Duration of Breastfeeding in ADHD vs. Non-ADHD Children Ages 3-5: Analysis of 2007 National Health Survey Data

Rachel M. Goldberg, Suzanne Sunday, Andrew Adesman.
Developmental Pediatrics, Cohen Children's Medical Center of New York, New Hyde Park, NY; Biostatistics, Feinstein Institute for Medical Research, Lake Success, NY.

BACKGROUND: Previous studies have found a direct relationship between breastfeeding and improved cognition. Since breast milk (BM) is richer in needed essential fatty acids (EFA) for the developing brain than formula and since children with ADHD benefit from EFA supplementation, it raises the question whether children with ADHD differ from controls regarding breastfeeding history.
OBJECTIVE: To compares the prevalence and duration of breastfeeding in ADHD and non-ADHD children using a national sample of preschool aged children.
DESIGN/METHODS: This study is a cross-sectional analysis of children ages 3-5 years old from the 2007 National Survey of Children's Health (NSCH). The NSCH includes 91,642 children and is weighted to represent the population of non-institutionalized children ages 0-17 in the United States. Following exclusion for confounding conditions & missing data, analyses were done on 54 children with ADHD and 54 controls carefully matched for sex, age, race, poverty, health insurance status, respondent, # of children and # of adults in the home, and birth order. Dependent variables were whether the child was ever breastfed and at what age breastfeeding stopped.
RESULTS: Significantly fewer preschool aged children with ADHD were breastfed. 46% of ADHD children did not breastfeed; 22% of the non-ADHD controls did not breastfeed (χ^2=7.12, p=0.0076). Among infants that were nursed, significant differences were noted regarding duration of breastfeeding. 57% of ADHD children were breastfed for <1 month, 20% for 1 – 5 months, and 22% for >6 months. For the cohort of matched controls, 26% breastfed for <1 month, 28% for 1 – 5 months, and 46% for >6 months (χ^2=11.58, p=0.0003).
CONCLUSIONS: Mothers of ADHD children were less likely to have breastfed their child than matched controls. In addition, mothers of preschool children with ADHD who did breastfeed were more likely to discontinue doing so at an earlier time. Since breast milk has more of the key essential fatty acids for brain development than does formula, and since children with ADHD have lower levels of long-chain polyunsaturated fatty acids and benefit clinically from essential fatty acid supplementation, formula feeding may be an additional risk factor for ADHD. The lower incidence of breastfeeding in our matched preschool ADHD cohort is consistent with this hypothesis.

136
5:00pm

Infant Formula: A Descriptive Study of National Sales Data

Peter F. Belamarich.
Pediatrics, Children's Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Information on infant formula sales in the US was last published in 2000. Since then there has been a proliferation of infant formula products many of which vary from standard cow's milk formula in composition and cost. What formula-fed infants are consuming in the US is unknown.

OBJECTIVE: A descriptive study of a nationally representative sample of one year's worth of infant formula sales. We sought to describe the proportion of infant formula that is milk-based vs. soy based and among the milk-based formulas describe the proportion that is lactose modified, contains a protein hydrolysate, or is modified in both ways. We describe cost variation in relation to these modifications.

DESIGN/METHODS: Data on 52 week's worth of sales of the top selling infant formula products were purchased from a company that tracks and aggregates point-of-sale scanner data from supermarkets, chain stores, and pharmacies nationally. The data we report was obtained in the 52 weeks preceding 9/5/2010. We obtained sales and cost information on the top 50 selling products and supplemented this with information from the manufacturer's websites. Generic formulas were not individually identifiable and were treated as one brand.

RESULTS: The data base includes information on 2.1 billion dollars worth of sales and 14.6 billion ounces of ready to feed equivalents (RTF) of formula. As a single formula can be sold in multiple different forms we found 20 unique infant formulas in the top 50 selling products. Our analyses are presented as the % of the total RTF equivalent ounces sold. Milk and soy - based formulas accounted for 90 % and 10% of RTF ounce equivalents sold respectively. Generic formula accounted for 4.1%. Premature formula comprised 1.4% of sales. For the 13.1 billion RTF equivalent ounces of milk-based formulas sold, 22 % were lactose-free or reduced and 25 % contained either casein or whey hydrolysate. The proportion with either a lactose or a protein modification was 36%. Ten percent were modified in both ways. The mean±SD cost (per RTF ounce) was $0.16±.053, range $0.04-.29, generic formula was $ 0.07±0.01. Mean cost for unmodified brand milk-based formula was $ 0.14±0.051 vs. lactose modified or hydrolysate containing brand milk-based formula 0.18±0.061, p<.03.

CONCLUSIONS: A large number of formula products are now available and a substantial proportion of the milk-based formula now sold in the U.S. has either a reduced lactose content and or contains a protein hydrolysate. These modifications are associated with increased formula cost.

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5:15pm

House Officer

Barriers to Breastfeeding in an Urban Inner-City Population

Lindsay B. DeVries, Vaneet K. Kalra, Jeannette Prentice, Girija Natarajan, Sanjay Chawla.
Pediatrics, Wayne State University, Detroit, MI.

BACKGROUND: The American Academy of Pediatrics (AAP) recommends exclusive breastfeeding for the first 6 months of life. Breastfeeding rates are lowest among low income, young African-American mothers.

OBJECTIVE: To estimate the rate of breastfeeding and identify barriers for successful breastfeeding in an urban inner city hospital population, predominantly comprised of African-American mothers.

DESIGN/METHODS: Mothers of the neonates born in a tertiary hospital with gestational age ≥ 35 weeks and uneventful newborn course between May - July 2012 were contacted after discharge. An information sheet regarding the study with an option to opt out of the study was provided before contact was made. Specific questions were asked regarding infant feeding and counseling provided during prenatal visits and hospital stay to initiate and maintain breastfeeding.

RESULTS: Our cohort (n=153) comprised of 76% African-American mothers with 47% male infants. Median (IQR) maternal age was 24 (21-30) years. At the time of discharge from the hospital, 17% of babies were exclusively breastfed, 46.4% were exclusively formula fed, and 36.6% were both breast and formula fed. At the time of phone call on median (IQR) day of life 11 (9-14) days, 22.9% were exclusively breastfed, 32.7% received both and 44.4% were receiving only formula. Of those mothers breastfeeding their infant, 46% were planning to continue for ≥ 6 months. Unsuccessful attempts to initiate breastfeeding (39%) and lack of interest in breastfeeding (31%) were the most common reasons reported for not breastfeeding. Among women who did not breastfeed, 39% reported that with more support and counseling, they would have considered breastfeeding. 15% of women were not aware of the benefits of breastfeeding and 12% reported receiving no breastfeeding counseling. Among those counseled, only 59% received both prenatal counseling and postnatal support.

CONCLUSIONS: Rates of "Ever Breastfed" was much lower in our cohort (56%) than the national average of 77%. Failed attempts to initiate breastfeeding and lack of interest in breastfeeding were the most common reasons for not breastfeeding in our cohort. Improving counseling during prenatal visits and establishing better lactation support in the hospital to help mothers in initiating breastfeeding may improve breastfeeding rates in our population.

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5:30pm

House Officer

Formula Supplementation in Breast Feeding (BF) Mothers and Suggestions for Intervention by the Pediatric Community

Joanna Pierro, Virteeka Sinha, Bdair Abulaimoun, Philip Roth, Jonathan Blau.
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BACKGROUND: Formula supplementation & exclusive formula feeding are common practices despite significant public health measures promoting the health benefits of BF. Our institution has joined the national trend of discontinuing free formula samples at discharge, as well as received funding to become a U.S. Baby-Friendly Hospital. Despite these efforts, exclusive formula feeding & supplementation persist.

OBJECTIVE: To determine the reasons potentially amenable to interventions that parents choose to either exclusively formula feed or supplement in order to increase exclusive BF rates. We hypothesize that a wide array of factors, including prior BF experience, influences of family & health care providers, are likely contributory.

DESIGN/METHODS: 2 surveys are being administered: 1 for mothers who exclusively formula feed & a 2nd for BF mothers, whether exclusive or supplementing. All of the ~ 3,000 mothers delivering annually at our institution will be surveyed.

RESULTS: Survey responses of postpartum mothers:

Mean ± SEM (* P-value < 0.05 vs. Exclusive BF)	Exclusive BF (N=30)	BF + formula (N=65)	Exclusive formula (N=11)
Birth weight (grams)	3290 ± 74	3418 ± 139	3343 ± 67
C/S	10%	* 20%	* 27%
Married	73%	64%	75%
# Previous children BF	1 ± 0	* 2 ± 0	* 0 ± 0
Offered formula without asking	28%	27%	N/A
Felt received adequate BF support	97%	91%	N/A
Mothers BF as infants	72%	78%	* 0%

Since data collection began on 10/22/12, the 106 collected surveys show a statistically significant increase in formula usage with the following: C/S birth & lack of mothers' BF during their own infancy. Conversely, exclusive formula usage was less likely in mothers with more prior BF experience. Despite our hospital's efforts to promote BF, almost one-third of BF mothers report being offered formula without asking. Interestingly, the vast majority of BF mothers who supplement report adequate BF counseling. Thus far, the most common reasons BF mothers report using supplementation include perception of insufficient milk supply, need to rest and advice of health care providers.

CONCLUSIONS: These surveys have already highlighted reasons mothers choose to use formula, despite recent efforts to promote exclusive BF. Future BF educational measures should consider mothers' prior BF experiences. Despite the perception of increased BF support among providers, further education is needed to address the persisting practice of offering formula.

Emergency Medicine I
Platform Session

Saturday, March 23, 2013
4:15pm–5:45pm

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4:15pm

Fellow in Training

Usage Characteristics of a Children's Hospital Safety Center

Sadiqa A. Edmonds, Kristy B. Arbogast, Gina P. Duchossois, Mark R. Zonfrillo.
Center for Injury Research & Prevention, The Children's Hospital of Philadelphia, Philadelphia, PA; Division of Emergency Medicine, The Children's Hospital of Philadelphia, Philadelphia, PA; The Safety Center, The Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Unintentional injuries are the leading cause of acquired disability and mortality in children. Safety Centers (SC) have been developed in various health care contexts to provide safety equipment, often subsidized or free.

OBJECTIVE: To describe the usage characteristics of a single hospital SC.

DESIGN/METHODS: This was a prospective survey of customers of a SC in single, large, tertiary care children's hospital who obtained items from 12/1/11 to 9/28/12. The survey asked about referral source, employee status, number of children in the household, number of car seats obtained free by low-income families, and other safety items purchased.

RESULTS: 895 visits were documented, representing 1459 household children. Only 4% of customers refused to participate, for a 96% response rate. The mean number of household children was 1.6, and the mean number of items purchased per visit was 1.9. A free car seat was obtained in 45% of visits, and in only 4% of those visits was another item purchased. Overall, 29% of customers identified as hospital employees, and this number increased to 52% when limiting the sample to those who did not utilize the free car seat program. Customers were referred by: a medical provider (34%), word of mouth (19%), social work (17%), and walk by (11%). Only 0.4% of patients were referred from the emergency department (ED).

CONCLUSIONS: The SC has provided a significant number of free car seats and reduced priced safety equipment to families. Although low income families utilize the free car seat program, few families purchase other safety items. Over half of patrons who purchased items were hospital employees rather than families of an ED or hospitalized patient. Additional research is necessary to further evaluate how SCs can be maximally utilized by patients, families, and employees.

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4:30pm

Sick or Not Sick: Using I-PASS To Identify Patients at Risk for Clinical Deterioration

Genevieve London, Mutiat T. Onigbanjo, Kathleen Brennan, Steve Paik.
Pediatrics, New York-Presbyterian Morgan Stanley Children's Hospital, New York, NY; Columbia University, New York, NY.

BACKGROUND: Medical resident work hour restrictions have increased the frequency of patient handoffs. I-PASS is a standardized handoff format designed to augment patient care and safety; it includes a classification of patient illness severity. Early identification of patients with high illness severity and therefore at risk for clinical deterioration has been shown to improve clinical outcomes. Little data exists analyzing the accuracy of I-PASS illness severity designations at identifying at risk patients.

OBJECTIVE: To assess the accuracy of resident physicians at determining illness severity and identifying patients at risk for clinical deterioration.

DESIGN/METHODS: In 2012, we implemented the I-PASS handoff system and adapted our electronic medical record (EMR) to include a complementary written handoff tool with a designation of patient illness severity using the I-PASS common vocabulary: *stable*, *watcher*, *unstable*. We are performing a retrospective case series of patients with clinical events (rapid response or code) at our institution between August 2012-present. We are collecting patient illness severity designations for these cases, determined by resident physicians caring for the patient, from the EMR handoff tab on the day of the event and the two preceding days. Additionally, we are tracking the distribution of illness severity classifications on our inpatient teams daily in order to analyze the sensitivity and specificity of the designations.

RESULTS: We collected data from 40 clinical events and found that 80% of these patients were designated *watcher* or *unstable* on the day of the event. Of this subset 29% were admitted on the day of or prior to the event. In contrast, of the 20% of patients who had events but were designated *stable*, 66% were admitted on the day of or prior to the event. On the day of events, 25-69% of the total patients on the teams were designated as *watcher* or *unstable*.

CONCLUSIONS: Residents are proficient at identifying patients at risk for clinical deterioration. Resident assessments are less accurate on day 0-1 of hospitalization. Assessments are dynamic reflecting patient familiarity and patient clinical course. The severity designation is accessible via EMR to providers assuming care of the patient. Comparison of I-PASS designations with more objective measures such as a modified Pediatric Early Warning Score (PEWS) is warranted and underway.

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4:45pm

Fellow in Training

Measles Vaccination Rates in Pediatric Emergency Department Patients

Philip Zachariah, Amanda Posner, Melissa S. Stockwell, Peter S. Dayan, Florence M. Sonnett, Philip L. Graham, Lisa Saiman.
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BACKGROUND: Maintaining high vaccination rates for measles is critical to sustain measles eradication. Measles, mumps and rubella (MMR) vaccination rates of patients presenting to the Pediatric Emergency Department (PED) has not been described. We hypothesized that the MMR vaccination rate in the PED population would be lower than that of other pediatric populations, potentially due to different demographic and clinical characteristics.

OBJECTIVE: To determine MMR vaccination rates of patients in an urban PED and compare them to national, state and local estimates.

DESIGN/METHODS: We conducted the study in 2 phases. [1] We prospectively enrolled a convenience sample of PED patients aged 12 months to 18 years (Non-critically ill triage categories 3,4,5) seen for 4 consecutive days in November 2011 and assessed their immunization records in the New York Citywide Immunization Registry (CIR) to determine feasibility of CIR use. Reporting to CIR is mandated under public health law. [2] We then used CIR to assess MMR vaccinations of all consecutive PED patients 18 years and younger seen for 2 weeks in January 2012. Patients who resided outside NYC were excluded. We compared immunization rates of patients in Phase 2 to national, NY State, and NYC estimates in the 2011 National Immunization Survey.

RESULTS: In Phase 1, 94% (142/151) of patients had records in CIR. In Phase 2, 95.3 (1854/1945) of patients lived in NYC. Among 734 patients 16 months to 6 years old, 644 (88%) had at least one MMR dose reported to CIR. Among 696 patients 6-18 years old, 538 (77.3.%), 44 (6.3%), and 114 (16.4%) had 2, 1 and 0 MMR doses reported to CIR, respectively. Among 19 to 35 month-olds, 224/264 (84.8%; 95% CI 80.5, 89.1) received 1 MMR dose compared with 91.6% (95% CI 91.2, 92.8) nationally, 91.0% (95% CI 88.2, 93.8) in NY State, and 91.5% (95% CI 87.9, 95.1) in NYC. Complete MMR vaccination (2 doses) for 5 to 6 year olds in the PED cohort was lower (81.8%) than rates for children entering kindergarten in 2011 nationally (94.8%) and in NY State (96.9%).

CONCLUSIONS: The MMR vaccination rate appeared to be lower in our PED population than national, state, and city rates. Detecting clusters of unvaccinated or under-vaccinated children has implications for outbreak control and vaccination strategies. Improving the vaccination status of the PED population could further the Healthy People 2020 target of ≥ 95% MMR coverage.

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5:00pm

Fellow in Training

Postpartum Depression Screening in a Pediatric Emergency Department

Beth L. Emerson, Ellen R. Bradley, Antonio Riera, Linda Mayes, Kirsten Bechtel.
Pediatric Emergency Medicine, Yale University School of Medicine, New Haven, CT; Yale University School of Medicine, New Haven, CT; Child Study Center, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Postpartum depression (PPD) is a prevalent and under-diagnosed issue. Risks including mental health problems, poor attachment, and abuse are described for affected families.

OBJECTIVE: To determine the prevalence of and risk factors for PPD in mothers of infants presenting to the pediatric emergency department (PED).

DESIGN/METHODS: A convenience sample of mothers with infants <4 months of age who presented to our urban, tertiary care PED was surveyed (English or Spanish) using the Edinburgh Postpartum Depression Scale (EPDS). Demographic information was collected. Mothers were given information about community resources. Those screening positive on the EPDS (score ≥10) were counseled by the study team. Mental health resources were offered during the PED visit. Resource utilization and further needs were assessed with a follow-up phone call 1 month later. Additionally, test characteristics of a 3 question anxiety subset was compared using EPDS as the reference standard. Data was analyzed by t-test or Chi-square (with Yates's correction as necessary).

RESULTS: 200 mothers were enrolled of which 31 (16%) screened positive for PPD. Mothers had a mean age of 27 years (range 15-41); 45% were first-time mothers; 40% got pediatric care in a state funded clinic and 10% were Spanish-speaking. No statistically significant differences were observed in demographic characteristics of mothers with and without PPD. Mothers who were depressed were more likely to report that they strongly agreed or agreed with the statement "I feel that my child is always fussy." (p=0.004) The anxiety subscale produced a sensitivity of 0.87 (95% CI 0.69-0.96), specificity of 0.70 (95% CI 0.63-0.77) and NPV of 0.97 (95% CI 0.91-0.99). Follow up was achieved with 39% of mothers with PPD by EPDS. 92% noted interval improvement in their mood. 50% reported discussing their mood with someone else; only 33% of these did so with a medical provider.

CONCLUSIONS: PPD affects a significant number of mothers. There are no clear demographic identifiers of these at-risk mothers, making universal screening a valuable approach. Capture of at-risk mothers during PED visits may accelerate connection with mental health resources. Anxiety seems to be a significant contributor and mothers with PPD often characterize their infants as "fussy" in temperament. The appropriate referral for these women in this setting merits further investigation, as many do not seek out health care providers.

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5:15pm

Simulated Disasters To Assess the Accuracy of Three Pediatric Disaster Triage Strategies

Mark X. Cicero, Frank Overly, Linda Brown, Jorge Yarzebski, Barbara Walsh, Veronika Shabanova, Marc Auerbach, Antonio Riera, Garth Meckler, Carl R. Baum.
Pediatrics, Yale University School of Medicine, New Haven, CT; Emergency Medicine, Brown University, Providence, RI; University of Massachusetts School of Medicine, Worchester, MA; Yale Center for Clinical Investigation, Yale University, New Haven, CT.

BACKGROUND: Across the world, diverse strategies are used to triage pediatric disaster victims. Few comparisons of patient outcomes using these strategies exist to help determine the most accurate strategy.

OBJECTIVE: To compare the accuracy of two formal, algorithm-based pediatric disaster triage (PDT) strategies, JumpSTART, Smart, to Clinical Decision Making with no formal algorithm (CDM), during video-recorded simulated mass casualty events.

DESIGN/METHODS: A modified Delphi method was used to create high-fidelity house fire simulation. Delphi participants were experts in PDT and pediatric emergency medicine from the United States and Canada. Expected triage levels were assigned for 10 simulated patients. Each patient had a different illness or injury. One of four triage levels was assigned: Red (Emergent), Yellow (Delayed), Green (Ambulatory), or Black (Deceased). Standardized actors and simulation manikins portrayed the patients. Learners were paramedics and paramedic students at three sites within our research network. Each site used one of the PDT strategies, according to local policy. Learners triaged the patients independently. The prior training and experience of learners were recorded. Statistical models were used to determine the accuracy PDT strategy for determining each triage level, and for individual patients.

RESULTS: Among the learners, 6 used JumpSTART triage, 39 used Smart, and 22 used CDM. There was no significant difference in participant years of experience between the Smart and CDM sites; the JumpSTART participants were all paramedic students. Patients with expected triage levels of Red (p= 0.37), Yellow (p= 0.42), Green (p=0.055), and Black (p=0.30) had no difference in accuracy of triage outcome regardless of triage strategy used. There were no differences in accuracy for individual patients.

CONCLUSIONS: Our simulation-based PDT strategy comparison suggests that a CDM approach to PDT is equally efficacious to algorithm-based JumpSTART or Smart triage for accurate sorting of simulated child disaster victims. There was no difference in accuracy by triage level, or for any individual patients. This finding could impact selection of PDT strategies and EMT and paramedic education.

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5:30pm

Undergraduate Student

Abdominal CTs Do Not Improve Outcomes for Children with Suspected Acute Appendicitis

Danielle I. Miano, Renee M. Silvis, Jill Popp, Marvin C. Culbertson, Brendan Campbell, Sharon R. Smith.
Emergency, Connecticut Children's Medical Center, Hartford, CT;
Research, Connecticut Children's Medical Center, Hartford, CT;
Surgery, Connecticut Children's Medical Center, Hartford, CT.

BACKGROUND: Acute appendicitis in children is a clinical diagnosis often aided by imaging such as Computed Tomography (CT) scans. CT scans expose children to high amounts of radiation, which may increase the lifetime risk of developing a fatal malignancy. Ultrasound (US) may be equally effective without the risk of radiation.

OBJECTIVE: To compare the rate of rupture and negative appendectomies between children with and without abdominal CTs; and to evaluate the same outcomes for children with and without US.

DESIGN/METHODS: A retrospective chart review was conducted from 1/1/2009 – 12/31/2010 and included patients with suspected acute appendicitis. Emergency department and inpatient medical records were reviewed for type/result of diagnostic imaging, admission, demographics, appendectomies, appendicitis and ruptured appendices. Appendicitis and rupture were determined by review of the pathology report. Negative appendectomies were defined as appendices with non-inflammatory pathology.

RESULTS: 1493 children were identified with suspected appendicitis, with mean age of 11 years, 54% Caucasian, 25% Hispanic, 10% African-American, and 50% girls. 754 were admitted, 20% (150) received a CT, 53% US, and 8.4% both. Of these 754, 435 (58%) had appendicitis. The frequency of pathology proven appendicitis was similar for children who had a CT (91/150, 61%) compared to those without (344/604, 57%), p=0.460. Children with ruptured appendices (N=107) who had a CT (29.7%) were compared to those who had only an US (13.7%) and there was no significant difference (p=0.219). The proportion of children who went to the operating room and had a negative appendectomy was similar for those with CT (1.1%), those with US (4.8%), and those with neither (2.8%, p =0.306). The majority (61%) of CTs were done at referring hospitals whereas 10.8% of US were done elsewhere.

CONCLUSIONS: The rate of complications did not vary significantly for children with suspected acute appendicitis who underwent a CT scan versus those who did not, or compared to children who had an US. The proportion of children with pathology proven appendicitis, ruptured appendices, and negative appendectomy was similar for children regardless of type of imaging used. Because the rate of complications is similar and CT carries the added risk of radiation exposure, the use of CT should be reserved for children who pose diagnostic challenges or risks of other pathologies.

General Pediatrics III: Prevention Platform Session

Saturday, March 23, 2013
4:15pm–5:45pm

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4:15pm

House Officer

Impact of an Intensified Anticipatory Guidance Program in the Nursery on Non-Urgent Emergency Department Use in the First Month of Life: A Randomized Controlled Trial

Kelly Kamimura-Nishimura, Vikram Chaudhary, Folake Olaosebikan, Ayoade Adeniyi, Richard Neugebauer, Mamta Reddy, Sneha Galiveeti, Maryam Azizi, Stefan Hagmann.
Pediatrics, Bronx Lebanon Hospital, Bronx, NY.

BACKGROUND: Many neonates evaluated in emergency departments (ED) are presented by their caregivers for non-urgent medical concerns (NMC).

OBJECTIVE: To study prospectively the proportion of newborns who presented during the first month of life to the ED for NMC, and to evaluate the impact of an intensified anticipatory guidance program (AGP) in the nursery that also includes guidance on common neonatal NMC.

DESIGN/METHODS: Parturient mothers (PM) of healthy full-term newborns at Bronx-Lebanon Hospital Center (12/2011 - 04/2012) were randomized by month of birth to an intervention-AGP (iAGP) or control-AGP (cAGP). The cAGP provided information on breastfeeding, SIDS, shaken baby syndrome, jaundice, immunizations and fever. The iAGP in addition included information (video/handout) on common neonatal NMC (sneezing, nasal congestion, hiccups, spitting up, constipation). Baseline and 1-month follow-up knowledge, attitude and practice (KAP) surveys (11 questions [score range 0-11]) regarding newborn care were conducted. The primary outcome was the proportion of neonates who used the ED for a NMC. Secondary outcome was change in caregivers' KAP responses.

RESULTS: Of a total of 594 PM, 323 (54%) agreed to participate and were randomized to receive iAGP (n=170) or cAGP (n=153). Most randomized PMs (mean age [SD] of 26.5 [6.5] years) were hispanic (68%), single (61%), primiparous (39%), and without high-school diploma (44%). 35 (21%) iAGP-neonates and 41 (27%) cAGP-neonates were brought at least once for a NMC to the ED (p=0.12). The mean KAP score (SD) were (iAGP) 6.9 (2.4) and (cAGP) 7.0 (2.2) (p=0.6) at baseline, and (iAGP) 8.0 (2.2), (cAGP) 8.5 (1.9) (p=0.1) at 1-month post-intervention.

CONCLUSIONS: A large proportion of neonates in this Bronx birth cohort used the ED for a NMC regardless of AGP arm. The iAGP also had no impact on neonatal care-relevant KAP among mothers. Additional educational programs or alternative timing of the iAGP may be helpful to improve caregivers' handling of NMC.

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4:30pm

Fellow in Training

Post-Discharge Follow-Up of Newborn Infants: Impediments to Compliance with American Academy of Pediatrics Guidelines

Vaneet K. Kalra, Lindsay B. DeVries, Girija Natarajan, Sanjay Chawla.
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BACKGROUND: There is an increasing trend for early hospital discharge for normal newborns, with most going home prior to the peak of hyperbilirubinemia. The American Academy of Pediatrics (AAP) provides clinical practice guidelines on the optimal timing of post-discharge follow-up of newborn infants who are discharged within 72 hours of birth for early identification of hyperbilirubinemia.

OBJECTIVE: To assess the compliance with AAP guidelines for post discharge first newborn follow up and to identify the barriers in its implementation.

DESIGN/METHODS: Parents of the neonates born in a tertiary hospital with gestational age ≥ 35 weeks and uneventful newborn course between May - July 2012 were contacted after discharge. An information sheet regarding the study and an option to opt out of the study was provided before making the phone call. Specific questions on the information provided in the hospital regarding jaundice and first appointment with health care professional (HCP) were asked.

RESULTS: Parents of 153 infants were contacted at a median age of 11 (9-14) days. Our cohort comprised of 47% males and 76% African-Americans. Blood group incompatibility was present in 19% of babies. Among 116 infants with documented bilirubin level before discharge, 78 (67%) had bilirubin in low risk zone, 25 (22%) in low intermediate and 13 (11%) in high intermediate risk zones. Median (IQR) age of discharge was 57 (49-72) hr, with 121 (79%) patients being discharged within 72 hrs of life. Median age at first HCP appointment was 8 (6.5 -12) days with only 23% seen at the AAP recommended time frame. Median delay in first appointment with HCP was 3 (2- 6.5) days. Among 13 neonates with a pre discharge bilirubin in high intermediate risk zone, only 46% had a timely follow-up. Inadequate information provided before discharge by health care team (44.1%) and difficulty in getting appointment (31.2%) were the most common reasons for the delay.

CONCLUSIONS: Compliance with AAP guidelines on appropriate timing of first newborn health care professional visit was noted in few (25%) of patients. The commonest reasons for delay were inadequate information and difficulty in getting the appointment. Improving awareness among health care professionals and ensuring appropriate first appointment date prior to discharge may improve the compliance rate with AAP guidelines.

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4:45pm

House Officer

Comparative Management of Neonatal Hyperbilirubinemia Using Transcutaneous and Serum Bilirubin-Specific Nomograms

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BACKGROUND: 30 to 60% of term newborns develop jaundice and many require outpatient follow-up. Bilirubin levels are monitored with transcutaneous bilirubin (TcB) or total serum bilirubin (TSB) levels that are plotted on nomograms developed specifically for each method. Studies are needed that compare management outcomes of each method.

OBJECTIVE: To compare recommended management for hyperbilirubinemia of infants using TcB levels vs. their corresponding TSB levels using test-specific nomograms.

DESIGN/METHODS: We conducted a retrospective chart review of infants that had both TcB and TSB measurements done in the term nursery from August 2011 to August 2012. This nursery serves an urban, low income, inner city community. The standard nursery practice is to obtain TcB measurements if infants appear jaundiced followed by TSB levels, if clinically concerned. TcB and TSB levels were plotted on their respective nomograms (Bhutani for TSB vs. Fouzakas for TcB) and corresponding management outcomes were compared. Data were stratified using a cut-off of 10 mg/dl. Management outcomes were classified as high risk requiring phototherapy, high intermediate risk requiring 24 hr follow-up, low intermediate risk requiring 48 hr follow-up and low risk, no follow-up.

RESULTS: 64 babies born during the study period had both TcB and TSB measurements done (56% males, 92% term, 47% Black, 13% Asian, 11% White, 9% Mixed or unknown). 46 babies (72%) had <10mg/dl bilirubin levels by TcB. 31/46 (67%) of these babies had the same management outcome as the management dictated by the corresponding TSB level. For the other 30%, management dictated by the TcB nomogram was more aggressive than that dictated by the TSB nomogram. Of the 18 babies with TcB levels > 10mg/dl, 8 babies had the same management (44%). Of the 10 babies having different management, all babies except one would have been managed more aggressively by the TcB level than by the TSB. One baby was managed by phototherapy compared to the TcB recommended management of 24 hr. follow-up.

CONCLUSIONS: In 2/3 of cases, the management of hyperbilirubinemia recommended for TcB levels plotted on the Fouzakas nomogram was in agreement with the TSB level management recommended by the Bhutani nomogram. In the other third where the recommended management differed, the TcB level plotted on the Fouzakas nomogram dictated more aggressive management in all babies except one high risk baby.

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5:00pm

House Officer

Usefulness of Universal Pre-Discharge Serum Bilirubin Risk Stratification as a Predictor of Admission for Phototherapy

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BACKGROUND: The Bhutani Normogram (BN) classifies a newborn's risk for hyperbilirubinemia. To our knowledge, there are limited studies establishing a direct relationship between BN risk zones and neonatal intensive care unit (NICU) phototherapy admissions in Hispanic and African-American (AA) populations.

OBJECTIVE: To determine the risk of NICU admissions for phototherapy based on BN risk zones in an underserved population.

DESIGN/METHODS: We performed a retrospective chart review of 724 (66.9% Hispanic, 23.6% AA) healthy, breast and bottle-fed newborns discharged between 8/2011 and 3/2012 at a large, university-affiliated community hospital. Newborns were stratified based on demographic variables, birth weight, ABO blood group and Rh-incompatibilities. Pre-discharge total serum bilirubin levels and their corresponding risk zones on the BN were recorded and compared with patient outcomes, i.e. routine discharge or admission within the first week of life for phototherapy. Chi square and t-tests were used to assess differences in neonatal outcomes between risk groups.

RESULTS: 697 patients (96.27%) were routinely discharged and 27 (3.73%) were admitted for phototherapy. There was no significant association between race, sex, age of gestation, mode of delivery, APGAR scores, birth weight, ABO incompatibility, Coombs status, or feeding type and patient outcomes. 480 (66.29%) were in the low-risk group, 139 (19.20%) in the low-intermediate group, and 62 (8.56%) & 43 (5.95%) were in the high-intermediate and high-risk zones, respectively. There were no admissions in the low-risk group, 1 (0.72%) in the low-intermediate risk group, 6 (9.68 %) in the high-intermediate risk group, and 20 (46.51%) in the high-risk group. Chi-square analysis shows a significant relationship between risk stratification and admission for phototherapy ($p < 0.05$). A regression model shows a 9% increased odds of admission for every unit increase in risk (OR 1.09, 95%CI:1.08-1.11).

CONCLUSIONS: Risk stratification in the BN based on pre-discharge bilirubin is helpful in predicting phototherapy admissions. Data suggest that serum bilirubin risk stratification be done as a very useful guideline in all neonates being discharged.

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5:15pm

Making "Meaningful Use" Meaningful: The Readability of Electronic Health Record Visit Summaries

Shareen F. Kelly, Bruce A. Berstein, Lorri L. Collins, Lee M. Pachter.
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BACKGROUND: To achieve "meaningful use" with electronic health records (EHR), a written summary of the health visit should be given to patients after their encounter. Our EHR summary includes vital signs, diagnoses, medications, procedures, codes, and narrative written by the provider. Health literacy experts recommend that material given to patients be at a 5th grade reading level. Our hypothesis was that technical language would make readability of the EHR summary above that desirable for our patients, but that the narrative would be more readable than the whole summary.

OBJECTIVE: To calculate the readability of the EHR summary documents created in our outpatient clinic.

DESIGN/METHODS: We calculated the readability of a convenience sample of 245 EHR summaries generated by providers in our pediatrics outpatient clinic ("Patient Plan" in NextGen platform). Readability was calculated using the Flesh-Kincaid formula (FK), the Statistical Measurement of Gobbledygook (SMOG), and the Flesh Reading Ease (FRE) formula. Mean scores were calculated for the entire Patient Plan, then for the narrative portion. Documents were stratified by visit type (acute care AC--n=62, health maintenance HMV--n=143, follow-up FUV--n=40) and provider training (intern--n=26, resident--n=63, attending--n=94, nurse practitioner--n=62).

RESULTS: Mean FK score of the entire summary was 8.0 with 8.4 for the narrative subset (suggesting an 8th grade reading level needed for comprehension). Mean SMOG scores for entire summary and narrative were 10.5 and 10.3 respectively (higher than 10th grade reading level) and FRE scores were 57 and 51 respectively (loosely defined to be the percentage of people likely to understand the text). Scores by visit type showed decreasing readability from FUV narratives, to AC, with least readability in HMV narratives (p=<.001 FK, p=0.001 SMOG, p<.001 RE). Readability of narratives did vary by provider training but this difference was not statistically significant.

CONCLUSIONS: Mean calculated readability of our EHR visit summary is an 8th to 10th grade reading level. FK and FRE scores indicated the narrative portion was written at a higher level than the entire document but the SMOG trend was opposite. Health maintenance visit summaries were more difficult to read. These observations may help direct efforts towards health literacy as we strive toward meaningful use of EHR.

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5:30pm

Psychopharmacology in Pediatric Primary Care: An ePROS Study of Electronic Health Records

Alexander G. Fiks, Robert W. Grundmeier, Lihai Song, Jennifer M. Steffes, Banita McCarn, Stephanie Mayne, Benyamin Margolis, Russell Localio, Richard C. Wasserman.
The Children's Hospital of Philadelphia, Philadelphia, PA; The American Academy of Pediatrics, Elk Grove Village, IL; The University of Vermont, Burlington, VT; Maternal and Child Health Bureau, Health Research Service Administration, Rockville, MD.

BACKGROUND: Increased use of psychotropic medications (PMs) in children has raised concerns regarding safety and efficacy, but patterns of use among those cared for by primary care pediatricians are incompletely understood.

OBJECTIVE: To describe the frequency of distinct patterns of PM use among children cared for by practicing primary care pediatricians.

DESIGN/METHODS: Electronic health record (EHR) data from children ages 4-20 years seen for ≥1 face-to-face visit were pooled from 14 independent pediatric primary care sites (11 states) in ePROS, the EHR-based network of the AAP. 5 different vendor systems were queried. After excluding those with seizures due to possible confusion between antiepileptics and mood stabilizers, we identified children 4-18 years of age prescribed any of the following groups of medication between 1/1/09 and 12/31/11: ADHD (stimulants, atomoxetine, alpha agonists), antidepressants (SSRIs, SNRIs, tricyclics), 2nd generation antipsychotics (SGAs), anxiolytics (benzodiazepines, others), and mood stabilizers. We then examined variability in PM use across practices. Group differences were calculated by chi-square tests.

RESULTS: Of a population of 62,762, 5,494 (9%) children were prescribed PM. A higher proportion of adolescents compared to those ≤ 11 years of age were prescribed PM (14% vs. 5%, p<0.001). Among children receiving PM, ADHD medications were the most common (4,236, 77%), followed by antidepressants (1,668, 30%), SGAs (620, 11%), mood stabilizers (322, 6%) and anxiolytics (212, 4%). 1,176 (21%) received drugs in two or more PM groups during the study period. Of the 1,176, the most frequent combinations were ADHD medication and antidepressants (448, 38%) and ADHD medication and SGAs (173, 15%). We found substantial variability across practices in the proportion of patients receiving any PM (range 3-14%, median 8%, p<0.001), as well as 20-fold variation in the proportion receiving >1 PM group (range 0.2-3.9%, median 1.2%, p<0.001).

CONCLUSIONS: PM use and polypharmacy are common in pediatric primary care, but highly variable. Although some variability might be accounted for by the practice population or documentation, such differences are unlikely to fully explain variability of this magnitude. Determinants and outcomes of these distinct practice patterns warrant investigation.

Hematology Oncology Platform Session

Saturday, March 23, 2013
4:15pm–5:45pm

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4:15pm

Medical Student

Obinutuzumab (GA101) Significantly Enhances Cell Death and ADCC Compared to Rituximab Against CD20+ Rituximab-Sensitive and -Resistant B-Cell Non-Hodgkin Lymphoma (NHL) and Lymphoblastic Leukemia (BLL)

Anthony Sabulski, Aradhana Awasthi, Janet Ayello, Carmella van de Ven, Matthew J. Barth, Mitchell S. Cairo.
Pediatrics, New York Medical College, Valhalla, NY; Pediatrics, Roswell Park Medical Center, Roswell Park, NY; Cell Biology & Anatomy, Medicine, Pathology, Microbiology & Immunology, New York Medical College, Valhalla, NY.

BACKGROUND: Patients who relapse with CD20+ B-NHL and B-LL have a dismal prognosis, often associated with chemotherapy resistance (Cairo et al. JCO, 2012, Mils/Cairo et al. BJH, 2012) and require alternative therapeutic strategies. Resistance to RTX, however, may predispose patients with CD20+ NHL to an increase risk of relapse or disease progression (Barth/Cairo et al. BJH, 2012).GA101, a novel type II glycoengineered CD20 antibody of the IgG1 isotype, mediates enhanced cell death vs RTX and induces significantly enhanced ADCC (Bologna L et al. JI, 2012).

OBJECTIVE: To evaluate the *in-vitro* efficacy of GA101 compared to RTX against RTX sensitive and resistant CD20+ B-NHL and B-LL cell lines.

DESIGN/METHODS: Raji (CD20+), U698-M (CD20+), Loucy cells (CD20-) (T-ALL) and Raji-2R and Raji-4RH (generously supplied by M. Barth) were cultured in RPMI with 10% FBS and incubated with GA101 and/or RTX at 100 µg/ml for 24 hrs (n=6), 48 & 72 hrs (n=5). Cell death was evaluated by staining with AnnexinV/7AAD and flow-cytometry. ADCC were performed with K562-IL-15-41BBL expanded NK cells at 20:1 effector: target ratio (E: T, n=3).

RESULTS: GA101 induced significantly more cell death compared to RTX in B-NHL and BLL cell lines.

	24 hrs			48 hrs		
Groups	RTX	Obinutuzumab	P-value	RTX	Obinutuzumab	P-value
Loucy CD20⁻	5.32±2.5%	6.15±2.8%		5.8±1.8%	6.8±1.3%	
U698-M CD20⁺	26.36±2.6%	40.5±2.01%	(p< .0001)	25.1±2.0%.	47.38±4.9%	(p< .0001)
Raji CD20⁺	32.7± 6.8%	45.1±3.3%	(p< .005)	25.1±2.0%.	35.6±9.1%	(p< .001)
Raji2R CD20⁺ Resistant	2.9± 1.1%	17.6±1.3%	(p< .001)	7.8 ± 2.45%	18.2±0.09%	(p< .001)
Raji4RH CD20⁺ Resistant	2.1± 1.5%	15.8±2.2%	(p< .001)	7.9± 1.3%	19.7± 2.2%	(p< .001)

GA101 vs RTX also elicited a significant increase a ADCC with K562-IL15-41BBL expanded NK cells, in Raji 73.8±8.1% vs 56.81±4.6% compared to Raji-2R 38.0±2.0% vs 21.6±1.2%, Raji-4RH 40.0±1.6% vs 0.5±1.1% and U698-M 70.0±1.6% vs 45.56±0.1%, compared to Loucy 21.67±0.48% vs 15.92±0.52%, respectively (p<0.001) at day 7.

CONCLUSIONS: GA101 compared to RTX significantly enhanced cell death and NK mediated ADCC in sensitive and RTX resistant B-NHL and B-LL. Further studies will investigate the combination of activated NK cells that may enhance or synergize with the efficacy of GA101 both in -vitro and in-vivo in xenografted NOD/SCID mice.

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4:30pm

Medical Student

Transcription Activator-Like Effector Nucleases Mediated DLEU1 Gene Knockdown Suppresses Apoptosis in Burkitt's Lymphoma

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BACKGROUND: Pediatric Burkitt Lymphoma (BL) is the most common histological subtype of Non Hodgkin Lymphoma in children and adolescents (Cairo et al, Blood, 2007; Miles/Cairo, BJHaem, 2012). We previously identified in a subset analysis that children with BL and a 13q deletion, particularly 13q14.3, had significantly poorer outcome and inferior overall survival despite aggressive short, intensive multiagent chemotherapy (Poirel/Cairo et al, Leukemia, 2009; Nelson/Cairo/Sanger et al, BJHaem, 2009). Deleted in Lymphocytic Leukemia 1 (DLEU1) is BL classifier gene (Dave et al, NEJM, 2006) on chr.13q14.3. Transcription Activator-Like Effector Nucleases (TALENs) technology has been developed for precision targeted genome editing and we have previously reported that significant knockdown of DLEU1 mRNA in TALENs transiently transfected Raji (Lee/Cairo et al, NHL, 2012 and ASH, 2012).

OBJECTIVE: We hypothesize that DLEU1 may act as a tumor suppressor and therefore examined whether the loss of DLEU1 by TALENs result in changes in programmed cell death and expression of network genes.

DESIGN/METHODS: DLEU1 TALENs were stably transfected into Raji cells for endogenous DLEU1 gene modification. Apoptosis assays were performed using caspase 3/7 assay and qRT-PCR was performed for comparison of mRNA expression of network genes. Statistical significance was determined by Student t-test.

RESULTS: DLEU1 TALEN mediated stably transfected Raji (T13-2) was established and showed significantly reduction of DLEU1 mRNA about 80% reduction (p<0.02) compared to a control. In apoptotic assays, caspase 3/7 activities showed significantly reduction (23%, p<0.03) in T13-2. In comparison of mRNA expression of DLEU1 network genes in T13-2, there were significantly reduction TUBB2C and UBR1 mRNA (<50%, p<0.04 and <25%, p<0.006), respectively, and significantly increased expression of RASSF1 mRNA (>12%, p<0.05).

CONCLUSIONS: We demonstrated that 1) TALENs mediated DLEU1 stably knockdown resulted in inhibition of BL apoptosis as a tumor suppressor, and 2) deletion of DLEU1in childhood BL may result in chemotherapy resistance according to loss of a tumor suppress gene.

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4:45pm

Undergraduate Student

Natural Killer (NK) Cells Successfully Transduced with an Anti-CD20 Chimeric Antigen Receptor (CAR) by mRNA Nucleofection Have Significant Cytotoxicity Against Poor Risk B-Cell (CD20⁺) Leukemia/Lymphoma (B-L/L)

Ashlin Yahr, Yaya Chu, Janet Ayello, Lowrence Lo, Jared Katz, Mitchell S. Cairo.
Pediatrics, New York Medical College, Valhalla, NY; Medicine, Pathology, Microbiology & Immunology and Cell Biology & Anatomy, New York Medical College, Valhalla, NY.

BACKGROUND: The outcome for children and adolescents with B-L/L has improved significantly but for those who relapse, the prognosis is dismal due to chemo-immuno-radiotherapy resistance (Cairo, et al, *J Clin Oncol*, 2012). Natural Killer (NK) cells play an important role in tumor surveillance post allogeneic stem cell transplantation (Beziat V et al, *Leukemia*, 2009) but cell number and tumor recognition limit adoptive NK cell therapy (Shereck/Cairo, *PBC* 2007).

OBJECTIVE: To generate large-scale, efficiently modified NK cells with low cost, clinical applicable and a non-viral method, we investigated the functional activities and cytotoxic effects of chimeric anti-CD20 antigen receptor (CAR⁺) expression PBNK cells following mRNA nucleofection against CD20⁺ B-L/L.

DESIGN/METHODS: After expansion with inactivated K562-mbIL15-41BBL cells, CD56+CD3- PBNK cells were isolated. *Anti-CD20-4-1BB-CD3ζ* mRNA (CAR mRNA) was produced *in vitro* and nucleofected into expanded PBNK. PBNK cytotoxicity was assessed by europium release assay. CD56, CD3, CAR expression, CD107a degranulation and intracellular IFNg production were measured by flow cytometry.

RESULTS: After CAR mRNA nucleofection, 50 to 95% PBNK cells were detected to express CAR after 16hrs. PBNK *in vitro* cytotoxicity was enhanced by CAR⁺ PBNK compared to CAR⁻ PBNK against CD20⁺ B-L/L at 10:1 (n>3): **Ramos** (p<0.05), **Daudi** (p<0.001), **Raji** (p<0.05), and **U-698-M** (p<0.001). However, there was no significant difference against CD20⁻ RS4;11 or Jurkat cells. CD107a degranulation was enhanced in CAR⁺PBNK compared to CAR⁻PBNK in response to CD20⁺ **Ramos** (p<0.001) and **Daudi** (p<0.001) stimulation. There was no significant difference in response to RS4;11 or medium. Intracellular IFNg production was also enhanced in CAR⁺PBNK compared to CAR⁻PBNK in response to CD20⁺ **Ramos** and **Daudi** specific stimulation.

CONCLUSIONS: Anti-CD20 CAR expression in PBNK cells was associated with a significant increase in CD107 degradulation, INF-g production and significant and specific PBNK *in vitro* cytotoxicity against CD20⁺ B-L/L. Future directions include examining CAR NK cytotoxity against CD20⁺ primary B-L/L tumor cells isolated from patients and testing the anti-tumor activity of CAR NK against B-L/L and survival in xenografted mice.

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5:00pm

Medical Student

Low Day 100 Transplant-Related Mortality (TRM) and Relapse Rate Following Clofarabine (CLO) in Combination with Cytarabine, Total Body Irradiation (tbi) and Allogenic Stem Cell Transplantation (ALLSCT) in Children, Adolescents and Young Adults (CAYA) with Poor-Risk Acute Leukemia

Nan Chen, Kavita Radhakrishnan, Jennifer Krajewski, Angela M. Ricci, Lauren Harrison, M. Fevzi Ozkaynak, Prakash Satwani, Alexandra C. Cheerva, Julie Talano, Mark B. Geyer, Theodore B. Moore, Alfred Gillio, Lee-Ann Baxter-Lowe, Mitchell S. Cairo.
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BACKGROUND: Patients with acute leukemia in third complete remission (CR3), induction failure (IF) or refractory relapse (RR) have a poor prognosis.(Gaynon, BJH, 2005; Wells, JCO, 2003). CLO, a purine anti-metabolite, has been shown to induce lasting remissions with Busulfan in poor-risk AML. (Magenau et al., Blood, 2011).

OBJECTIVE: This study seeks to determine the safety, day-100 TRM, and overall survival (OS) associated with a conditioning regimen of CLO, cytarabine, and TBI followed by AlloSCT in CAYA with poor-risk ALL or AML.

DESIGN/METHODS: This is a multi-center Phase I/II trial of a novel conditioning regiment consisting of CLO (maximal dose of 52mg/m²/d achieved without dose limiting toxicity) x5d, sequential cytarabine 1000 mg/m² x6d 4 hours post CLO, and TBI (1200cGy) followed by AlloSCT from matched related or unrelated donors in CAYA with ALL or AML in CR3, RR or IF. GVHD prophylaxis consisted of tacrolimus and MMF. Kaplan-Meier method was used to determine the probabilities of engraftment, GVHD, TRM, and OS.

RESULTS: 30 patients, median age: 11.9 yrs (1.5 – 21.8); M:F:21:9, ALL/AML:27:3 (10 CR3, 3RR, 17 IF), 11 related donors, 19 unrelated donors (11 BM/PBSCs, 8 UCB). Median TNC and CD34 dose was 4.49x10⁸/kg and 4.2x10⁶/kg for BM/PBSCs and 4.8x10⁷/kg and 3.4x10⁵/kg for

UCB. Probabilities of neutrophil, platelet engraftment, grade II-IV aGVHD and chronic GVHD were 100%, 93%, 45%, and 35% respectively. Probability of Day 100 TRM was only 7.6%. The probability of relapse was 27% (CI_{95}: 4-59%). Probability of 1-yr PFS and OS were 52% (CI_{95}: 30-70%), and 46% (CI_{95}: 26-64%) respectively.
CONCLUSIONS: These updated results suggest that this conditioning regiment including CLO dose 52 mg/m^2 followed by AlloSCT is safe and well tolerated in CAYA with poor-risk ALL or AML. Our results are promising with respect to a low risk of day 100 TRM and leukemic relapse rate in this patient population. This approach should be considered in better risk patients with ALL/AML who require AlloSCT.

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5:15pm

Fellow in Training

Elevated Cotinine Levels Are Associated with More Frequent Hospitalizations in Children with Sickle Cell Disease

Sara C. Sadreameli, Kayin T. Robinson, John J. Strouse.
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BACKGROUND: Tobacco smoke exposure has been associated with more frequent hospitalizations in children with sickle cell disease (SCD), but previous studies have not quantified the exposure by direct methods.
OBJECTIVE: We hypothesized that elevated cotinine levels would be associated with increased rates of hospitalization for pain and acute chest syndrome in children with sickle cell disease.
DESIGN/METHODS: We enrolled 50 children and young adults with SCD in a retrospective cohort study. Tobacco exposure was quantified by indirect (questionnaire) and direct (salivary cotinine) measures. We used a multivariable negative binomial regression model to evaluate the association between salivary cotinine and hospital admissions and adjusted for known confounders.
RESULTS: We found that 45% (22/49) of participants had significant elevation of salivary cotinine (> 0.5 ng/ml). The incidence risk ratio of admission for ACS was 4.5 (95% CI 1.2, 25, P=0.02) and for pain was 5.4 (95% CI 3.1, 10, P <0.001) for those with cotinine > 0.5 ng/ml. The incidence risk ratio for all admissions was 4.5 (95% CI 3, 7.1, p<0.0001) for salivary cotinine > 0.5 ng/ml. The incidence risk ratio for all admissions was 4.1 (1.3, 14, P=0.02) in those with elevated cotinine after adjustment for age, household income per person, and genotype of SCD.

Variable	Cotinine <0.5	Cotinine ≥ 0.5	P-value
Age (years)	8.6 (4, 14)	14.1 (7, 19)	0.04
Male (%)	12 (44)	14 (64)	NS
Genotype (%)			
HbSS	15 (56)	15 (68)	NS
HbSC	9 (33)	4 (18)	
HbSβthal	3 (11)	3 (14)	
Household Income <$10,000/person (%)	3 (14)	8 (67)	0.005
ACS (rate/year)	0.06	0.25	0.02
Pain (rate/year)	0.3	1.6	<0.001
Hospitalization	0.5	2.4	<0.001

[Demographics and Rates of Admission in Patients with SCD by Salivary Cotinine]

CONCLUSIONS: We show that a direct measure of tobacco smoke exposure, salivary cotinine, is strongly associated with the rate of admissions in children and young adults with SCD. This association is likely causal and underscores the importance of screening for tobacco smoke exposure as part of routine care of people with SCD. Further investigation is warranted to determine the effectiveness of interventions to decrease exposure.

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5:30pm

House Officer

Hyperuricemia: An Unappreciated Risk Factor for Acute Hypertension in Pediatric Tumor Lysis Syndrome

Lydia Pecker, Shulamit Kulak, Mimi Kim, Adam Levy, Beatrice Goilav.
Pediatric Nephrology, Children's Hospital at Montefiore, Bronx, NY; General Pediatrics, Children's Hospital at Montefiore, Bronx, NY; Pediatric Hematology-Oncology, Children's Hospital at Montefiore, Bronx, NY; Epidemiology & Population Health, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Chronic hyperuricemia has been linked to endothelial dysfunction and is associated with primary hypertension (HTN) in adolescents. The role of acute hyperuricemia on the development of HTN has not been evaluated.
OBJECTIVE: This study investigated the relationship between acutely increased uric acid levels, induced by the tumor lysis syndrome (TLS), and short-term and long-term blood pressure (BP) in pediatric patients with leukemia and lymphoma.
DESIGN/METHODS: We evaluated the records of fifty-three children with leukemia or lymphoma, ages 1-21 years, admitted to our hospital between 1998 and 2007. We compared BP in hyperuricemic (uric acid>5.0 mg/dL, n=19) and normouricemic patients (n=34). We collected BP values, uric acid levels, biochemical data including renal function, and medications at regular intervals. We defined hypertension as BP >95th percentile for height, gender, and age at enrollment, and at 3 consecutive measurements on follow-up, or any patient requiring anti-hypertensive therapy. In patients >18 years, blood pressure was interpreted using adult guidelines.
RESULTS: Hyperuricemic patients were significantly more likely than normouricemic patients to have HTN at enrollment (11/19 vs 10/34, p<0.05), even after adjusting for BMI (p=0.71), gender (p=0.28), race (p=0.53), or days of treatment with rasburicase (p=0.55) or allopurinol (p=0.17) between the two groups. Patients diagnosed with HTN were significantly younger (6.38 +/- 5.29 vs 11.81 +/- 5.32, p<0.005) than normotensive subjects. At follow-up there was no difference in the prevalence of HTN between groups (p=0.98). Sub-group analysis showed children with leukemia (n=39) were significantly more likely than those with lymphoma (n=14) to be hypertensive at enrollment (20/39 vs 1/14, p<0.005) and to have sustained HTN at follow-up (22/39 vs 3/14, p<0.05).
CONCLUSIONS: In our study, acute hyperuricemia with the TLS is a risk factor for acute HTN in children with leukemia and lymphoma. Pediatric leukemia survivors are at known risk for HTN. Our results show that hyperuricemia at cancer diagnosis is a risk factor for acute HTN. Long-term follow up by nephrology is warranted. Study of adult survivors of childhood malignancy might offer insight into long-term consequences of acute hyperuricemia.

Neonatal Neurology Platform Session

Saturday, March 23, 2013
4:15pm–5:45pm

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4:15pm

Fellow in Training

Effects of Post Hypoxic-Ischemic Hypothermia on Hemispheric Preference in the Immature Rat

Leslie M. Pierce, Jeffrey Perlman, Holly Moore, Susan Vannucci.
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BACKGROUND: Neonatal hypoxia-ischemia(HI) is a major cause of mortality and morbidity in survivors. Therapeutic hypothermia has shown promising results in protecting against mortality, motor, and neurocognitive deficits. Rodents, like humans, have behavioral and neurochemical brain asymmetries that correlate with lateralized motor behavior. In adult stroke studies, a lesion to the dominant hemisphere results in worse outcome, however this has not been studied in neonates as most neonatal HI/stroke rodent models induce a unilateral cerebral lesion by matter of convention.
OBJECTIVE: To investigate the role of innate laterality on outcome following HI, with and without hypothermia, in term-equivalent neonatal rats.
DESIGN/METHODS: 30 Wistar rats of both sexes were used. Prior to HI, innate laterality was assessed by paw preference on a flat surface(min 5 trials). Unilateral(right) HI was induced on P10(36-40wks gestation equivalent), according to our standard procedure with 8% FiO2 for 65 min. Following HI, 50% were recovered in hypothermia (average rectal temp 32^0 C for 4h(H); and 50% recovered at 36^0(NL). All pups underwent MRI at 1-2 weeks of recovery for damage scoring(DS). Side preference was determined by spontaneous behavior in a T-maze at P28.
RESULTS: Prior to HI 23(77%) demonstrated right-sidedness, 4(13%) left, and 3(10%) no preference with no effect of sex. NL recovery resulted in significant damage in all pups with males more damaged than females (DS 2.5 + .7 vs 1.4 +.3, p<.05). At P28, ~ 25% of damaged NL animals switched from initial right to left sidedness, regardless of sex. In the H groups, 2/8 females and 1/6 males had no damage on MRI; the range of damage in the remaining animals was sufficient to preclude a significant effect of cooling. On determination of sidedness in the T-maze 5/6 H damaged females switched from initial right preference to left; the 2 with no damage maintained their original right preference. None of the 6 H males exhibited this transition from right to left preference (p< 0.05 vs H females).
CONCLUSIONS: Innate hemispheric dominance, demonstrated by laterality, may play a role in functional recovery after HI possibly accentuated by therapeutic hypothermia, at least in females. These preliminary findings may have implications for behavioral/functional outcome studies in experimental models of unilateral cerebral lesions, as well as potential clinical manifestations related to impact of sex on recovery.

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4:30pm

Fellow in Training

Seizure vs Non-Seizure Behaviors in Hypoxic and Hypoxic-Ischemic Neonatal Rat Pups

Aimee M. Parow, Murray Engel, Jeffery Perlman, Susan J. Vannucci.
Newborn Medicine, New York Presbyterian Weill Cornell, New York, NY; Pediatric Neurology, New York Presbyterian, Weill Cornell, New York, NY.

BACKGROUND: Diagnosis of seizures in neonates and animal models has depended primarily on behavioral observations. With increased clinical use of electroencephalograms, it has become clear that many behaviors observed in neonates attributed to seizures (Sz) are not associated with electrographic (EEG) Sz. This discrepancy may be even more pronounced in preterm, relative to older, infants.
OBJECTIVE: To characterize seizure and nonseizure behaviors in hypoxic (H) and hypoxic-ischemic (HI) rat pups of preterm and term equivalent ages.
DESIGN/METHODS: P8 and P11 Wistar rats (brain development ~ 32-36 wk and 40 wk gestation human, respectively) were used. EEG headmounts were placed the day before H or HI (n= 10/age/group). HI pups underwent right carotid ligation and all pups were monitored with video EEG during hypoxia (90 min for P8 & 75 min for P11) and for 20 min post-H/HI. EEG Sz were defined as repetitive, rhythmic patterns with increased amplitude, lasting at least 10 sec. 6 stereotypic behaviors were scored; 4 "classic" Sz behaviors: paddling, paddling+ (fast uncoordinated limb movements), wet-dog shakes, and repetitive head shaking along with 2 more subtle behaviors: tonic posturing and slight repetitive mouth/limb movements. Subclinical Sz had EEG Sz with no movement at all. Brains were removed at 48 hours post-H/HI and stained with triphenyltetrazolium chloride (TTC) to assess damage.
RESULTS: To date 4 pups/group/age have been scored. All HI, and no H, animals exhibited both clinical and subclinical EEG Sz, which began during the 2nd half of hypoxic exposure. P11 pups had more Sz than P8 (11.7+3.3 vs 5+ 2.5; NS). The "classic" Sz behaviors of paddling, paddling+, and wet dog shakes were observed in all pups (H and HI, P8 & P11) during the entire hypoxic period. However, the more subtle mouth/limb movements and posturing were observed during the

2nd half of hypoxia in all HI pups, either just preceding or during EEG Sz, compared with no H pups (P = .014). As previously reported, EEG Sz was positively associated with damage for P11 but not P8, and no H pups had damage.
CONCLUSIONS: Classic Sz behaviors, observed in all animals, rarely correlated with EEG Sz. Further study of Sz semiology in neonatal rodents requires more careful attention to subtle repetitive movements and the extent to which these behaviors are observed in human infants. This initial data further supports the importance of the use of EEG in diagnosis and treatment of neonatal Sz.

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4:45pm

Fellow in Training

Origins of Interneurons in the Cerebral Cortex of Fetuses and Premature Infants

Arslan Arshad, Praveen Ballabh.
Div Newborn Med, MFCH-NYMC, Valhalla, NY.

BACKGROUND: Interneurons constitute 20–30% of all cortical neurons. An imbalance between inhibitory interneurons and excitatory projection neurons is associated with neurodevelopmental disabilities, epilepsy, autism, and psychiatric disorders. Interneurons originate primarily from ventral subventricular zone (SVZ) of the cerebral cortex, whereas projection neurons derive from dorsal SVZ. Determining their development after mid-pregnancy might elucidate the mechanisms of brain development and enhance the understanding of neurological disorders in premature infants.
OBJECTIVE: Determine the densities and proliferation of interneurons in the dorsal and ventral (ganglionic eminence) SVZ of the cerebral cortex.
DESIGN/METHODS: Autopsy materials from fetuses (16-22 gestational week, gw) and premature infants (23-26 gw) of less than 18 h postmortem interval were included in the study (n=5 each group). Subjects with major congenital anomalies, culture proven sepsis, meningitis, or hypoxic-ischemic encephalopathy were excluded. Brain slices taken at the level of the head of the caudate nucleus were fixed in 4% paraformaldehyde; and cyrosections were stained with GABA, calretinin, parvalbumin, and Ki67 specific antibodies. The images were acquired with Nikon confocal microscope; and cells in the SVZ were counted.
RESULTS: We found that the total number of $GABA^+$ interneurons in the ganglionic eminence was higher in fetuses compared with preterm infants (974±192 vs.390 ±100.9,P<0.02). However, the total number of $GABA^+$ interneurons in dorsal SVZ was similar in fetuses and preterm infants. Accordingly, in ganglionic eminence, percentage of $GABA^+$ (ratio of $GABA^+$ interneurons and $sytox^+$ nuclear stain) interneurons was greater in fetuses compared with premature infants (P<0.04), but not in the dorsal SVZ. When two germinal zones were compared, $GABA^+$ interneuronswere higher in density in the dorsal SVZ compared with the ganglionic eminence in preterm infants (P<0.001), but similar in fetuses. $Calretinin^+$ and $parvalbumin^+$ interneurons were also comparable in density in fetuses and preterm infants. Likewise, interneurons co-labeled for GABA and calretinin were similar in fetuses and premature infants.
CONCLUSIONS: $GABA^+$ interneurons are more abundant in the dorsal SVZ compared to ganglionic eminence in premature infants, but similar in fetuses. The data challenges the current notion that $GABA^+$ interneurons primarily originate from the ganglionic eminence.
Supported by NIH/NINDS RO1 NS071263 (PB).

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5:00pm

Undergraduate Student

Neurofunctional Tests in Neonatal Rats after Focal Cerebral Ischemia

Gregory L. Gedman, Shuang Xu, Javier Pacheco-Quinto, Elizabeth A. Eckman, Ben H. Lee.
Neuroscience, Drew University, Madison, NJ; Neonatology, MidAtlantic Neonatology Associates, Morristown, NJ.

BACKGROUND: Although histopathological and mortality analyses are typically used with neonatal focal cerebal ischemia (FCI) rat models of perinatal brain injury, neurofunctional outcomes have not been as fully utilized in modeling clinical outcomes in animal models.
OBJECTIVE: To assess differences in outcomes associated with neonatal FCI versus sham in a battery of neurofunctional tests (NFT).
DESIGN/METHODS: Left middle cerebral artery FCI was induced in P7 Sprague-Dawley rats; sham-operation (SO) involved pertinent vessels dissection only. Body weight and eye opening (EO) were monitored and NFTs were initiated starting 24 hours after surgery, including righting reflex on a surface (RRS) and in air (RRA), auditory (SR) and tactile (TS) startle responses, negative geotaxis (NG, measured until eye opening occurred), cliff avoidance (CA), walking initiation (WI), and square bridge (SB) tests. All assessments were performed until death or P22.
RESULTS: 60 pups were studied (30 FCI, 30 SO, 47% male); 29% died (all FCI, median at P14). Weight curves were significantly different between FCI and SO groups, starting at P8 (Δ3g) through P22 (Δ13g), with FCI pups being consistently smaller than SO pups. Among FCI pups, females were more likely to be smaller and die prior to P22 than males. TS was present in all pups at P8. By P10, 97% of SO had intact SR versus 57% of FCI pups (p<0.001). Mean RRS for FCI versus SO at P8 was 2.0s versus 1.6s, at P10 was 2.5s versus 1.1s, at P12 was 1.7s versus 0.9s (p<0.05 for all points); at P14 onwards, mean RRS times were consistently less than 1s for all pups. WI for 2 concentric circles were performed at P14 (Trial 1), P18 (Trial 2), and P22 (Trial 3); only Trial 2 showed statistically significant differences between FCI and SO groups (11.9s versus 28.5s for inner, 21.0s versus 28.5s for outer, respectively). The median age for EO and CA was P16. There were no differences noted between FCI and SO groups for EO, CA, RRA, NG, or SB.
CONCLUSIONS: This study identified selected NFTs sensitive in detecting functional deficits in a neonatal FCI rat model, including SR at P10, RRS at P10, and second trial of WI (on P18 in the current study). Persistent weight differences existed between FCI and SO pups, starting the day after brain insult. Differential outcomes by sex were detected for weight and survival.

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5:15pm

Fellow in Training

Indomethacin Prophylaxis (IP) for Intraventricular Hemorrhage (IVH) in Extremely Low Birth Weight (ELBW) Infants: Effects of Time of Administration

Hussnain Mirza, Abbot R. Laptook, Sarah Kandefer, William Oh, Betty R. Vohr, Barbara Stoll, Barbara S. Stonestreet, Generic Database Subcommittee.
Pediatrics, Brown University, Providence, RI; Statistics and Epidemiology Unit, RTI International, Research Triangle Park, NC; Pediatrics, Emory-Children's Center, Atlanta, GA; Genetic Database Subcommittee, NICHD Neonatal Research Network, Bethesda, MD.

BACKGROUND: IP reduces the risk of IVH in preterm infants. Current references (Neofax) recommend administration of IP at 6-12h of life. Since IVH may occur soon after birth, earlier IP may be more effective.
OBJECTIVE: IP before 6 h of life (Early IP) reduces the incidence of IVH or death compared to initiation after 6 but before 24 hr (Later IP).
DESIGN/METHODS: This is a retrospective analysis of prospectively collected data from the Neonatal Research Network database for 2003-2010. Inclusion criteria were birth weight <1000 grams and IP before 24h of life. Exclusion criteria were death ≤ 12 h after birth, congenital syndromes, unknown time of IP and missing cranial ultrasound (CUS). The database contains the worst CUS report in the first 28 days. Grade 3 and 4 IVH were defined as severe IVH. Infants were dichotomized based on age of IP (≤ or > 6hrs). Groups were compared for maternal and neonatal variables, CUS findings and mortality > 12h. Logistic regressions adjusted for group differences. Data are mean ± sd.
RESULTS: IP was given to 4582 infants < 24h; 334 met exclusion criteria. 2340 infants received Early IP (age 3.8±1.3hr) and 1915 infants received Later IP (age 10.2±4.3hr). Early IP mothers had more hypertension (29% vs 26%*) and antenatal steroids (64% vs 60%†). Gestational age (25.5±1.7 vs 25.4±1.7wk), birth weight (747±148 vs 741±145g) and percent male (49 vs 48) were similar. Early IP had less out-born births (3% vs 14%†), chest compressions at birth (6.4 vs 11.4%†), medically treated PDA (22 vs 30%†) and lower mortality (20.3 vs 24.9%†). Any IVH or death was lower in Early IP (41.7% vs 45.5%^); severe IVH or death was also lower in Early IP (30.4 vs 33.8%*). Any IVH (32.5 vs 33.7%) or severe IVH (17.9 vs 18.6%) did not differ for Early vs Later IP. After adjustment for maternal hypertension and antibiotics, cesarean section, antenatal steroids, race, gender, SGA, out-born, admission temperature, medically treated PDA and center, Early and Later IP did not differ for any IVH, severe IVH, any IVH or death, or severe IVH or death. There was no gender by time of IP interaction. (*p<.05, †p<.0001, ^p=.01).
CONCLUSIONS: Time of Indomethacin prophylaxis does not affect the incidence of IVH alone or IVH or death among ELBW infants.

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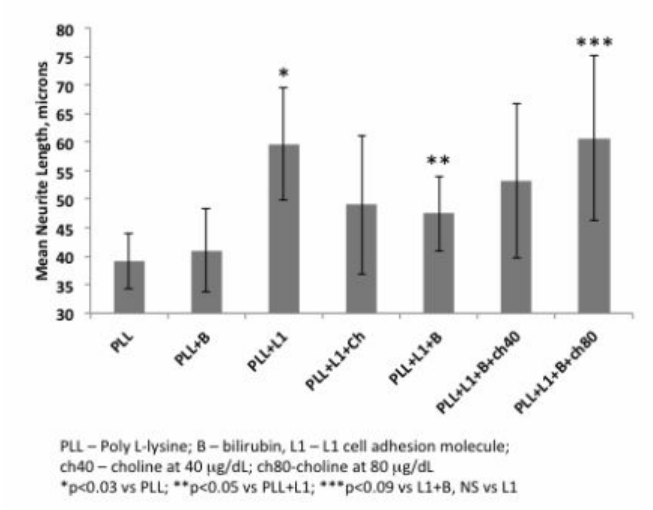
5:30pm

Fellow in Training

Choline Prevents Bilirubin Induced Neuronal Injury through a Lipid Raft Dependent Mechanism

Gail S. Cameron, Ningfeng Tang, He Min, Cynthia F. Bearer.
Pediatrics, University of Maryland, School of Medicine, Baltimore.

BACKGROUND: Hyperbilirubinemia is an important cause of neurological morbidity. However, the mechanism of its neurotoxicity is not known. We have previously shown that bilirubin may cause neurotoxicity through inhibition of lipid raft dependent neurite outgrowth. Lipid rafts are sphingomyelin rich microdomains of the plasma membrane important in cell signaling. L1 cell adhesion molecule (L1), critical for the proper development of the central nervous system, requires lipid rafts to promote neurite outgrowth. Therefore L1 serves as a reporter protein for lipid raft function. Choline, a constituent of sphingomyelin, has been shown to ameliorate the neurotoxicity of ethanol. We hypothesize that choline will protect the function of lipid rafts and therefore prevent bilirubin induced inhibition of L1 mediated neurite outgrowth.
OBJECTIVE: To determine if choline prevents the inhibition by bilirubin of L1 mediated neurite outgrowth of cerebellar granule neurons (CGN).
DESIGN/METHODS: Cerebellar granule neurons were prepared from postnatal day 6 rats and plated on poly L-lysine coated plates (PLL) alone, or prepared with L1 cell adhesion molecule (PLL+L1). Choline supplementation was added to the serum free defined media. Bilirubin prepared in albumin (1:14 ratio) was added for a final concentration of 0.3mg/dL. Cells were grown overnight, fixed and neurite length measured.
RESULTS: Neurite length was significantly increased of CGN plated on L1 compared to PLL. Adding bilirubin to CGN plated on L1 reduced neurite length. Addition of choline 80 μg/dL prevented the inhibition of bilirubin on L1 mediated neurite outgrowth. Choline had no effect on L1 mediated neurite outgrowth itself, nor did bilirubin inhibit neurite outgrowth of CGN plated on PLL alone.



PLL – Poly L-lysine; B – bilirubin, L1 – L1 cell adhesion molecule; ch40 – choline at 40 μg/dL; ch80-choline at 80 μg/dL
*p<0.03 vs PLL; **p<0.05 vs PLL+L1; ***p<0.09 vs L1+B, NS vs L1

CONCLUSIONS: We conclude that choline prevents bilirubin inhibition of L1 mediated neurite outgrowth. This suggests that choline may be a novel intervention for the prevention of bilirubin induced neurotoxicity.

Neonatology II
Platform Session

Saturday, March 23, 2013
4:15pm–5:45pm

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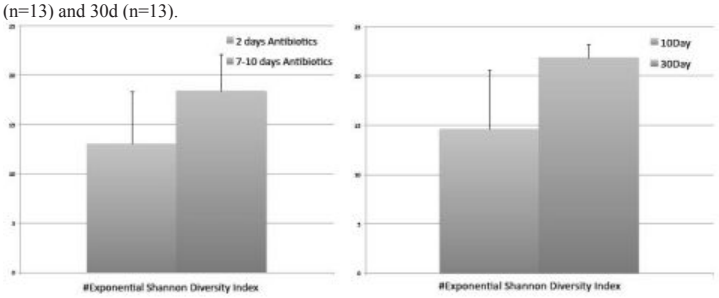
4:15pm

Fellow in Training

Impact of Postnatal Antibiotics on Diversity of the Preterm Intestinal Microbiota

Majd Dardas, Steven Gill, Gloria Pryhuber, Yi-Horng Lee, Ann Gill, Ronnie Guillet.
Pediatrics, Division of Neonatology, University of Rochester Medical Center, Rochester, NY; Surgery, Division of Pediatric Surgery, University of Rochester Medical Center, Rochester, NY; Microbiology and Immunology, University of Rochester Medical Center, Rochester, NY.

BACKGROUND: Prolonged antibiotics exposure has been associated with increased incidence of NEC. We studied the effect of postnatal antibiotic (abx) exposure on early establishment of the preterm intestinal microbiome as a potential etiologic link.
OBJECTIVE: To determine if duration of abx within the first 10d after birth affects the intestinal microbiome diversity at 10 and 30d.
DESIGN/METHODS: This study was performed at the University of Rochester Medical Center, 1-10/2012. Subjects were 24 0/7-31 6/7 weeks' GA who received a total of ≥100 ml/kg of feeds and whose breast milk intake was ≥50% of feeds by d10. Infants NPO for ≥7d, had NEC, intestinal perforation or other GI anomaly or whose 1st 48h course of abx was followed by a 2nd course in the first 10d were excluded. We compared babies who received 2d and those who received 7-10d of abx. Rectal swabs were collected at 10 and 30d. Bacterial DNA was extracted and analyzed by 454 pyrosequencing of bacterial 16S rRNA. Sequences were assigned to Operational Taxonomic Units based on degree of genetic relatedness. Diversity was determined using the Exponential Shannon Diversity Index (DI).
RESULTS: We enrolled 28 infants to date, 16 who received 2d and 12 who received 7-10d of abx. Patient characteristics were similar in both groups except babies who received more abx were significantly more likely to be born via C/S and have mothers with gestational diabetes. Assays completed to date showed no difference in DI at 10d between babies who received abx for 2d (n=12) vs 7d (n=7). Regardless of abx exposure, no significant difference was noted in DI at 10d (n=13) and 30d (n=13).



CONCLUSIONS: Our preliminary data suggest that there is no difference in diversity of the intestinal microbiome in preterm infants exposed to different durations of early abx. We speculate that the preponderance of maternal breast milk feeds in both groups may contribute to this discrepancy.

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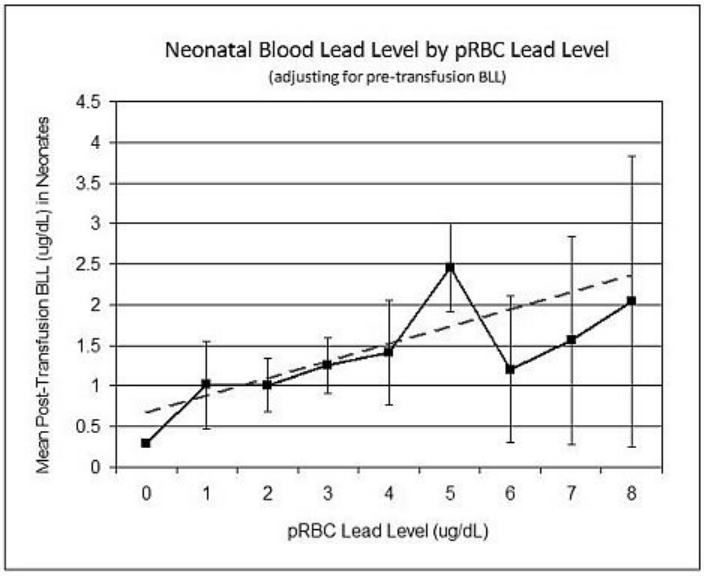
4:30pm

House Officer

Risk of Lead Exposure in Preterm Infants Receiving Red Blood Cell Transfusions

Hijab Zubairi, Paul Visintainer, Jennie Fleming, Matthew Richardson, Rachana Singh.
Baystate Children's Hospital, Springfield, MA.

BACKGROUND: Lead is a potent neuro-toxin. The developing brain of preterm infants is particularly susceptible to the effects of lead exposure. Red blood cells (RBCs) transfused from adult donors may represent a significant lead exposure for preterm infants who are at risk for multiple transfusions; however, little information is available on the effect of transfusions on lead levels in this group.
OBJECTIVE: To quantify the impact of RBC transfusions on lead levels in preterm infants <30 weeks gestation.
DESIGN/METHODS: This was a prospective cohort study of infants admitted to Baystate Children's Hospital NICU during the study period. Infants who were <30 weeks gestational age were eligible, while those < 23 weeks gestational age and known chromosomal disease were excluded. Lead levels were obtained from the infant at birth (via cord blood), before and after each transfusion, and at discharge. Lead levels were obtained from the aliquot of donor RBCs that was transfused. A logistic regression was done to correlate pRBC lead load with post-transfusion lead levels while controlling for pre-transfusion lead levels.
RESULTS: In our cohort of 75 infants, 33 infants received a total of 95 pRBC transfusions. Each infant had an average of 2.9 transfusions (range 1-8). 92% of lead levels in the transfused aliquot were ≤ 5 mcg/dL, 6.8 % had a level between 6-8, and 1 had a level of 56. The average total lead load was 1.3 mcg/dl with a range of 0-8.6 mcg/dl. For each 1 mcg/dL increase in transfused pRBC lead level, infant's post transfusion lead level increased by 0.21mcg/dl (p=0.001). There was no significant increase in discharge lead levels and the mean discharge lead level was 0.4 mcg/dL.



CONCLUSIONS: Post-transfusion infant lead levels correlate significantly with the transfused pRBCs lead level. Infant discharge lead levels were not significantly elevated indicating possible deposition of lead in tissues. Subjects from this study are being studied to follow neuro-developmental outcomes between 18-24 months.

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4:45pm

Buccal Swabs: A Non-Invasive Method for Genetic Analysis in Premature Neonates

Mariam Said, Clint Cappiello, Zohreh Tatari-Calderone, Joseph M. Devaney, Stanislav Vukmanovic, Khodayar Rais-Bahrami, Naomi Luban, Anthony Sandler.
Children's National Medical Center, Washington, DC; The George Washington University School of Medicine and Health Sciences, Washington, DC.

BACKGROUND: Phlebotomy is the current method of obtaining DNA for genetic evaluation in premature infants. Buccal cells have previously been discredited as a source of reliable DNA in neonates. It is the purpose of this study to evaluate if a non-invasive test can be used to obtain enough high-quality DNA to perform a variety of genetic analyses.
OBJECTIVE: We hypothesize that DNA extracted from buccal cells of preterm infants using a non-invasive swab, yields genomic DNA of comparable quality and quantity as compared to DNA extracted from whole blood, currently the gold standard.
DESIGN/METHODS: With parental consent and IRB approval, patients with a gestational age of less than 34 weeks were invited to participate. Neonates with major congenital anomalies or genetically inherited disease were excluded. 1.5mL of blood and two buccal swabs were collected from each patient. DNA was extracted from buccal swabs and whole blood in EDTA using a QiagenBuccal cell and DNAeasy kit, respectively. Template DNA was amplified with polymerase chain reaction (PCR) and digested with the restriction enzyme BglII to determine the genotype for a single nucleotide polymorphism (SNP) of interest. One microgram of DNA was also prepared for whole exome sequencing (WES). WES was performed at our institution using Illumina's Truseq DNA Sample Prep v2 kit protocol. Concordance was determined for six SNPs across twelve

matched samples of genomic DNA from whole blood and buccal cells.
RESULTS: A total of 106 buccal swabs and whole blood samples were obtained from 53 patients. DNA was extracted and yields measured using NanoDrop spectroscopy at wavelengths of 260 and 280nm. When compared to whole blood, buccal cells yield significantly more DNA per sample ($p<0.0001$). 260/280nm ratios were not significantly different. Six SNPs were identified across 12 matched samples with 100% concordance. WES analysis of 36 samples identified approximately 19,000 SNPs, both known and novel.

	N	Average Yield (mg)	p value	Average 260/280nm	p value
Buccal Cells	53	23.50	< 0.0001	1.91	0.1701
Whole Blood	53	4.27		1.94	

CONCLUSIONS: Genomic DNA extraction from buccal cells obtained by swabs in premature neonates is feasible, simple, and non-invasive. This method can potentially be used as an alternative to drawing blood for genetic analysis. Further studies will aim to validate this method for clinical application.

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5:00pm

Fellow in Training

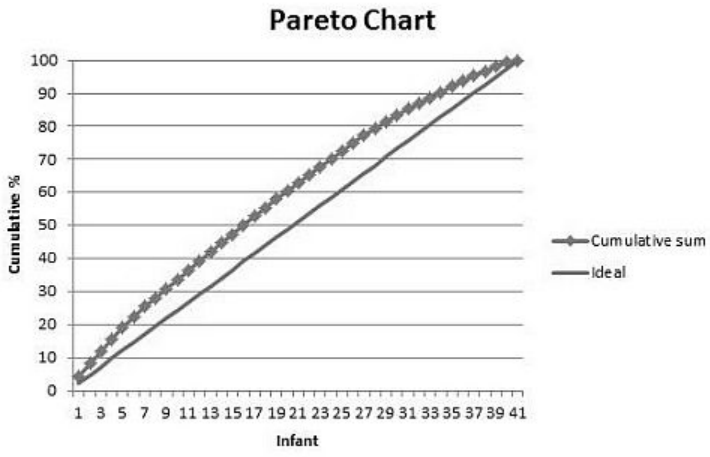
Extent of High Oxygen Saturations in VLBW Neonates with Respiratory Distress Syndrome and Associated Factors

Jenda M. Arawiran, Jeanne M. Curry, Lorna Welde, Gad Alpan.
Newborn Medicine, Maria Fareri Children's Hospital at Westchester Medical Center - New York Medical College, Valhalla, NY; Newborn Medicine, Maria Fareri Children's Hospital at Westchester Medical Center, Valhalla, NY.

BACKGROUND: Considerable attention has been paid to maintaining oxygen saturations in premature infants in a predefined range. Reports suggest that preterms receiving supplemental oxygen spend 30-40% of the time higher than the intended SpO2 range. Previous studies of oxygen saturation have typically shown only aggregate data. Data are analyzed under implicit assumption that oxygen saturations are independent between and within different babies.
OBJECTIVE: This study aims to determine the amount of time that VLBW babies spend above 92% and whether there is a subgroup of patients who are prone to be in the higher range that would merit special attention in quality improvement endeavors.
DESIGN/METHODS: We studied 1481 12-hour nursing shifts in 41 babies <1500g who were receiving supplemental oxygen (>21%). These patients were on Masimo pulse oxymeters. Oxygen saturation data, at 2s intervals, were downloaded and reviewed. We measured proportion of time spent per shift with oxygen saturation ≥ 93% (%HiSat). We related %HiSat to mode of ventilation, time of shift, and birthweight. We also used Pareto analysis to check whether the total %HiSat was equally distributed among the babies.
RESULTS: The mean gestational age was 25wks (23-30wks), mean birthweight 742g (420-1310g). On average, 36.9%±17.2% of a shift was spent with oxygen saturation of 93-100%. Birth weight was not related to %HiSat and neither was shift time (day vs. night). Table below shows the result according to the ventilation mode.

Mode of Ventilation	High Freq*	A/C Vent	CPap or BiPap	Nasal Cannula*
%HiSat (mean±SD)%	31.40±16.09	42.2±17.02	40.72±16.54	59.97±14.05

*p value <0.001 vs. all other modes



CONCLUSIONS: VLBW babies spend 36.9% of time with O2 sats ≥ 93%. Pareto analysis showed that time spent in the high range was equally distributed among all babies. Although %HiSat was (statistically significantly) lower when on HFV than other ventilation modes, the difference has little clinical implications.

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5:15pm

House Officer

Laser Therapy for Retinopathy of Prematurity in Extremely Premature Infants: Frequency after the Revised Guidelines

Elizabeth O'Donnell, Sharon Kirkby, Ursula Nawab, Kevin C. Dysart, Linda Genen, Jay S. Greenspan, Zubair H. Aghai.
Pediatrics/Neonatology, Thomas Jefferson University/Nemours, Philadelphia, PA; Alere Health, Atlanta, GA; Neonatology, Children's Hospital of Philadelphia, Philadelphia, PA; Pediatrics/Neonatology, Cohen Children's Medical Center, New Hyde Park, NY.

BACKGROUND: The guidelines for screening and treatment of retinopathy of prematurity (ROP) was revised by the American Academy of Pediatrics (AAP) in 2006. The first screening for ROP is performed at 31 weeks postmenstrual age (PMA) in premature infants born at < 27 weeks of gestation. The retinal findings that required ablative therapy was also modified and the treatment was recommended for less severe ROP.
OBJECTIVE: To compare the frequency and PMA of laser surgery for ROP in extremely premature infants (< 27 weeks) before and after the revised AAP guidelines.
DESIGN/METHODS: This study is a retrospective data analysis from a large neonatal database for preterm infants (< 27 weeks) born between January 2004 and August 2012. The frequency and the PMA of laser surgery was compared before (2004-2006) and after (2007-2012) the revised AAP guidelines.
RESULTS: A total of 3,382 infants were included, 1,227 infants (BW 754±171 g, GA 25.2±1.0 w) born before and 2,155 infants (BW 754±171 g, GA 25.2±1.0 w) born after the revised guidelines. The frequency of laser therapy for ROP significantly increased and the mean PMA at surgery was reduced after the revised guidelines. None of the infants required laser surgery before 32 weeks PMA prior to new guidelines. However, 5 infants required intervention before 32 weeks PMA after the guidelines were revised.

	Pre (04-06) (n= 1227)	**Post (07-12)** (n=2155)	p
Laser for ROP (% of n)	60 (4.9)	263 (12.2)	<0.001
Survived	958 (78.1)	1666 (77.3)	0.2
Laser for ROP (% of survived)	60 (6.3)	263 (15.8)	<0.001
PMA of laser (mean, range)	38.2 (32.6-52.7)	36.7 (31.1-45.1)	0.03
Laser at 31 weeks	0	5	
Laser at 31 and 32 weeks	1	10	

CONCLUSIONS: The frequency of laser therapy for ROP in extremely premature infants is increased after the revised AAP guidelines. Extremely premature infants are receiving laser therapy at an earlier PMA. A number of infants received laser therapy at 31 weeks PMA after the new guidelines. Premature infants born before 27 weeks of gestation may benefit with earlier screening (prior to 31 weeks PMA), which may lead to early detection and timely intervention for this rapidly progressive disease.

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5:30pm

Fellow in Training

Do the Signs and Symptoms of Gastroesophageal Reflux (GER) Correlate with the Reflux Episodes as Detected by Multiple Intraluminal Impedance (MII) Study?

Apryle Y. Funderburk, Ursula Nawab, Zubair H. Aghai.
Pediatrics/Neonatology, Thomas Jefferson University, Philadelphia.

BACKGROUND: Multi-channel Intraluminal Impedance studies (MII) have become the gold standard for the diagnosis of gastroesophageal reflux (GER). Several clinical signs and symptoms which are attributed to GER during infancy may not be related to true reflux.
OBJECTIVE: Our objective was to correlate the observed reflux-like behaviors to true reflux events on MII studies.
DESIGN/METHODS: We conducted a retrospective review of data on infants being evaluated for GER by using MII between 01/09 and 10/12. These infants were referred for reflux evaluation based on a high index of clinical suspicion. During the MII study the infants were observed for clinical behaviors. The type and frequency of these behaviors were recorded during the MII study. The behavioral symptoms were than reviewed to assess if there was any correlation to actual events detected by the MII.
RESULTS: 54 infants were evaluated during the study period. The mean age at study was 86 days. Irritability (30 infants), bradycardia (19), emesis (17) and desaturation (15) were the common signs and symptoms. A total of 2,142 (755 acidic and 1,386 non acidic) reflux episodes and 906 clinical reflux behaviors were recorded in 54 infants. Irritability, bradycardia and coughing occurred more frequently, however the majority of these events did not correlate with true reflux episodes correlating 37.2%, 24%, 14.6 % of the time, respectively. Only 8.6% of arching episodes were related to acid reflux.

Symptoms (number of infants)	Occurrence	Acid related	Non acid related	All reflux related	Unrelated
Irritability (30)	295	35 (11.8%)	79 (26.8%)	110 (37.2 %)	185 (62.7%)
Bradycardia (19)	116	9 (7.7%)	8(6.8%)	17 (14.6%)	99 (85.3%)
Emesis (17)	72	6 (8.3%)	19 (26%)	25 (34.7%)	47 (65.2%)
Desaturations (15)	85	10 (11.7%)	12 (14.1%)	22 (25.8%)	63 (74.1%)
Cough (12)	158	10 (6.3%)	29 (18%)	38 (24%)	120 (75.9%)
Gagging (6)	37	12 (32%)	6 (16.2%)	17 (45.9%)	20 (54 %)
Regurgitation (5)	28	7 (25%)	3 (10.7%)	10 (35.7 %)	18 (64.2%)
Difficulty feeding (4)	26	2 (7.7%)	22 (84.6%)	24 (92.3 %)	2 (7.6%)
Arching (4)	71	6 (8.5%)	18 (25.3%)	23 (32.4%)	48 (67.6%)
Apnea (3)	18	2 (11%)	1 (5.6%)	3 (16.6 %)	15 (83.3%)

CONCLUSIONS: The majority of clinical signs and symptoms attributed to GER did not correlate with true reflux episodes on MII study.

Poster Session II

Saturday, March 23, 2013
6:00pm–7:30pm

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Fellow in Training

Obesity, Unsustained Early Puberty, and Hypothyroidism: A Variant of VanWyk-Grumbach Syndrome?

Evan Graber, Dennis Chia, Robert Rapaport.
Pediatric Endocrinology & Diabetes, Mount Sinai School of Medicine, New York, NY.

BACKGROUND: VanWyk and Grumbach described a syndrome of early sexual development and hypothyroidism. The presentation of VanWyk-Grumbach syndrome (VGS) includes early breast development, vaginal bleeding, no signs of adrenarche, high TSH, delayed bone age, and nonpubertal response to gonadotropin-releasing hormone (GnRH) stimulation testing.
OBJECTIVE: Demonstrate an atypical case of VGS.
DESIGN/METHODS: Patient Presentation.
RESULTS: The patient was a $9^{1/12}$ year-old female with obesity (BMI 26.5 kg/m^2, Z-score = 2.34) and hypothyroidism (TSH = 83.29 uIU/mL (normal range 0.34-5.6)). Thyroglobulin (TGA) and thyroid peroxidase antibodies (TPO) were positive (TGA = 146.6 U/mL (normal < 4.1), TPO = 485.8 IU/mL (normal < 5.6)). She reported breast development since $8^{11/12}$ years and one episode of vaginal bleeding at $8^{10/12}$ years. On physical exam, she had Tanner III breasts, no pubic hair, and vaginal discharge. Random luteinizing hormone (LH) and estradiol (E2) were prepubertal. GnRH agonist (GnRHa) stimulation testing revealed a prepubertal response.

	Random	0min	60min	120min	24h*
LH (mIU/mL)	0.026 (normal 0.02-0.18)	0.068	1.3	0.971	0.743
FSH (nIU/mL)	-	2.3	7.8	12	6.1
E2 (pg/mL)	3.5 (normal 5-20)	4.1	-	-	20

*Pubertal response: LH = >5 mIU/mL, E2 = >50 pg/mL

We were unable to obtain pelvic ultrasound or ovarian antibody titers. Bone age was advanced by 1.5 years. The patient was started on levothyroxine and has not had further menses or breast development for 6 months.
CONCLUSIONS: Our patient has features typical of VGS, including obesity, early pubertal signs, prepubertal gonadotropins, and hypothyroidism.

Typical Features of VGS	Features of Patient
Elevated TSH	Y
Early menarche	Y
No adrenarche	Y
Enlarged cystic ovaries	N/A
Delayed bone age	N
High E2	N
Prepubertal GnRHa stimulation response	Y

Patients often report recent onset of obesity with resolution after treatment with levothyroxine. Our patient was obese for years prior to treatment and remains obese despite having adequately controlled thyroid disease for 6 months. The E2 level is elevated in girls and the bone age is delayed, which was not the case in our patient. In the setting of the prepubertal E2 level, the advancement of the bone age was most likely due to her longstanding obesity and non-sustained early puberty. Due to rising obesity rates, cases of VGS with advanced bone age and non-sustained puberty may become more common. Thyroid functions should be obtained in girls who present with obesity and early puberty.

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Fellow in Training

Arginine and Levo-Dopa Stimulation in Children: Association of Peak Growth Hormone Response with Body Fat Percentage

Elizabeth Chacko, Molly Regelmann, Rachel Annunziato, Evan Graber, Amy Buono, Elizabeth Wallach, Michelle Klein, Dennis Chia, Robert Rapaport.
Pediatric Endocrinology and Diabetes, Mount Sinai Hospital, New York, NY; Fordham Univesity, Bronx, NY.

BACKGROUND: Growth hormone (GH) stimulation testing (ST) is part of the evaluation of growth failure (GF) in children. An inverse relationship has been shown between Body Mass Index (BMI) and stimulated peak GH (PGH) levels in children. We are not aware of studies exploring the relationship between stimulated PGH levels and body fat percentage (BFP) in children with GF.
OBJECTIVE: Evaluate relationship between BFP and PGH levels in response to arginine and levo-dopa (ALD) ST.
DESIGN/METHODS: Prospective analysis of BFP in children with GF who underwent ALD ST (arginine 0.5 g/kg IV, levo-dopa 250-500 mg PO; 6 serum samples obtained from 0-180 min). BFP was measured using fat loss monitor model HBF-306C. BFP calculated by standard formula, BFP (%) = (body fat mass in pounds/body weight in pounds) x 100. GH and IGF-1 levels were measured by Esoterix Lab (Calabasas Hills, CA). Data collection included age, sex, height (Ht), weight, pubertal status, BMI, BFP, GH, and IGF-1. Statistical analyses included Pearson correlations and t-tests.
RESULTS: Data of 32 (26 M) consecutively tested children were reviewed. Females (n=6) were excluded from further analysis due to limited sample size. PGH levels negatively correlated with BFP and BMIZ-score in all males (M) and pubertal M (PM). BFP was significantly higher in M with PGH <10 ng/mL (p=0.000). Similar results were obtained for BMIZ-score (p=0.005). PGH did not correlate with either Ht standard deviation score (SDS) or IGF-1 SDS.

	Mean Age	Mean Ht SDS	BMIZ-score	Mean BFP	Mean PGH	Correlation of PGH with BFP r-coefficient (p-value)	Correlation of PGH with BMIZ-score r-coefficient (p-value)
All (n=26)	12.4±1.6	-1.50±0.61	0.08±0.75	26.7±8.3	11.8±6.3	-0.594 (0.001)	-0.643 (0.000)
PM (n=16)	12.8±1.5	-1.42±0.66	0.06±0.79	26.4±9.3	12.2±7.4	-0.647 (0.007)	-0.729 (0.001)
PPM (n=10)	11.9±2.3	-1.63±0.53	0.11±0.72	27.1±6.9	11.1±4.3	-0.401 (0.250)	-0.422 (0.225)

CONCLUSIONS: A significant negative correlation was demonstrated between BFP and PGH response to ST in PM, but not in prepubertal M (PPM). For M with PGH <10 ng/mL, BFP and BMI were significantly higher. Therefore both BFP and BMI may need to be considered in the evaluation of the pituitary-GH axis in M evaluated for GF. Additional data from a larger population are needed to confirm these preliminary findings.

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Fellow in Training

Endocrine Dysfunction in Diamond Blackfan Anemia

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BACKGROUND: Diamond Blackfan anemia (DBA) is a rare inherited syndrome characterized by bone marrow failure and congenital anomalies usually diagnosed in childhood. About 40% of patients receive chronic transfusions and are at risk of developing significant iron overload. There has been no formal study of endocrine complications stemming from iron deposition in this population. Cohen Children's Medical Center of New York hosts the National DBA Registry (DBAR), providing a unique opportunity to assess endocrine complications.
OBJECTIVE: To evaluate potential endocrine dysfunction among DBA patients with respect to glucose tolerance, pituitary, adrenal, thyroid, parathyroid and gonadal function in anticipation of a broader prospective study.
DESIGN/METHODS: A retrospective chart review was done from a subset of DBAR patients evaluated between 1/1/2004 and 10/1/2012 who had undergone endocrine testing.
RESULTS: A total of 12 patient charts were reviewed. Most (83%, n=10) were males. One patient was deceased. Median age at DBA diagnosis was 6 months (range 2 weeks – 8 years) and median age at endocrine testing was 26y (range 11 - 43 years). Ten of 12 patients had been receiving chronic blood transfusions. Of the other two, one was treated with glucocorticoids and another was in remission (off treatment for >6 months). Table 1 summarizes various endocrine disorders found.

Endocrine Disorder	Number of Patients (n)
Hypogonadism	6
Primary hypothyroidism	5
Vitamin D insufficiency (25 OH Vit D level: 20-30 ng/ml)	5
Vitamin D deficiency (25 OH Vit D level: <20 ng/ml)	3
Diabetes mellitus	1
Secondary adrenal insufficiency	1
Diabetes insipidus	1
Growth hormone deficiency	1

CONCLUSIONS: We have identified a wide spectrum of endocrine disorders in a group of patients with Diamond Blackfan anemia. We hypothesize that these complications are due to iron deposition following chronic transfusions that began in childhood. A broader prospective study is underway to understand the natural history of endocrinopathies and the respective contributions of transfusion, the underlying disease process and/or glucocorticoid therapy. Two of the patients in this analysis developed multiple endocrine deficiencies at <18 years age, indicating that endocrinopathies may start in pediatric age group. The significance of these investigations will be to develop appropriate surveillance and intervention strategies for the endocrinopathy at-risk DBA population.

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Fellow in Training

Mechanisms of Islet Dysregulation in Beckwith-Wiedemann Syndrome Resulting in Hyperinsulinism

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BACKGROUND: Beckwith-Wiedemann Syndrome (BWS) is a heterogeneous disorder caused by genetic and epigenetic anomalies in the highly imprinted region of chromosome 11p15.5. Hypoglycemia due to hyperinsulinism (HI) is present in up to 50% of cases, but the mechanism responsible for dysregulated insulin secretion is not well understood.
OBJECTIVE: To describe the clinical phenotype of hypoglycemia in a child with BWS and to examine the mechanisms of insulin secretion in pancreatic islets isolated from the surgical specimen.
DESIGN/METHODS: Medical records were reviewed. Pancreatic islets were isolated from the surgical specimen by collagenase digestion. Cultured islets were incubated with Fura-2AM prior to perifusion with glucose and amino acids. Cytosolic calcium flux was measured by dual wavelength fluorescence microscopy.
RESULTS: **Clinical case**: Patient was born at 30 wks gestation with right hemihypertrophy.

Hypoglycemia was noted at birth and required IV dextrose to maintain euglycemia. Critical sample at time of hypoglycemia (blood glucose = 39 mg/dL) showed an insulin level of 161 uU/mL, betahydroxybutyrate level of 0.04 mmol/L and free fatty acids levels of 0.04 mmol/L. There was also a positive response to glucagon, all consistent with HI. Diazoxide was trialed with failure to wean off dextrose. Genetic studies for common genes known to cause HI were negative. An 18-FDOPA PET scan showed no focal uptake in the pancreas. Genome wide array showed whole genomic mosaic uniparental isodisomy (UPD) in 85-95% of peripheral blood cells. Testing performed on bladder and skin biopsies was consistent with UPD. Due to intractable hypoglycemia, the child underwent a near-total pancreatectomy with improvement of glucose control. **Islet phenotype**: Pancreatic islets demonstrated elevated cytosolic calcium at baseline as compared to normal controls islets. When stimulated with amino acids, cytosolic calcium increased, in contrast to normal islets which don't respond to stimulation with amino acids. In contrast to the brisk response to amino acids, the BWS islets did not respond to stimulation with glucose.
CONCLUSIONS: The islet phenotype in this case of BWS due to UPD resembles the phenotype of islets with inactivating mutations of K_{ATP} channel and may explain the mechanism of HI. We postulate that the overexpression of paternally inherited genes results in dysregulated insulin secretion mediated by changes in KATP channel function.

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Fellow in Training

Cystic Fibrosis Related Diabetes: Unique Challenges in Identifying Glucose Intolerance

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BACKGROUND: Cystic fibrosis-related diabetes (CFRD) affects 40-50% of adults with CF by age 30, and is associated with worse nutritional status, decline in pulmonary function, and increased mortality. Because of its often insidious onset, annual screening by oral glucose tolerance testing (OGTT) starting at age 10y is recommended, but implementation of annual OGTT in CF patients has been challenging.
OBJECTIVE: To demonstrate limitations of the standard OGTT in diagnosing glucose intolerance in CF patients.
DESIGN/METHODS: We present a patient with CF and worsening pulmonary function and nutritional status whose glucose intolerance was under-estimated by OGTT, and whose CFRD was revealed by glucose monitoring during overnight enteral feeds.
RESULTS: A 15 year old male with pancreatic insufficient CF had impaired glucose tolerance* based on 2hr plasma glucose (PG2)=194 mg/dL during OGTT (Table). His hemoglobin A1C was 7.4%, consistent with CFRD. His BMI% had decreased from 74.4% at age 10y to 36% at 15y despite overnight enteral feeds and increasing pancreatic enzyme doses. His FEV1% predicted also declined by 5% over the preceding year to 95%. OGTTs at ages 9y and 12y were normal according to current CF Foundation definitions:

Glucose Tolerance Category According to OGTT Plasma Glucose		**Subject's Screening OGTT**			
		Age	9y	12y	15y
Normal (NGT)	PG1<200 mg/dL PG2<140 mg/dL	PG0 (mg/dL)	99	106	121
Indeterminate	PG1≥200 mg/dL PG2<140 mg/dL	PG1 (mg/dL)	169	188	220
Impaired (IGT)	PG2 140-199 mg/dL	PG2 (mg/dL)	139	116	194*
CFRD	PG2>200 mg/dL	**Category**	**NGT**	**NGT**	**IGT**

During admission for new onset diabetes, his blood glucose range was 91-303mg/dL, and averaged 230mg/dL during overnight continuous feedings. Insulin therapy (combinations of NPH and regular prior to lunch and to continuous feeds) was initiated. Four months later, his BMI% was 48% and his FEV1% predicted was 108%.
CONCLUSIONS: This case highlights the 1) difficulties in interpreting OGTT in CF and 2) that "early" OGTT glucose abnormalities may translate into clinically relevant hyperglycemia during continuous feeds. The extent to which this non-physiologic feeding regimen further burdens compromised β-cell function is not known, but these data suggests that routine screening of blood glucose during such feeds may be prudent.

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House Officer

Glucometer Manipulation in Adolescents with Type 1 Diabetes Mellitus

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BACKGROUND: Type 1 Diabetes Mellitus (T1DM) is a common chronic illness affecting adolescents. Since Hemoglobin A1C (HbA1C) and glucometer readings are both measures of blood glucose, these values should correspond. There is a occasionally a major discrepancy between glucometer readings and HbA1C. Our clinical experience is that children and young adults may purposely manipulate their glucometer to obtain more desirable readings. Although there is a small literature on inaccuracies in glucometer measurements, there are no studies of intentional meter manipulation.
OBJECTIVE: To understand how frequently adolescents try to manipulate their meter and strategies they use.
DESIGN/METHODS: We conducted a prospective study of the adolescent and young adult T1DM population at a moderate sized pediatric diabetes clinic. 113 participants aged 12-22 years old were recruited and privately completed an anonymous questionnaire. Raw data were then uploaded and analyzed.
RESULTS: For the 113 subjects surveyed, there was a negative correlation between HbA1c and meter BG average, r=-0.44, p<0.001. There were no significant differences between the 14 subjects(12%) who admitted to manipulating the meter and those who did not in HbA1c (mean(SD)) (9.14 (1.8) vs 8.6 (1.4) p=0.23, mean glucometer BG 215 (46) vs 209 (200) p=0.71, SD of glucometer BG (105(26) vs 101(30) p=0.66 or mean number of BG checks per day 3.9(1.9) vs. 3.4(2.2) p=0.42. Although only 12% of subjects acknowledged having actively tried to trick their meter, 26% acknowledged they sometimes will not test their blood glucose when they are afraid of getting a "bad" number. 7% of subjects acknowledged they knew of other individuals who trick their meters while 36% acknowledged that tricking a glucometer is possible. When asked about potential reasons a patient might try to trick their meter, 61% of all subjects selected high readings upset parents; 56% selected high reasons make one feel bad about themselves; and 54% high readings upset the doctor. Strategies described included use of control solution, trying different codes, using friend's blood, diluting the sample, wiping off the strip, slamming the meter, changing the time after a "good score", bolusing insulin right before testing, and other creative tricks.
CONCLUSIONS: A minority of our population surveyed acknowledged trying to manipulate their glucometers although a larger proportion admit they will forgo glucometer testing if they anticipate an unsatisfactory result.

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Fellow in Training

Calcitriol Treatment in Infants with Metabolic Bone Disease of Prematurity

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BACKGROUND: Metabolic bone disease (MBD) of prematurity is common in preterm, low-birthweight, and chronically ill neonates. It can lead to fractures, compromised pulmonary status, and contribute to subsequent poor growth. Phosphorus, Vitamin D, and calcium supplementation are traditional treatment strategies. With calcium deficiency, excessive parathyroid hormone (PTH) secretion causes urinary phosphate wasting and excessive bone resorption. In such states of excessive PTH, active Vitamin D (calcitriol) may enhance gastrointestinal calcium absorption, directly suppress PTH secretion, and reverse urinary phosphate wasting to promote bone mineralization.
OBJECTIVE: To report the use of calcitriol in a series of three infants with MBD and elevated PTH (>100 pg/mL).
DESIGN/METHODS: Retrospective chart review of three neonates with MBD followed by the Children's Hospital of Philadelphia Bone Health Team. Measures of disease severity and treatment efficacy were reviewed, including serum calcium and phosphorus, alkaline phosphatase, intact PTH, urine calcium/creatinine, and tubular phosphate reabsorption (TRP).
RESULTS: Subject A is a 3 month old ex 24-week male with a history of perforated NEC. Subject B is an 8 week old ex 23-week male with pneumatocele and feeding difficulty. Subject C is 3 month old ex- 26 week male with short gut syndrome. All 3 patients were TPN-dependent. Significant demineralization was visible on X-ray in all 3 cases. IV calcitriol therapy (0.05 mcg/kg/day) was started in all 3 cases based on elevated PTH. Pre- and post-treatment lab values are reported.

	A		B		C	
	Pre	Post	Pre	Post	Pre	Post
Intact PTH (pg/mL)	593	85.7	222	45.9	197	40.6
Alkaline Phosphatase (U/L)	753-1069	264-390	540-1033	444-789	444-789	561-1233
Serum Calcium (mg/dL)	8.9-10	9.3-9.7	8.2-9.7	9.9-10.3	8.6-9.4	9-10
Serum Phosphorus (mg/dL)	3-3.5	4.1-5.1	2.7-4.5	5.6-7.4	4.3-4.9	5.4-6.6
Urine Calcium/ Creatinine	<0.08	<0.08	0.22	0.08	0.73	0.21
%TRP	91	96	90	97.9	71.6	96.7

Following calcitriol treatment, PTH levels improved and serum phosphorus and TRP increased. The degree of hyperphosphatasia pre- and post-calcitriol varied by individual.
CONCLUSIONS: Urinary phosphate wasting can be an important clue to elevated PTH. The decrease in PTH, normalization of serum phosphorus, and improvement in TRP indicate calcitriol is an effective treatment therapy in the subset of neonates with MBD and secondary hyperparathyroidism. Alkaline phosphatase appears to be a less sensitive marker of MBD.

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Fellow in Training

Clinical Characteristics and Factors Predictive of Progression of Neonatal Encephalopathy and Adverse Outcome Post-Cooling

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BACKGROUND: Diagnosis of neonatal encephalopathy and identification of eligible patients for hypothermia therapy remains challenging. Predicting which infants will respond to cooling or will have adverse outcome is difficult.
OBJECTIVE: Primary: To determine patient characteristics during initial evaluation for hypothermia and assess factors predictive of progression of neonatal encephalopathy and need for hypothermia therapy. Secondary: To identify risk factors in cooled infants that could predict adverse outcome: death or brain injury.
DESIGN/METHODS: The study population included full term infants admitted to the NICU at NYULMC between October 2008 to October 2012 with diagnosis of perinatal depression and metabolic acidosis at birth. For patients evaluated for hypothermia therapy, we conducted a retrospective chart review identifying clinical characteristics, laboratory values, aEEG recordings and neuroimaging.
RESULTS: Seventy-three infants were evaluated for hypothermia therapy. Perinatal risk factors between cooled (n=38) and non-cooled patients (n=35) were similar. However, we found significant difference in the need for epinephrine during resuscitation (p=.05) and higher initial postnatal pH

(p=.01) and base deficit (p=.008) in cooled infants. Using logistic regression analysis for the entire cohort, we found the odds of developing encephalopathy and need for cooling were increased for patients with higher initial base deficit OR 2.5 (p=.011). Factors independently associated with adverse outcome in cooled patients were higher initial base deficit OR 3.09 (p=.013) and initial lactate OR 3.29 (p = 0.05). In addition, hypotension requiring vasopressors (p=.053) and severely abnormal background activity on aEEG (p=.07) classified as burst suppression or continuous low voltage tracings trended toward significance in predicting death or brain injury in cooled patients.
CONCLUSIONS: Severe metabolic acidosis at birth can be a predictive value to identify patients with moderate to severe encephalopathy and need for hypothermia therapy. Persistent acidosis at birth that does not correct rapidly most likely signifies the severity and duration of hypoxic ischemic perinatal event and is also associated with adverse outcome in our cohort. Larger study cohort may show statistical significance in the severity of cerebral background activity on initial evaluation and need for vasopressors during cooling which may also be predictive of adverse outcome.

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Fellow in Training

Comparison of Clonidine Versus Phenobarbital as an Adjunct Therapy for Neonatal Abstinence Syndrome. A Prospective Randomized Clinical Trial

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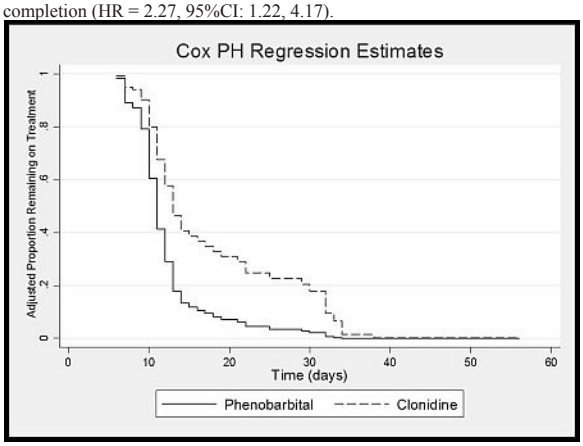
BACKGROUND: Phenobarbital is a commonly used as an adjunct to neonatal morphine sulfate (NMS) for neonatal abstinence syndrome (NAS) therapy but may cause neurocognitive delays. Clonidine as an adjunct has been shown to be safe and effective.
OBJECTIVE: To compare phenobarbital versus clonidine as an adjunct to NMS for NAS therapy.
DESIGN/METHODS: A prospective, non-blinded, RCT was conducted at BCH NICU. Infants meeting eligibility criterion were block randomized and stratified for polydrug exposure. Both groups were dosed based on initial Finnegan scores for initiation and weaning of the NMS. Data collected included maternal and infant characteristics, maternal drug history, length of therapy with NMS, mean total dose of NMS, therapy failures and adverse events.
RESULTS: Both the study groups had a shorter length of NMS therapy days when compared to 25 days average prior to the clinical trial. After adjusting for clinical variables infants treated with phenobarbital had shorter inpatient therapy days with NMS (4.6, 95%CI: 0.3, 8.9;p = 0.037). The average total dose of NMS was similar between the two groups (1.1 mg/kg, 95%CI: -0.1, 2.4; p = 0.069). Cox regression showed that the phenobarbital group had a 2.27-fold increase in the rate of treatment completion (HR = 2.27, 95%CI: 1.22, 4.17).



2 infants in the clonidine group failed therapy requiring change to phenobarbital and there was a trend towards greater sedation in phenobarbital group but none of these reached statistical significance. No adverse events were noted in the clonidine group.
CONCLUSIONS: Therapy with phenobarbital as adjunct had a shorter inpatient therapy time as compared to clonidine. The clonidine group however had overall shorter duration of NAS therapy as no outpatient therapy was required. Also, clonidine use was safe and effective with reduced risks for poor neurocognitive and behavioral effects that is of concern with long term phenobarbital exposure.

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Fellow in Training

Can Administration of DHA Ameliorate Alterations in Brain Chemistry Caused by Prenatal Exposure to Ethanol?

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BACKGROUND: Prenatal exposure to ethanol is associated with profound effects on the nervous system including mental retardation and behavioral alterations. To date, early behavioral intervention is the most effective method of ameliorating deficits in social behavior; however, this is time-consuming and costly.
OBJECTIVE: Using a rat model in which the somatosensory system is damaged, we will determine the effects of prenatal exposure to ethanol on energy metabolism and neurotransmitter synthesis in somatosensory cortex. We propose that supplementation of an omega-3 fatty acid, docosahexaenoic acid (DHA), will ameliorate these deficits. DHA is important for normal brain development, it is an integral part of cell membranes and also plays a role in neurogenesis. It can also be metabolized to docosanoids which can be neuroprotective.
DESIGN/METHODS: Timed pregnant Long-Evans rats were fed an ethanol-containing diet (6.7% v/v ethanol; Et) or pair-fed (Ct) an isocaloric, isonutritive non-alcohol diet. A second control group received ad libitum access to laboratory chow and water (Ch). Male pups from Ch-, Ct-, and Et-treated dams were assigned to one of three postnatal treatment groups: 1. supplemented with DHA (10 g/kg) in artificial rat milk, once per day between postnatal day (P)11 and P21; 2. supplemented with artificial rat milk once per day between P11-P21; 3. untreated. Animals were injected with [1, 6-^{13}C] glucose, euthanized 15 minutes later, and rapidly frozen. Samples from somatosensory cortex were extracted with perchloric acid and 1H and 13C-NMR spectra were obtained to determine alterations in brain metabolites that reflect the structural and metabolic integrity of the brain including N-acetyl aspartate (NAA), glutamate, glutamine, GABA, lactate, choline, and total creatine.
RESULTS: Our initial data (n=2-3 per group) show that prenatal exposure to ethanol leads to impaired neuronal synthesis of glutamate, glutamine, and overall tricarboxylic acid (TCA) cycle activity in 21-day-old rat somatosensory cortex. Postnatal DHA treatment normalized labeling of glutamate, glutamine, GABA and aspartate and TCA cycle activity to control values.
CONCLUSIONS: Postnatal administration of DHA can mitigate some deficits in metabolism that occur as a result of prenatal exposure to ethanol.

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Neurotherapeutic Potential of Placenta-Derived Adherent Cells (PDAC) in a Neonatal Rat Model of Focal Cerebral Ischemia (FCI)

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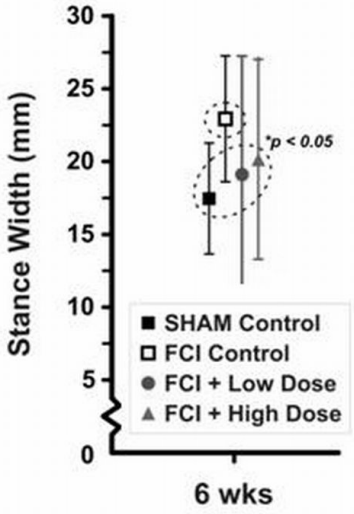
BACKGROUND: FCI induced in neonatal rats has been used to investigate various aspects of neonatal neuropathophysiology. PDAC have emerged as a potential neurotherapeutic agent but have not yet been evaluated in neonatal studies.
OBJECTIVE: To evaluate the neurotherapeutic effects of PDAC on adverse outcomes in a neonatal FCI rat model.
DESIGN/METHODS: Left middle cerebral artery FCI was induced in P7 Sprague-Dawley rats; sham-operation involved pertinent vessels dissection only. Left intracerebroventricular (ICV) injection of PDAC (4 or 20 x 10^6 cells/microL, low (lPDAC) or high (hPDAC) dose) or DMEM vehicle was performed 1hr post-FCI. Infarct size analyses were performed at 24 hours post-FCI. Gait analyses were performed at 3 and 6 weeks post-FCI or post-sham, with subsequent euthanasia for immunohistochemistry (IHC) analyses.
RESULTS: At 24 hours post-FCI, no differences in infarct sizes were detected among pups receiving lPDAC, hPDAC, or DMEM control (n=8 each), suggesting a similar degree of acute insult for all groups. For longer term outcomes (FCI+lPDAC=15, FCI+hPDAC=15, FCI+DMEM=18, Sham+DMEM=8, Sham+hPDAC=9), at 14 days post-FCI, survival among DMEM pups was 10% compared to 33% among PDAC pups. Post-insult, PDAC pups were less likely to have a widened stabilizing stance width, with values similar to sham controls, compared to FCI+DMEM pups.\



IHC with GFAP and MAP2 staining showed qualitatively increased peri-infarct cellular density with PDAC versus DMEM. There were no differences in outcomes between lPDAC and hPDAC groups for mortality, infarct sizes, or gait analyses.
CONCLUSIONS: In a neonatal rat model, a single ICV dose of PDAC ipsilateral to induced FCI is associated with a reduction in long-term gait impairment and potentially a reduction in mortality, compared to DMEM control. Additional studies investigating alternative neurotherapeutic PDAC dosing regimens are warranted.

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House Officer

Long Term Effect of Src Kinase Inhibition on Eya1 Protein Expression during Hypoxia in the Cerebral Cortex of Newborn Piglets

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BACKGROUND: The *EYA1* (eyes absent homolog 1) gene provides instructions for making a protein that plays a role in regulating the activity of other genes. EYA1 protein is called a transcription factor or transcription coactivator. The EYA1 protein interacts with several other proteins to activate genes that are important for normal development. Before birth, these protein interactions appear to be essential for the normal formation of many tissues. The *EYA1* gene belongs to a family of genes called PTP (protein tyrosine phosphatases). Previously we have shown that hypoxia results in increased activation of Src kinase in the cortex of newborn piglets.

OBJECTIVE: The present study aims to investigate the longitudinal effect of inhibiting the hypoxia-induced increased expression of EYA1 protein by administration of selective inhibitor of Src kinase, and test the hypothesis that inhibiting Src kinase prior to hypoxia will attenuate the hypoxia-induced expression of EYA1.

DESIGN/METHODS: Piglets were divided into 6 groups: Normoxia (Nx, n=3), acute hypoxia (Hx, n=3),, hypoxia followed by 1 day (Hx-1D, n=4) and 14 days (Hx-14D, n=2), hypoxia-pretreated with a Src kinase inhibitor (PP2 1mg/kg i.v.) followed by 1 day (Hx+PP2-1D, n=3) and 14 days (Hx+PP2-14D, n=3) in FiO_2 0.21. Hypoxic piglet were exposed to FiO_2 0.07 for 1 hour then retuned to FiO_2 0.21. Nuclei were isolated and the expression of EYA1 was determined by Western blot analysis using specific EYA1 antibodies. Band density was expressed as absorbance (OD/mm^2).

RESULTS: The expression of EYA1 was 228.76 ±4.13 in normoxia and 497.43±15.31 ($p<0.05$) in hypoxia. Expression of EYA1 was 516.43±19.53 in Hx-1D ($p<0.05$) and 355.70±18.82 in Hx+PP2-1D. Following 14 days, expression of EYA1 was 348.40±42.90 in Hx-14D and 224.40±10.23 in Hx+PP2-14D. The data show that the expression of EYA1 decreased in the Hx group on day 14 as compared to day 1. Src kinase inhibitor also prevented the hypoxia-induced increase in expression at day 1 and day 14.

CONCLUSIONS: We conclude that the dephosphorylating mechanism for histone H2AX is activated for long term following hypoxia and the expression of EYA1 during recovery is Src kinase-mediated. Increased expression of EYA1, by dephosphorylating Tyr^{142} on H2AX, will facilitate binding of DNA repair factors and increase the potential for DNA repair in the hypoxic brain that may result in increased cell survival.

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House Officer

Deep Gray Matter Involvement on MRI in Children with Acute Demyelinating Disease

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BACKGROUND: Acute disseminated encephalomyelitis and multiple sclerosis are uncommon inflammatory or post-infectious, autoimmune demyelinating disorders in pediatric patients and there is little systematic documentation of the clinical and neuro-radiological profile of pediatric patients with acute demyelinating disease. Studies have shown that involvement of deep grey matter with T2 hypointensity is associated with early physical disability, ambulatory impairment, severe cognitive impairment, brain atrophy and poor response to treatment in adult patients, but such studies are lacking in the pediatric population.

OBJECTIVE: To study the clinical as well as radiological profile of children with deep gray matter involvement among acute demyelinating lesions in MRI over the last 15 years (1997 to 2011) at BHMC.

DESIGN/METHODS: It was a retrospective descriptive study. Children aged 0-19 years who underwent MRI brain imaging in BUHMC between 1997-2011 were included in the study.

RESULTS: Total 2849 MRIs were done in this age group out of that 714 (25%) were positive based on indications. Mean age of the sample was 7.63 years (SD=5.6). Most common indications for MRI study were seizure (31%) followed by headache (19%), developmental delay (8%) and space occupying lesions (6%). Seizure was most common indication among all age groups except adolescents where headache was most common indication. Total number of positive MRI for demyelinating lesions were 15 (0.5%). Mean age was 14.5 years. Male to Female ratio was 1:4. Incidence of deep grey matter involvement in MRI was 20% (3 out of 15). Commonest sites of demyelinating lesions were periventricular region(67% pt), frontal lobe(26%) and internal capsule(20%). Clinically 43% of children had history of antecedent illness, 57 % presented with motor deficit, 43% presented with blurring of vision and 43% had higher motor function deficit. None of them had cerebellar sign or symptoms. There were 43% children who had complete or near complete recovery with steroid therapy.

CONCLUSIONS: Acute demyelinating lesions of the brain are rare MRI findings in the pediatric population. The most common site of acute demyelination in the pediatric patients is the periventricular region and the involvement of deep grey matter is a significant finding in pediatric patients. There is a need for further studies to correlate the deep grey matter involvement with clinical prognosis of these patients.

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House Officer

Parental Preference of Educational Handouts in an Urban Academic Pediatric Clinic

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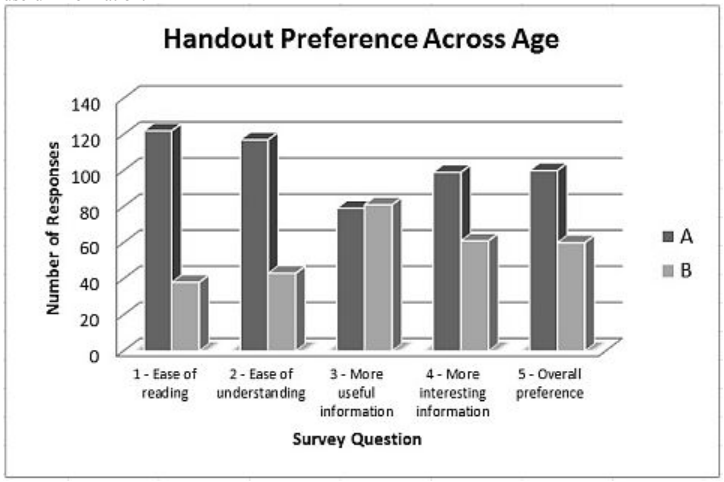
BACKGROUND: Prior studies have suggested that health literacy strongly predicts an individual's health status. In our population, 20% of parents read at or below the fifth grade level; however, most public health care materials are at the tenth grade level. Inadequate health literacy has proven it difficult to access health care and follow physician instructions.

OBJECTIVE: Assess the readability of revised well-visit handouts provided by our Center for Child and Adolescent Health.

DESIGN/METHODS: In the waiting room of our outpatient pediatric clinic, parents were chosen at random and given a survey as well as two handouts, in English or Spanish. Handout A was our revised handout with lower reading level, less wording, more white space, and more pictures; Handout B was the current well-child handout. On each survey, parents were asked to answer five questions to convey which handout they preferred.

RESULTS: Preliminary data includes responses for eight age groups (newborn to 9 years old) for a total of 160 surveys. Overall, 64.63% of parents preferred Handout A. There was preference for A with reading, understanding, and interest, but no preference when asked which survey had more useful information.



Question	%A	95% CI
1	76.25	6.59 (69.66-82.84)
2	73.13	6.87 (66.26-80)
3	49.38	7.75 (41.63-57.13)
4	61.88	7.53 (54.35-69.41)
5	62.5	7.5 (55-70)
Combined	64.63	3.31 (61.32-67.94)

CONCLUSIONS: Parents in our outpatient clinic were surveyed on their preference between two low literacy bilingual well-visit handouts. Overall, parents preferred the handout with more basic formatting. This demonstrates that clinics should tailor their health literacy materials to fit their population's education level.

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House Officer

Effect of Chronic Constipation on Children's Quality of Life

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BACKGROUND: Chronic constipation can contribute to abdominal pain and fecal soiling which may cause psychosocial difficulties and familial stress. Quality of life in such children has previously been insufficiently assessed, and never in comparison to asthma, the most prevalent chronic condition in children in urban inner-city areas.

OBJECTIVE: To assess quality of life (QoL) in children with chronic constipation aged 5-18 years by self-report and by report of their parents and compare this with both disease and healthy control children.

DESIGN/METHODS: A convenience sample of children with chronic constipation attending the pediatric gastroenterology clinic at the Bronx-Lebanon Hospital Center from 01/2010 to 05/2012 and their caregivers were asked to complete the validated PedsQL™ (Pediatric Quality of Life Inventory) version 4.0 generic core scale. The PedsQL examines physical, emotional, social and school functioning .The score, summed across these four areas, ranges from 0 to 100. Healthy children and children with asthma with their respective caregivers were recruited as controls from the center's ambulatory clinic network and asthma clinic, respectively. Groups were compared on mean QoL using the independent samples t-test.

RESULTS: A total of 54 children completed the assessment (28 [52%] male, mean age [SD] 10.9 years [4.62]) including 20 children with chronic constipation, 19 children with asthma and 15 healthy children. Based on child self-report, the mean QoL score differed significantly among the three study groups ($p<.000$).QoL was significantly lower in the chronic constipation group compared with healthy children (70 vs 94, $p<0.05$) and did not differ from that of children with asthma (70 vs 73, $p<0.26$). Both asthma and constipation groups were both significantly worse off as regards quality of life from the healthy children. Findings based on parental reports paralleled those derived from child reports.
CONCLUSIONS: Quality of life by self-report and by parental report in children with both chronic constipation and asthma had significantly poorer quality of life when compared with healthy children. It is prudent that physicians planning comprehensive management for children with chronic constipation be cognizant of the effects on quality of life.

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House Officer

Practical Parenting: A Reproducible Curricular Module for Pediatric Residents on Infant Consumer Products

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BACKGROUND: Many pediatric residents are not parents and have limited experience with infant consumer products. This makes it challenging to gain credibility and provide guidance about consumer products during well child visits. To date, few residency programs have published their formal curricula to address this barrier. After performing a needs assessment of our graduating residents and reviewing the AAP policy statements, we designed a scavenger hunt-themed curricular module to educate pediatric residents on infant consumer products.
OBJECTIVE: Assess the practicality of a voluntary scavenger hunt-themed curricular module on infant consumer products related to diapering, sleeping, child-proofing, nutrition, breastfeeding, and automobile safety and evaluate its impact on the knowledge of pediatric residents of these products.
DESIGN/METHODS: From September through November of 2012, all 78 pediatric residents at St.Christopher's Hospital for were recruited to participate in a voluntary shopping curriculum to learn about the costs and features of a variety of infant consumer products. The residents self-sorted into one of four groups: those who completed the curriculum in-store, online, both in-store and online, and those who did not complete the curriculum (control group). Changes in knowledge were measured by comparing a pre and post curriculum questionnaire.
RESULTS: Pre and post curriculum data were analyzed taking into account year of residency, previous experience with children, and completion of curriculum. At baseline, there was a significant difference between those who had previous exposure to children and those who did not ($p=0.01$) but no difference between year of residency training ($p=0.81$). Preliminary post curriculum data shows that residents who participated in the curriculum answered 47% of questions correctly versus 22% in residents in the control group ($p=0.18$). Post curriculum data approaches significance, however, more data is needed. First year residents were more likely to participate in the curriculum.
CONCLUSIONS: A formal curriculum with a scavenger hunt theme about infant consumer products was well received and demonstrates improved knowledge in pediatric residents in all years of training. Residency programs wishing to initiate similar shopping experiences should consider protecting resident time so that participation can be maximized or incorporate into resident curricula.

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House Officer

Evaluation of the Utility of a Sleep Screener in the Primary Care Setting

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BACKGROUND: Despite general knowledge about the prevalence and consequences of pediatric sleep disorders, sleep problems mostly go undetected during routine clinical care. More information is needed regarding the usefulness of sleep screeners to detect sleep problems in different pediatric patient populations.
OBJECTIVE: To evaluate the utility of a sleep screener to assess the severity and frequency of sleep problems among inner city children in a primary care setting.
DESIGN/METHODS: We conducted a chart review of children ages 2-12 years old who made a well child visit to a hospital-based pediatric primary care continuity clinic in an inner city community. In September 2012, we introduced a sleep screener adapted from the BEARS screen. The screener has 2 age-specific versions for children 2-5 years and 6-12 years old. The original BEARS was designed with a yes or no answer. We modified the BEARS by adding a time frame (in the last four weeks) and a 4 point severity scale (none, mild=once a month/week, moderate 2-3 nights/week, severe 4+ nights/week) which were modeled after the Asthma Control Test (ACT). We also asked about factors related to sleep hygiene such as room/bed sharing, TV in the bedroom, exposure to cigarette smoke and co-morbidities.
RESULTS: 209/289 charts had completed screeners. Children's mean age was 5.5+3.1 (SD) years, 54% were females, 94% had Medicaid, 15% were obese, 27% had asthma, 77% had TV in the bedroom, 63% were room sharing, 20% were bed sharing and 36% were exposed to smokers. Younger children had a significantly higher prevalence of night awakenings ($p=0.0002$) and a trend towards more bedtime problems. Older children had higher prevalence of snoring ($p=0.39$). Both age groups had similar prevalence of excessive daytime sleepiness.

	Age 2-5 (n=120)	Age 6-12(n=89)	P value
Bedtime Problems	15%	10%	0.3241
Mild	8%	9%	
Moderate to Severe	7%	1%	
Excessive Daytime Sleepiness	18%	18%	0.9652
Mild	3%	13%	
Moderate to Severe	15%	5%	
Awakenings at Night	27%	6%	0.0002
Mild	13%	4%	
Moderate to Severe	14%	2%	
Snoring/Difficulty Breathing	15%	21%	0.3903
Mild	7%	9%	
Moderate to Severe	8%	12%	

CONCLUSIONS: Overall there was a high prevalence of sleep problems among inner city children. A modified version of the BEARS sleep screener was useful in assessing the severity and frequency of sleep problems among inner city children in a primary care setting.

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Provider's Experience with a Self-Administered Written Screening Tool for Intimate Partner Violence

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BACKGROUND: The American Academy of Pediatrics recommends screening for Intimate Partner Violence (IPV) in pediatric offices. No specific screening method is recommended. Little has been published about providers' experience using a self-administered written tool to screen for IPV.
OBJECTIVE: To describe pediatric providers' experience with and perceptions about a written tool to screen for IPV in a pediatric office.
DESIGN/METHODS: An IPV screening program was implemented in a resident continuity clinic serving an urban, minority, low-income population. The program included staff training by an on-site IPV counselor and use of a validated (English and Spanish) written screening tool, HITS. The HITS tool consists of a 4 questions, such as "How often does your partner physically hurt you?" and 5 Likert-scale choices ranging from rarely to frequently. A score of 8 was considered a positive screen. Caregivers were asked to complete the tool and providers reviewed it and responded to positive screens. Nine months after program implementation, all providers were asked to complete an anonymous survey about their experience, perceptions and level of comfort with the HITS tool.
RESULTS: 100% of faculty (6/6) and 70% (14/20) of residents responded to the survey. All residents and 80% of faculty had used the HITS tool; 57% of residents and 80% of faculty had had one or more caregivers who screened positive for IPV. All providers felt comfortable discussing screener results with caregivers, 95% knew what to do with a positive screen and were comfortable making referrals for IPV services. Most providers (75%) felt that caregivers responded honestly to the questions. 100% of providers felt the written tool was a good way to screen for IPV. All faculty and 57% of residents preferred to screen for IPV with the written tool, 14% of residents preferred to screen verbally and 21% had no preference. One tenth of all providers felt they needed more training to screen and respond to IPV and level of comfort was linked to the desire for more training.
CONCLUSIONS: Over a 9 month period, almost all residents and faculty in a resident continuity clinic screened caregivers for IPV with the written HITS tool and most identified IPV victims. Almost all felt this tool was an effective method to screen for IPV and preferred this method over verbal screening. Self-administered written tools appear to be a promising method to screen for IPV in pediatric office settings.

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Care Transitions: Communication Challenges between a Hospitalist Service and a Primary Care Pediatric Network

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BACKGROUND: Transitions of care are actions designed to ensure coordination and continuity of health care as patients transfer between different locations. Effective transition of care for the hospitalized child to the primary care setting is crucial to ensure quality patient care and safety.
OBJECTIVE: To conduct a needs assessment of transitions of care between a pediatric hospitalist service and a primary care network.
DESIGN/METHODS: We conducted an anonymous survey of pediatric providers in an urban primary care practice network whose patients are admitted to its own hospitalist service at a children's hospital. The network and hospital do not share electronic medical records. Providers were asked about their experience with communication from the hospitalist service; follow up of pending test results and their expectations regarding such communications.
RESULTS: The primary care practice network includes 10 practices: 5 solo, 3 medium size (2-5 providers), 2 large (10+ providers). Provider response rate was 76% (25/33). On average 20-29 patients per provider were hospitalized in the previous 2 years. Providers received communication regarding hospitalization in 50-75% of cases (fax, phone call or discharge summary brought by patient). A frequent complaint was poor legibility of discharge summaries. For pending test results at discharge, most providers called the hospital lab directly. Most providers would prefer communication both during the hospitalization and upon discharge, via e-mail for complicated/urgent developments and fax for routine. However, communication expectations of providers varied by practice size. In the smaller practices, providers felt that hospital communication was crucial to maintaining their relationship with the family. However, in large practices, where patients were cared for by multiple providers and information communicated to one provider was not always shared with fellow providers or documented systematically, providers felt that communication needs varied with complexity of hospitalization.

CONCLUSIONS: Transition of care post discharge presents communication challenges at both the interface between the hospital and primary care setting as well as within the primary care setting. Improvements are needed to enhance information transfer and coordination of care, particularly in large practices.

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House Officer

Integration of Domestic Violence Screening in a Resident Continuity Clinic

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BACKGROUND: The American Academy of Pediatrics recommends that pediatricians screen for DV. Establishment of successful DV screening practices in resident continuity clinics may be the first step in promoting DV screening practices in the next generation of pediatricians.

OBJECTIVE: To assess the effectiveness of a multifaceted DV screening program in a resident continuity clinic.

DESIGN/METHODS: In October 2011, we implemented a multifacted DV program in a hospital-based, resident continuity clininc serving an inner city population. The program included DV education, a written screening tool (HITS) and a DV counselor. Educational methods included lectures, role-plays, small group discussions and positive reinforcement to screen for DV in the clinic. A written screening tool was chosen; clinic staff and providers were instructed in its use. Clinical staff asked caregivers of children arriving for their well-child exams to anonymously complete the screeners, but only if the caregiver was not accompanied by another adult. A check box with an acronym for DV was added to the well child visit forms to document DV screening results. The DV counselor provided support and resources to caregivers requesting help. Prior to program implementation, residents had not received DV specific education and most screened for DV verbally by asking, "Do you feel safe at home?" Screening rates were determined by dividing the number of DV screeners by the number of well-child visits each month. Chart documentation was assessed by reviewing 100 randomly selected charts 6 months pre- and 6 months post-program implementation.

RESULTS: Six months prior to program implementation, 9% of charts had DV screening results documented compared to 25% of charts 6 months post-implementation; one of these had a positive screen. Monthly screening rates increased from 10% in the first month up to 38% (251/657) six months post implementation. This continued to increase to a high of 50% eleven months post-program implementation. Overall, 4.5% (103/2,309) of screeners were positive for DV.

CONCLUSIONS: A multifaceted DV screening program in a resident continuity clinic effectively increased screening rates and documentation of DV screening results in medical records. As medical educators, we aspire to help residents establish lifelong professional practices that can benefit patient care. These results show a promising start.

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House Officer

Predictors of New Inhaled Corticosteroid Prescription to Children Hospitalized for Status Asthmaticus

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BACKGROUND: Guidelines published by the National Heart, Lung and Blood Institute (NHLBI) suggest prescribing inhaled corticosteriods (ICS) for asthmatics of all ages with disease severity classified as persistent and consider initiating ICS therapy for any child requiring hospitalization for asthma symptoms. Prior studies have reported low rates of prescribing ICS. Studies investigating additional criteria clinicians utilize when starting ICS therapy are limited.

OBJECTIVE: For children hospitalized with status asthmaticus: (1) To determine the rate and predictors of new ICS prescription and (2) to assess rates of documentation of asthma symptoms necessary to assign an NHLBI asthma severity level.

DESIGN/METHODS: This is a retrospective study of children aged 2-20 years admitted to an urban tertiary children's hospital, with a primary or secondary diagnosis of status asthmaticus in a six-month period (October 2008- April 2009). Exclusion criteria: reported current use of an ICS, comorbid conditions (prematurity, congenital heart disease). Each patient's chart was reviewed for documentation of asthma symptoms, inpatient management and discharge prescription for ICS. Data was analyzed in STATA using a two-sample tests of proportions.

RESULTS: We reviewed 565 records of unique patients hospitalized during the study period with asthma symptoms. Of these, 235 met inclusion criteria. It was determined that 135 (57%) were discharged with a prescription for an ICS while 103 (43%) were not. Predictors of ICS Prescription

	Prescribed ICS (n=132)	Not Prescribed ICS (n=103)	p-value
PICU care	16	7	0.082
Prior Admission	93	22	<0.001
Magnesium Sulfate	33	8	0.142
Methylprednisolone	29	17	0.261

Documented Asthma Characteristics

	Rate
Daytime Symptoms	29.7%
Night-time Symptoms	3%
All NHLBI Classification Criteria	0%

CONCLUSIONS: The rate of new ICS prescription for study patients admitted in status asthmaticus is 57%. Predictors of new ICS prescription include previous hospitalization for asthma and requiring ICU care during the current admission; with a trend toward higher prescription rates for patients requiring methylprednisolone or magnesium sulfate. Provider documentation of NHLBI asthma characteristics is low. By utilizing NHLBI criteria for prescribing new ICS to children classified as persistent, the rate of ICS might be increased. Future efforts will be directed at improving the documentation of NHLBI asthma classification.

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House Officer

Pediatric Hospitalist Preoperative Evaluation of Children with Neuromuscular Scoliosis

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BACKGROUND: Spinal fusion surgery is commonly performed at A.I. duPont Hospital for Children for patients with neuromuscular scoliosis (NS). Given these patients' complexity, they benefit from a multidisciplinary approach to their management. One adult study has suggested improved clinical outcomes with hospitalist preoperative evaluation of medically complex patients. In 2009, we began a hospitalist preoperative evaluation program for patients with NS in anticipation of spinal fusion surgery. To our knowledge, this is the first study in pediatrics of hospitalist involvement in this manner.

OBJECTIVE: To characterize the interventions suggested by pediatric hospitalists during preoperative visits for patients with NS in anticipation of spinal fusion surgery.

DESIGN/METHODS: We conducted a retrospective chart review of 214 patients with the diagnosis of NS who were seen from November 2009 through September 2012 by our pediatric hospitalists prior to spinal fusion surgery. We collected clinical and demographic data for each patient in addition to recommendations made by our pediatric hospitalist during these preoperative visits.

RESULTS: We analyzed data for 214 patients. Of these, 155 patients (72%) received specific preoperative recommendations and 59 patients (28%) were cleared for surgery. Interventions suggested by our pediatric hospitalists included modification in medications, additional laboratory or diagnostic testing, subspecialty referral, or nutrition modifications. A history of seizures (84% vs. 67%, p=0.007), or gastrointestinal diseases (84 % vs. 61%, p < 0.001) or an underlying diagnosis of cerebral palsy, spina bifida, or myopathy (p= 0.024) were associated with specific pre-surgical recommendations being made by the pediatric hospitalist. Children who took fewer preoperative medications (2.13 vs. 3.8, p= 0.0015) and ambulated independently versus requiring assistance (p=0.001) were cleared for surgery without recommendations.

CONCLUSIONS: Medically complex children undergoing spinal fusion surgery for NS may benefit from a preoperative outpatient visit by a pediatric hospitalist. Patients with certain clinical characteristics may especially benefit from this type of visit. Future studies will evaluate the impact of this type of intervention on surgical outcomes.

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Graduate Student

Specialist-Hospitalist in Pediatric Endocrinology: Qualitative Assessment and Resource Utilization

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BACKGROUND: Hospitalists are a relatively new addition to healthcare and have mainly worked in generalist medicine. The changing demographics of admissions have prompted the emergence of specialist-hospitalists, though not prevalent in pediatric care.

OBJECTIVE: To assess the impact of a full-time endocrinology hospitalist service, in place since September 2009, on professional dynamics, quality and resource utilization at a freestanding academic children's hospital.

DESIGN/METHODS: Qualitative assessment of the sub-specialty hospitalist model was conducted through semi-structured interviews. Separately, resource utilization was analyzed using a longitudinal retrospective pre/post study design (2007-2012). Length of stay (LOS) and standardized length of stay ratio (SLOSR) (i.e. observed to expected LOS) for newly admitted patients with Type 1 diabetes, diabetes with ketoacidosis, and unspecified hypoglycemia from the pre/post implementation period were compared using random-effects maximum likelihood regression models adjusted for demographics, illness severity, seasonality, mortality risk and complications.

RESULTS: According to unit staff, the full-time specialist improved professional dynamics and facilitated better quality of care (Table 1). Average LOS for visits under the hospitalist model was not significantly shorter than previously. Average SLOSR was, however, 0.21 (p=0.002) less for patients under the hospitalist model.

Table 1 Professional Assessment of the Full-time Endocrinology Hospitalist Model

	Professional Dynamics	Patient Outcomes
Safety	Accountability and oversight	Medical team has someone with whom they are familiar and to whom they can address questions or concerns
	Leadership engagement	More opportunities to identify and correct safety issues (ex: working with EPIC to correct a glitch effecting insulin orders)
	Ongoing and individualized medical education	Improved medical management by Residents and Fellows with and without supervision
	Availability	Quality assurance (ex: additional time for complex cases)
		Improved care coordination with community providers, facilitated by consistency of sub-specialty hospitalist
		On-call service collectively has less days per year with patients on the floor, and so when they are on service (nights and weekends) there is increased potential for inefficiency
	Predictability	Nurses, who provide the bulk of safety checks, are more likely to catch errors in prescription orders because they have a standard with which to compare
Effectiveness	In-patient and disease-specific specialization	Increased use of effective and decreased use of ineffective specialty-service care
		Inefficiency associated with general pediatric care
	Bench-to-bedside	Increased familiarity with ongoing research protocols and ability to refer participants where appropriate
Patient-Centeredness	Availability	Additional time with patients and families for medical care, education, listening and support
		Medical team can more quickly identify and address psycho-social issues related to patient care
		Sense of security for patients and families
	Longitudinal relationships with patients and families (continuity of care within and between hospitalizations)	Improved trust and communication
		Improved adherence and compliance
		Fewer arbitrary changes to treatment plans (and associated hospital days)
	Clinician job satisfaction	Increased vested interest in inpatient quality of care with fewer competing responsibilities
		Risk of burnout and associated implications for patient care
Timeliness and Efficiency	Institutional familiarity	Opportunity for expedited labs, procedures, and consults
	Leadership Engagement	More opportunities to identify and systematically correct inefficiency (ex: instituting policy to flag missing information)
		Cost-reduction via strategic planning (ex: sub-specialty hospitalist more inclined to participate in waste reduction and billing efficiency efforts)
	Availability	Mid-day reassessment and adjustment as necessary
	Longitudinal Relationships	Less time spent re-reading charts, and more time providing direct patient care and teaching
Equity	Accessibility	Increased access for families and providers to the specialist through the hospital's free specialty service hotline

CONCLUSIONS: Overall, this case study suggests that a specialist-hospitalist offers consistent and accessible attending-level care that facilitates enhanced quality, encourages inter-professional dynamics, and for specific complex diagnoses accomplishes both with shorter than expected stays for patients. The specialty-hospitalist model may be beneficial in other pediatric service lines as well as in adult medicine.

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House Officer

Parent and Caregiver Education on Management of Choking in Infants and Children

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BACKGROUND: Choking is one of the main causes of morbidity and mortality among children. Between 2002-2009 over 900 children died of obstruction of the respiratory tract by food or nonfood items. Prompt, effective first aid provided by a bystander may and often does prevent morbidity or even death.

OBJECTIVE: To document the prevalence of a history of non-fatal choking episodes from a sample of patients in our clinic and to assess parental knowledge and confidence about choking management. We also wanted to increase parental knowledge and confidence by providing verbal demonstrations and American Red Cross Skill Cards on choking management.

DESIGN/METHODS: During visits to the clinic, parents of children 6 months to 5 years old (high risk population for choking based on AAP guidelines) completed a survey that assessed if they had ever witnessed a choking event in their child, whether they had intervened and how. The survey also assessed parental knowledge of CPR and confidence in the ability to provide first aid. The parents were then shown appropriate intervention strategies and provided with American Red Cross Skill Cards that included diagrams and written instructions on choking management. Finally, parents were asked to complete a feedback form assessing their post-intervention level of knowledge and comfort level in treating a choking child.

RESULTS: 140 parents filled out both the survey and the feedback form. 59 parents (42%) said they had witnessed their child choking at least once. Among those choking events, 9 (15%) were significant enough for the parents to call 911. Prior to our intervention only 18 of 140 patients (13%) demonstrated knowledge of basic choking management compared to 90 of 140 (64%) post- intervention. 107 parents (76.4%) indicated that they would like to get advice on choking prevention and management during their child's health maintenance visit. Parents who reported having previously taken a CPR course were significantly more likely to answer the knowledge portion of the survey correctly (p=0.014).

CONCLUSIONS: A significant percentage of our parental respondents reported that they did not feel confident or have sufficient knowledge about choking management. Our data showed that a brief demonstration by a medical professional paired with handouts and written material can significantly increase knowledge and confidence levels, two factors that may result in more effective and timely treatment, and thereby reduce child morbidity and mortality due to choking.

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Use of Focus Groups To Inform a New Youth Diabetes Prevention Program

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BACKGROUND: While the prevalence of cardiovascular disease risk factors in adolescents has not changed, rates of diabetes and pre-diabetes have increased in the last decade and are disproportionately high in minority populations.

OBJECTIVE: To explore minority adolescents' perceptions of their diabetes risk and barriers and facilitators to adhering to lifestyle changes for diabetes prevention.

DESIGN/METHODS: We conducted four focus groups with adolescents (ages 14-18 with a family history of diabetes) recruited from collaborating community sites in East Harlem, NY. Trained moderators facilitated the groups, which were audio-taped and transcribed. Two researchers independently coded the transcripts, identified major themes, compared findings, and resolved differences through discussion and consensus. Interrater reliability was manually calculated as percent agreement in codes.

RESULTS: Participants (8 boys and 13 girls) were 60% Latino and 40% African-American. We identified 56 codes (with 92% code agreement) and 4 dominant themes: 1) Despite having a limited understanding of diabetes, adolescents do appreciate its impact on quality of life within their personal networks and community. 2) Although adolescents perceive that dietary modification is the only way they can prevent or control diabetes, regulation of diet is antithetical to their usual lifestyle. 3) Adolescents' food choices and physical activity behaviors are largely determined by a combination of cost, mood, body image, social norms and environment, not health. 4) Social pressures reinforce sedentary behaviors and unhealthy diets, and there is minimal counteraction with positive lifestyle social support.

CONCLUSIONS: A community-based qualitative research approach yielded insight into youth perceptions of diabetes and perceived barriers and opportunities for diabetes prevention. Using findings, a Community Action Board is developing a peer-led diabetes prevention program for pre-diabetic adolescents. Based on themes identified, we recommend that youth diabetes prevention interventions include building self management skills, personal stories about diabetes, dispelling myths about common adolescent dietary practices, addressing non-health related factors impacting diet and physical activity, managing social pressure to engage in unhealthy behaviors, and building self efficacy through goal setting and addressing barriers to lifestyle changes.

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Clinical Versus Community-Based Recruitment for an Adolescent Diabetes Prevention Study

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BACKGROUND: Little is known about successful strategies for recruitment of adolescents for research, particularly in community settings.

OBJECTIVE: To compare recruitment from clinical and community sites for a new youth diabetes prevention program.

DESIGN/METHODS: We developed a diabetes prevention program for pre-diabetic youth (ages 13-19) in East Harlem, New York. We employed a two phase recruitment strategy. Diabetes risk was assessed by measuring body mass index (BMI). We then screened overweight/obese youth for pre-diabetes using oral glucose tolerance testing and completed adiposity and blood pressure measurements and a health and lifestyle survey. The two recruitment strategies included: 1) referral from health care providers and 2) screenings at community sites. We compared the number of adolescents completing both phases of recruitment, and the proportion eligible for phase two (a proxy for diabetes risk) and the proportion diagnosed with pre-diabetes between those recruited in clinical and community sites.

RESULTS: In 3 months, we screened 186 adolescents for diabetes risk (156 in community sites and 30 from clinical referrals). Overall, 47% were at risk for diabetes based on measured BMI, 64% returned for diabetes testing, 34% had pre-diabetes and 1.8% had diabetes. The table below compares recruitment in clinical and community sites.

Recruitment Site	Screened (n)	High Diabetes Risk Based on BMI n(%)	Returned for Testing n(%)	Pre-Diabetes Diagnosis n(%)
Total	186	88 (47%)	56 (64%)	19 (34%)
Clinical	30	26 (87%)	22 (85%)	10 (45%)
Community	156	62 (40%)	34 (55%)	9 (26%)

Demographic and other characteristics did not vary among pre-diabetic adolescents recruited in clinical versus community sites.

CONCLUSIONS: In a short time period, we screened 186 adolescents for diabetes risk, finding high rates of un-diagnosed pre-diabetes, even in clinical settings. Community based and clinical recruitment were both effective in diagnosing at-risk adolescents with pre-diabetes. Because providers referred adolescents thought to be at-risk, clinical sites yielded higher rates of diabetes risk based on BMI as well as higher rates of return for screening and diagnosed pre-diabetes. More adolescents screened in community sites were at lower risk for diabetes (not overweight), or did not have pre-diabetes once tested. However, this broad approach allowed access to more adolescents and opportunities for education about weight and diabetes in a community setting.

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Fellow in Training

Does Dietician Diversity Impact Outcomes in Pediatric Weight Management?

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BACKGROUND: Multidisciplinary care is important to pediatric weight management, but it is important to study how best to utilize different members of the care team and what characteristics of care providers are important to achievement of successful outcomes.

OBJECTIVE: To determine whether seeing a dietician during an initial visit to a pediatric weight management clinic has an effect on retention rate and weight outcomes. Because our dieticians are all Caucasian females, we also studied the differential effect of seeing the dietician on outcomes by demographic subgroups.

DESIGN/METHODS: We conducted a retrospective cohort study of 1020 patients who presented for an initial visit to a pediatric weight management clinic between 2009 and 2011. We compared patients who saw a dietician for their initial visit and those who did not on return for follow-up visit utilizing odds ratio analysis and change in weight and BMI percentile at the first follow-up visit utilizing t-tests. We also conducted subgroup analysis by age, gender, race, insurance, and baseline weight and BMI percentile.

RESULTS: The majority of patients were female (61%) and Caucasian (50%) with mean age 11 years and mean baseline weight 78.5 kg and BMI percentile 98.6%. Seventy-seven percent of patients returned for a follow-up visit (mean time to follow-up was 1.4 months). Between the initial and follow-up visit, the mean weight change per month was -0.3 kg (SD 2.1) and the mean BMI percentile change per month was -0.1% (SD 0.4). Twenty-one percent of patients saw a dietician at their initial visit. Seeing a dietician at the initial visit was not associated with an increase in the likelihood of a patient to return for a follow-up visit, except for patients who were male (OR 1.97, p=0.05) or Caucasian (OR 1.66, p=0.07). Seeing a dietician at the initial visit was not associated with mean weight change or BMI percentile change from the initial to the follow-up visit, even amongst different demographic subgroups.

CONCLUSIONS: Seeing a dietician during an initial pediatric weight management visit did not improve overall retention rates or weight outcomes. The finding that males and Caucasians were more likely to follow-up after a visit with a female Caucasian dietician suggests that some patients may benefit from seeing a dietician at the initial visit, but also that there is a need to recruit weight management providers who are diverse in background in order to provide the best and most culturally-competent care for all weight management patients.

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The Family Safe Zone: A Needs Assessment for a Multi-Level Parenting Intervention in the Pediatric Setting

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BACKGROUND: Physical punishment is a toxic stressor that disrupts normal brain development. Spanking is associated with increased aggressiveness, delinquency, criminality, and substance abuse, among children. Physical punishment is not an effective practice and impairs the parent-child relationship. Pediatric visits provide an opportunity to screen for harsh parenting, to educate parents and to refer families to local resources. While over 90% of pediatricians report discussing discipline with parents, 75% of parents report not discussing discipline.

OBJECTIVE: The Family Safe Zone sought to improve parenting practices through a multi-level intervention in one pediatric setting.

DESIGN/METHODS: Staff in a large, urban hospital completed surveys to identify attitudes and behaviors toward harsh parenting. The survey was intended to identify current practices in working with parents. Researchers also observed caregiver-child interactions in the clinic waiting areas and staff reactions to these interactions.

RESULTS: At baseline, healthcare providers (n=90) reported observing a variety of harsh parenting practices (90%), such as yelling (93%), cursing (83%), and hitting (71%). Many providers were not comfortable intervening with the abusive parent (61%), the distracted parent (28%), or the stressed parent (49.4%). While most providers reported discussing discipline techniques (78%) with parents, they were less likely to discuss spanking (67%) or toxic stress (40%). Clinic observations (40 hours; n=1460) revealed that 25% of caregiver-child interactions were negative with parents using name-calling, teasing, cursing, or saying "shut up" with children. Only two healthcare provider interventions were noted, one positive and one negative.

CONCLUSIONS: Needs assessment data suggested that providers knew the impact of harsh parenting on children's development, yet needed support to intervene. Staff received training in two programs, OneKindWord and Partnering with Parents. These programs were designed to change the culture of the organization where providers would intervene when they witnessed harsh parenting. Once an intervention or positive screening occurred, staff could refer parents to an onsite parenting specialist. Data are currently being collected to determine changes in provider attitudes and behaviors. The Family Safe Zone offers a model for replication in other pediatric settings.

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Needs Assessment of Parents in a Multi-Level Parenting Intervention in the Pediatric Setting

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BACKGROUND: Toxic stress, such as physical punishment, disrupts brain development. Spanking is associated with increased aggressive behavior, delinquency, physical abuse, violent/criminal behavior and substance abuse, and poor parent/child relationships. Pediatric visits provide opportunity to screen for family violence, intervene and potentially mitigate potential causes of toxic stress. While over 90% of pediatricians report providing anticipatory guidance about discipline, 75% of parents report not discussing discipline with their pediatrician.

OBJECTIVE: To identify areas of need among at-risk parents in a pediatric healthcare center parenting program.

DESIGN/METHODS: The Family Safe Zone project is a multi-level parenting program designed to increase screening for family violence by pediatric healthcare providers. At-risk families were referred to an on-site parenting specialist. The Parenting Specialist counseled parents on the effects of harsh parenting on children's brain development and the use of positive discipline practices. Parents/caregivers (n=54) completed the Parenting Stress Index and the Adult Adolescent Parenting Inventory (AAPI-2). The surveys were used to identify knowledge, attitudes, and behaviors of parenting.

RESULTS: Needs assessment data revealed that 21% of the parents seen by the specialist had critically high total stress levels (scored above the 85th percentile). On the AAPI-2, 43% of participants scored high risk on the power and independence scale. This scale identifies parents who restrict the child's power while expecting strict obedience to parental demands. Approximately one-third of parents exhibited low levels of empathy, meaning that they did not understand or value normal childhood needs. Thirty percent of respondents reversed family roles, expecting the child to meet the parents' needs rather than focusing on the child's developmental needs. Seventeen percent scored high risk on inappropriate expectations. These parents expect more of their children than the child is capable of achieving.

CONCLUSIONS: Data suggest the need for anticipatory guidance by pediatricians in working with parents. Providers can help parents to identify normal childhood development behaviors and to support positive parenting. The impact of the program is currently being measured through post-program surveys with parents and healthcare providers.

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House Officer

Community Acquired MRSA: Does Anatomical Location Matter?

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BACKGROUND: The incidence of community acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) skin infections is increasing worldwide. Although some risk factors, such as a personal or family history of abscesses or contact with health care workers, have been identified, often none of these are present. Given the delay in identifying antibiotic susceptibilities, factors that help predict infections with MRSA could help guide empiric antibiotic choice.

OBJECTIVE: To determine the association between the anatomical location of skin abscesses and infection with MRSA.

DESIGN/METHODS: We conducted a retrospective chart review of pediatric patients 0-21years (10.5±6.6 yrs) seen in the emergency department and ambulatory clinics of an inner-city, community-based hospital between 1/2007 and 12/2009. We identified 475 patients (55.1% females) with a diagnosis of cutaneous abscess where wound cultures were obtained; post-surgical infections and burns were excluded. We gathered data on classical risk factors of MRSA infection, location of the lesion, and demographic information. Associations were analyzed using Chi-square for categorical variables. A multiple logistic regression model was created to control for potential confounding.

RESULTS: 157 cases of MRSA (33.1%) were found during the study period. When analyzed by anatomical location, 72/185 (38.9%) of abscesses located in the upper extremities and head were MRSA compared to 16/51 (31.4%) and 65/227 (28.6%) of those located in the trunk and lower extremities respectively (p= 0.047). MRSA was identified more frequently in patients that presented with fever (p=0.007), had a family history of abscesses (p<0.001), and who received antibiotic treatment prior to obtaining culture (p= 0.004). When adjusting for these factors, along with age and gender, the association between location and MRSA persisted (p= 0.002).

CONCLUSIONS: Our data suggest that, in addition to fever, family history of abscesses, anatomical location of an abscess in the upper body (upper extremities and head/neck) is significantly associated with MRSA infection. This finding may help guide the choice of empiric antibiotic therapy for skin abscesses in pediatric patients.

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Clinical Information Gleaned from Written Domestic Violence Screeners in a Primary Care Setting

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BACKGROUND: Childhood exposure to domestic violence (DV) can affect physical and psychological health. Universal DV screening in pediatric offices increases identification of caregivers and children exposed to DV. Little is known about what clinical information can be gleaned from written DV screeners.

OBJECTIVE: To describe the type and amount of clinical information that can be obtained with a written DV screener in a pediatric primary care setting.

DESIGN/METHODS: Retrospective review of all self-completed DV screeners collected over 11 months at a hospital-based, primary care practice serving an inner city community. Unaccompanied female or male caregivers arriving with her/his child for well-child visits were asked to complete anonymous, validated, written, 4-item questionnaires (HITS tool): How often does your partner 1) physically hurt you, 2) insult you, 3) threaten you with harm, and 4) scream or curse at you? Answers were based on a 5-point Likert scale (never to frequently). We considered a score > 8 as positive. Primary outcomes were: 1) number of screeners completed, number of positive screens; 2) distribution of caregiver scores indicating degrees of DV in households and 3) caregiver comfort level with completing the screeners.

RESULTS: From October 2011 to August 2012, approximately 6,600 patients arrived for well-child visits and 2,329 written screeners were anonymously completed (35% screened). 56% were completed by females, 6% by males, and no sex was listed on the remaining 37%. Of all screeners completed, 80% (58% female, 5% male, 37% unlisted sex) had scores of 4, indicating no abusive behaviors; 16% had scores of 5-7 (58% females, 9% males, 32% unlisted sex), indicating some abusive behaviors; and 4% (101) had scores of > 8 (68% female, 10% males, 22% unlisted sex), indicating more than one abusive behavior occurs sometimes to frequently. Almost all caregivers completing screeners were somewhat or very comfortable with the tool.

CONCLUSIONS: A written DV screener provides very useful clinical information about children's home environments. Most caregivers felt comfortable completing the tool. Written screeners show promise as a way to screen for DV in pediatric primary care settings.

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Medical Student

Pilot Methodological Study on Defining Adolescent Menstrual Regularity

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BACKGROUND: Studies examining menstrual regularity, defined by the World Health Organization as one cycle every 20-40 days for three consecutive months, have used methods ranging from interviews to questionnaires to menstrual calendar diaries (electronic or paper). The best method to capture regularity has not been determined.

OBJECTIVE: We examined age, ethnicity, caregiver income/education, interview language, pubertal staging, and BMI between girls who completed at least three consecutive monthly calendars as compared to those who were introduced to the calendars but completed less than three months. We compared reported menstrual regularity obtained from caregiver interview with information from monthly menstrual calendars completed by the girl.

DESIGN/METHODS: Latina (N=120) and African American (N=59) girls from the Growing Up Healthy study in New York City were introduced to the prospective menstrual calendar that recorded the month, date, and presence of cramps, bleeding, spotting, heavy bleeding, and bloating. The girls' caregivers were asked annually in English or Spanish about girls' menstrual regularity.

RESULTS: The 36 girls who completed at least 3 months of the calendar did not statistically differ in age (p=0.97, range 10.6-15.5 years, average age 13 years), BMI (p=0.42), interview language (p=0.69), or caregiver's education level (p=0.15) compared to the 147 who completed 0-3 months. Caregivers' classification of menstrual regularity as compared to regularity by calendar, the reference, demonstrated a sensitivity and specificity of 71% and 50% and a positive predictive value and negative predictive value of 77% and 42%, respectively.

CONCLUSIONS: Caregiver interview questions on menstrual regularity and monthly diaries gave comparable results, although a small percentage of girls may be incorrectly classified as irregular by the caregiver report in this low-income minority population. To our knowledge, this is among the first methodological studies comparing reported regularity versus menstrual calendars in adolescents and can inform future studies of reproductive health.

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House Officer

Do Parents Read the Label? An Assessment of Parents' Use and Understanding of Nutrition Labels

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BACKGROUND: Nutrition labeling on packaged food is a population-based approach that provides information for consumers. Research suggests that the mandated back-of-the box Nutrition Facts label (NFL) is difficult to interpret and voluntary front-of-package labeling (FOP) is available on some food products. Few studies have investigated parents' use and understanding of nutrition labels, especially among inner-city families where pediatric obesity rates are highest.

OBJECTIVE: To determine 1) reported use of nutrition labels among inner-city families 2) comprehension of nutrition labels using the NFL, and 3) if FOP correlates with a better understanding of nutrition information.

DESIGN/METHODS: We created a 29-item questionnaire assessing use and understanding of nutrition labels among parents of pediatric patients in an inner-city academic practice located in the Bronx. Parents were assessed for food label comprehension of both the standard NFL and the FOP. Data was analyzed using STATA. Two-sample z-tests were performed to compare proportions.

RESULTS: Seventy participants responded to the survey (89% were female, 36% with overweight/obese child). Overall, 63% reported reading the food label when purchasing a product for the first time. There were no significant demographic differences between the two groups. Of those who reported reading the label, 42% reported that their decision to purchase a food product was changed based on reading the label. Parents were more likely to understand the FOP vs the NFL.

Comparison of Correct Answers When Using NFL vs. FOP Label

Question	NFL (%)	FOP (%)	p-value(*=significant)
Locate number of calories	84	96	0.0242*
Calculate calories in 2 servings	70	92	0.0013*
Identify amount of sodium	89	97	0.0490*
Compare sugar content in 2 products	79	91	0.0332*
All questions correct overall	60	87	0.0003*

When participants were asked what they would change regarding the current label, 43% reported they would prefer the information to be larger, easier to read, and on the front.

CONCLUSIONS: Parents report reading nutrition labels when choosing food for their family and demonstrated improved comprehension of label information when using FOP. Development of a simple, standardized FOP system may help parents make more informed, healthier decisions when purchasing food for their families.

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Medical Student

The Feasibility and Utility of Using a Brief Dietary Screener in the Pediatric ED

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BACKGROUND: Pediatric emergency departments (PED) provide a valuable setting to promote community health via screening, education and early intervention. Assessing dietary intake in the PED may represent what a child consumes when not sick, and indicate dietary risks associated with excessive adiposity. Previous research has shown that assessing food preferences correlates with biomarkers of dietary intake.

OBJECTIVE: To test the feasibility of assessing a child's dietary intake during a PED visit using a food preference survey, assess the reliability of responses during the visit with those completed at home, and assess the diet-adiposity relationships.

DESIGN/METHODS: A convenience sample of children in the PED was asked to complete a preference survey (33 foods, 4 non-foods). Those critically ill or with psychiatric illnesses were excluded. For test-retest reliability assessment, the preference survey was sent home to complete when usual health had resumed. Height and weight were measured for age- and sex-specific body mass index (BMI).

RESULTS: 150 children were approached, 2 were ineligible, and 8 failed to complete all items. The mean age was 11 years (range 5-17) and 43% were publically-insured. The sample was gender balanced; 14% African American, 33% Hispanic, 45% Caucasian; and 3% underweight, 50% normal weight, 47% were overweight/ obese. The mean time to complete the survey was 3:52 minutes. Through comparing ranks of preferences, all children ranked vegetables as least liked and starches, sweets and fruits as most preferred. The relationship between reported preferences and BMI percentile was strongest in girls. Overweight/obese females reported less preference for vegetables, yet greater preference for caloric beverages (juices, soda, whole milk) than did normal weight females. Through comparing absolute preference ratings via multiple regression analysis ($p \leq 0.05$), liking for high-fat sweets increased as BMI percentile increased, independent of demographic variables. For reliability testing, the home survey showed good test-retest reliability with average intra-class coefficient of 0.7.

CONCLUSIONS: The food preference survey appears feasible to complete in the PED. The test-retest reliability was acceptable, suggesting that what was reported in the PED was reflective of dietary behaviors at home. The food preference responses could be used to initiate discussions and nutrition education.

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Diagnostic Utility of Neuroimaging in Evaluation of Headache in Children Presenting to the Emergency Department

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BACKGROUND: Headache is a common complaint in children. The frequency of visits to the pediatric emergency room (ED) with a chief complaint of headache is low (1.3%) and similar to that in adults (1.3% - 2.5%). Headache can be the initial symptom of life-threatening disorders, e.g., meningitis, intracranial hemorrhage, brain tumor. Neuroimaging is widely used for evaluation of headache, with a rise in CAT scan and MRI. However, the most common diagnoses in children presenting with headaches in the E.D are viral illness, sinusitis, migraine and post traumatic headache; most of these conditions can be diagnosed based on history and physical examination without need for neuroimaging.

OBJECTIVE: To determine the role of CT or MRI in the pediatric emergency room evaluation of headaches.

DESIGN/METHODS: A 10 year retrospective chart review done at Bronx-Lebanon Hospital Center of all children presenting to the pediatrics E.D. with headache, its variants and associated symptoms as chief complaints. Headaches were classified into primary and secondary using the World Health Organizations classification of headache disorders. Primary/ Secondary complaint of headache, and a discharge diagnosis with ICD codes: 784.0, 346.2, 307.81, 349.0, 346.9, 346.1, 668.8 were included in the study. The following data were collected: basic socio-demographic

data, medical record number, date of admission to the ED, date of discharge, CT or MRI results, if done, detailed history, associated symptoms and neurological examination for patients who had CT or MRI, Diagnosis, Follow-up. The data were analyzed using SPSS V.16.0.
RESULTS: Total sample size was 3028. Of these, 1708 were included based on the above criteria. Mean age was 11.5 yrs; males 56%; Hispanics 65%, African-American 31%. Neurological examination was normal in 99.7% (group A); abnormal in the remaining 6 subjects (group B). CAT scan/MRI was obtained for 10% (n=175) of group A and for all patients in group B. Approximately 18% (n=31) of group A, and 50% (n=3) of group B had abnormal CAT scans. Of children with abnormal imaging results in group A, only 7% were related to headache. In group B, all abnormal imaging was related to headache.
CONCLUSIONS: Our findings suggest that neuroimaging plays at best a minor role in the diagnosis and management of patients presenting with headache in the ED with normal neurological exam.

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Reduction in New York State Infant Influenza Rates Associated with Passage of the 2009 Neonatal Influenza Protection Act (NIPA)

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BACKGROUND: Influenza presents with increased morbidity & mortality in children <6months of age. Vaccination of caregivers is indicated but immunization rates are estimated at 30%. The 2009 New York State Neonatal Influenza Protection Act (NIPA) aimed to reduce the burden of infant influenza by mandating offering of influenza vaccine to caregivers during the post-partum hospitalization in hospitals with neonatal intensive care units.
OBJECTIVE: To determine the impact of NIPA on infant influenza rates.
DESIGN/METHODS: Data on laboratory-confirmed influenza cases between 2006 & 2012 were extracted from the New York State Electronic Clinical Laboratory Reporting Service (ECLRS). Data on cases were categorized by age (0-5 months) & location (New York City (NYC), outside NYC) based on reporting laboratory site. Total number of influenza cases & percentage of total cases in the infant age group were normalized to number of reporting laboratory sites. Chi-square Test of Independence was used in a bivariate analysis pre-and-post implementation. Year-to-Year trends were assessed by linear regression. All tests of significance are two-sided and evaluated at the $p<0.05$ level.
RESULTS: During the 6-year study period, 3,154 cases of influenza were detected in infants 0-5 months. In bivariate analysis 1,707 (54.1%) cases occurred prior to NIPA implementation and 1,447 (45.9%) cases occurred after ($p<0.001$). Of the 1,422 cases detected in NYC, percentages of influenza cases pre-post NIPA were 777 (54.6%) & 645 (45.4%) respectively ($p<0.006$). Outside NYC, the percentage of cases was reduced from 53.7% (930/1732) to 46.3% (802/1732, $p<0.02$). Prior to implementation there was a year-to-year increase in the number of infant influenza cases state-wide ($p<0.04$ for trend). The ratio of infant influenza cases normalized per ECLRS site in NYC increased each year after NIPA passage ($p<0.01$ for trend). The ratio of infant cases outside NYC annually decreased ($p<0.05$ for trend). No year-to-year trends were seen in the percentage of total influenza cases in the infant age group compared to total cases across all age groups either within or outside NYC.
CONCLUSIONS: Comparison of influenza seasons before & after NIPA suggests a total statewide reduction in the burden of infant influenza. However the greatest driver of this reduction occurs from reduced disease in infants outside NYC. We speculate parental immunization as encouraged by NIPA may not create cocoon immunity in NYC.

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Fellow in Training

Continuous Versus Intermittent Pulse Oximetry Monitoring of Children Hospitalized for Bronchiolitis

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BACKGROUND: Bronchiolitis is the most common infectious cause of pediatric hospitalization. Hypoxia is a common reason for admission for bronchiolitis. However, pulse oximetry monitoring recommendations in these children are based on expert opinion.
OBJECTIVE: Assess the impact of intermittent pulse oximetry monitoring on length of stay, clinical outcomes, and health care costs for children hospitalized for bronchiolitis.
DESIGN/METHODS: Multi-center, randomized trial of pulse oximetry monitoring strategies for children hospitalized for bronchiolitis. Otherwise healthy children with a history of term birth and hospitalized for bronchiolitis were randomized to continuous pulse oximetry monitoring (control arm) or spot-checks during regular vital sign and clinical reassessments (intervention arm). Researchers collected data on clinical outcomes, length of stay (LOS), number of invasive respiratory treatments performed, diagnostic and therapeutic measures utilized, and costs of care.
RESULTS: A total of 103 patients have been enrolled out of a goal of 266 patients. Children randomized to intermittent monitoring were significantly older than those undergoing continuous monitoring (6.6 months intermittent vs 3.5 months, $p=0.01$). Mean LOS was not significantly different between study arms (1.9 days intermittent vs 2.0 days continuous monitoring, $p=0.98$). Children randomized to intermittent pulse oximetry monitoring had no difference in rate of PICU admission, diagnostic testing, oropharyngeal suctioning, antibiotic use, bronchodilator use, or duration of supplemental oxygen therapy. Average total cost of all diagnostic testing, including pulse oximetry monitoring, was $203.80 for patients receiving continuous monitoring versus $179.80 for patients undergoing intermittent monitoring ($p=0.19$).
CONCLUSIONS: Our interim analysis demonstrates no safety risk to patients undergoing intermittent pulse oximetry monitoring and a trend toward decreased costs of diagnostic testing and monitoring. Length of stay for hospitalized patients did not change based on pulse oximetry monitoring strategy. These preliminary data support the expert guideline that intermittent pulse oximetry monitoring be used in children hospitalized for bronchiolitis.

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Fellow in Training

Clinical Screening for HAART Induced Mitochondrial Toxicity in HIV-Infected Children in Ghana

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BACKGROUND: Highly active antiretroviral therapy (HAART) has decreased HIV morbidity and mortality; however, the prevalence of HAART toxicity is high. Mitochondrial dysfunction is implicated in most of these toxicities. Moreover, HIV infection also causes mitochondrial damage. Differentiating between mitochondrial dysfunction due to HAART or to HIV infection is critical for treatment decisions, particularly in resource poor settings.
OBJECTIVE: Our primary objective was to test the utility of clinical tools (the Mitochondrial Disease Criteria (MDC) and the Enquête Périnatale Française (EPF)) to screen for mitochondrial toxicity among HIV-infected children in a resource poor setting.
DESIGN/METHODS: We conducted a retrospective chart review of 403 HIV-infected children at Korle-Bu Teaching Hospital, Ghana. Two clinical definitions of mitochondrial toxicity were used: the MDC and the EPF. Each is a checklist of clinical symptoms, a combination of which when present results in a (+) score. Data on demographics, WHO stage, age of diagnosis, start date of HAART, adherence, medications used, and length of treatment were collected. Fisher's Exact Test determined significance regarding MDC or EPF (+) scores. Logistic regression models determined predictors of (+) score.
RESULTS: Of 403 HIV-infected children, 331 were on HAART. There was no significant difference in MDC score between those on HAART and treatment naive children whereas the differences in EPF score approached significance ($p=0.1$). Male sex, higher WHO stage, younger age at diagnosis, and younger age of HAART initiation were all significantly associated with EPF(+) score ($p\leq0.01$). Adherence to treatment trended toward a significant association with EPF(+) score ($p=0.093$). Nevirapine, Abacavir, and Didanosine appear to increase risk of an EPF(+) score (OR=3.55(CI=1.99-6.33), 4.76(2.39-9.43), 4.93(1.29-18.87), respectively). Efavirenz is protective (0.5(0.28-0.87)). None of the criteria of those with EPF(+) score seem to occur more frequently in children on HAART or treatment naive.
CONCLUSIONS: Neither EPF nor MDC were able to identify a significant difference between HIV-infected children with mitochondrial toxicity from HIV alone vs. HIV with HAART. However, indicators of longer exposure to HAART are associated with an EPF(+) score. A prospective study is needed to evaluate the utility of the EPF to detect mitochondrial toxicity in children in resource poor settings.

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House Officer

Prescriber Perceptions of an Antimicrobial Stewardship Program (ASP)

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BACKGROUND: The development of antimicrobial (AM) resistance has been shown to increase morbidity, mortality, and healthcare costs. ASPs can help reduce AM usage in hospitals and therefore reduce AM resistance. In 2004, our pediatric tertiary care hospital implemented an ASP which has helped decrease unnecessary AM use, as well as optimize AM selection and dosing. Aspects of our ASP include prospective audits with real-time feedback, required preauthorization and indication for certain AMs, online clinical guidelines, order sets, and a yearly antibiogram.
OBJECTIVE: We aimed to determine provider attitudes about the effectiveness of our ASP generally and its effects on their own AM prescribing behaviors specifically.
DESIGN/METHODS: We surveyed hospital-based providers, including residents, fellows, attending physicians, selected nurse practitioners and physician assistants. An online survey was designed utilizing questions with a Likert scale response format and was sent out by e-mail. The data were collected and analyzed using Stata.
RESULTS: Of 153 potential participants the survey was completed by 93 prescribers, 52% of whom were pediatric residents. Most participants found the features of our ASP to be helpful. Overall recommendations from the infectious disease (ID) pharmacist were found to be helpful by 82%, and 94% reported they had never experienced an adverse outcome related to ASP interventions. Individual aspects of our ASP were found to be more than somewhat helpful by more than 60% of participants.

ASP Intervention	% prescribers rating intervention more than somewhat helpful (4 or 5 on Likert scale)
Requirement for authorization from ID attending	60
Real-time feedback	77
Vancomycin order-set	87
Required antibiotic indication field	62
Clinical guidelines	68
Yearly antibiogram	69

Comparing residents to non-residents, residents reported accessing the ASP online resources more often ($p=0.0001$), were more familiar with the ID pharmacist ($p=0.0014$), and found the vancomycin order set more helpful ($p=0.0012$).
CONCLUSIONS: Our ASP was perceived to be effective in improving AM usage and was well received by prescribers. Hospitals considering creation of an ASP can anticipate that these interventions may affect prescribing behaviors in positive ways.

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Enteral Feeding Tube Design and Differential Bacterial Overgrowth: An In Vitro Comparison

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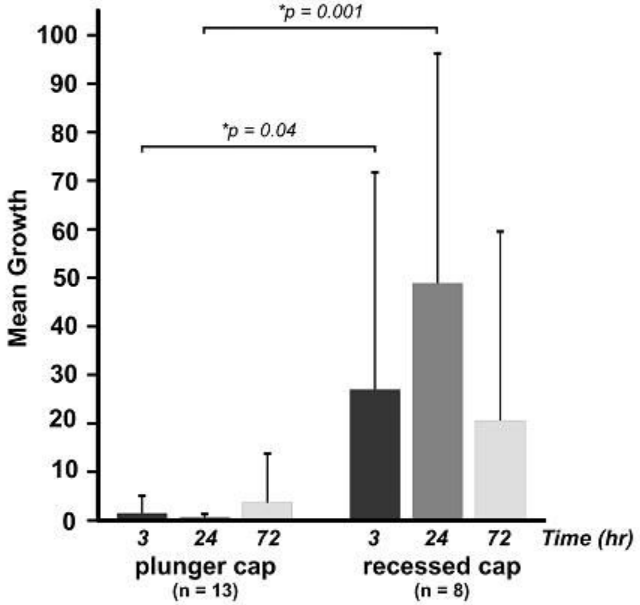
BACKGROUND: NICU patients often require nutritional gavage support via enteral feeding tubes (EFTs), with various designs existing for EFT caps, inlet hubs, and distal ends. It is possible that certain EFT designs may increase the risk for nosocomial infection by promoting bacterial overgrowth.

OBJECTIVE: To compare in vitro bacterial overgrowth of design components of commercially available 8 French EFTs, including the proximal hub (H), cap (C), and distal end (DE) outlet.

DESIGN/METHODS: EFT caps (plunger (PC), recessed (RC) and threaded (TC)); hubs (single or double port); and distal ends (open (OE) or pouch (POE)) were assessed. Four polyurethane (PE) and 1 silicone (S) EFT were selected. EFTs were innoculated with a 2:1 mixture of ready-feed 24 kcal/oz premature formula and human saliva, placed in a 75% humidified isolette at 34°C, and removed at 3, 24 or 72 hours. EFTs were sterilely sectioned; caps, hubs and distal ends were placed in PBS and cultured using standard microbiological procedures. Bacterial colony forming units (CFUs) were determined for each specimen and standardized for maximum growth by time and component, creating a '0-100' scale for two-tailed t-test comparisons.

RESULTS: Maximal growth was detected for specimens at 3 hours. A significant difference existed between PC and RC caps at 3 and 24 hours; this difference disappeared by 72 hours.



Despite a significant amount of growth in the DEs, there was no difference between design types. Hubs also had abundant bacterial growth at 3 and 24 hours but no differences between designs (single port with recessed or plunger cap, Y-shaped design or threaded hub) were detected. EFTs made of PE and S had similar growth burdens.

CONCLUSIONS: EFTs are foreign bodies which may serve as a potential source of bacterial overgrowth and nosocomial infection. This study suggests certain EFT design components, particularly the proximal cap, may increase the potential for bacterial growth after humidified incubation.

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House Officer

Comparison of Multiple Combination Methods of Analgesia for Neonatal Circumcision

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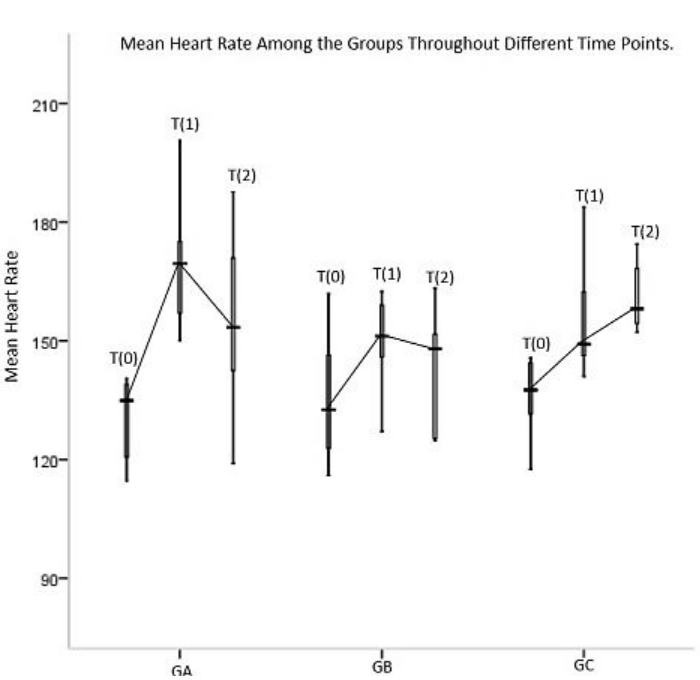
BACKGROUND: Neonatal circumcision is a painful procedure. Interventions for circumcision pain control have been examined, but effectiveness of simultaneous multiple interventions has not been assessed. There is no consensus as to the best current practice managing circumcision pain.

OBJECTIVE: To compare the effectiveness of combined mode of analgesia on pain responses in neonatal circumcision.

DESIGN/METHODS: Prospective randomized, one sided blinded, experimental study. Healthy full terms male neonates were circumcised by same physician. All subjects received non nutritive sucking +2ml 25% oral sucrose water in addition to one of the following: Group A (GA)=Topical EMLA Cream (Eutectic mixture of Local Anesthetics), Group B (GB)=Ring block, Group C (GC)= Dorsal penile nerve block. Physiologic [heart rate (HR), respiratory rate (RR), mean arterial pressure (MABP) and oxygen saturation (SO2)] and behavioral parameters as measured by FLACC (Face, Legs, Activity, Cry and Consolability) score and crying time (CT) were recorded at 3 time points; baseline (T0), at the circumcision (T1) and 5 minutes post circumcision (T2). The FLACC scores were rated by video tape analyzed by a physician who was blinded as of which anesthesia the subjects received. Data were analyzed using repeated measures analysis of variances (RM-ANOVAS), p value of <0.05 was considered significant.

RESULTS: A total of 21 subjects participated in the study (GA=6, GB=7 and GC=8). RR, MABP, CT, SO2 and FLACC scores were not statistical significant different among the three groups (p>0.05). GA shows statistical significant increase in HR when compared with GB and GC (p-0.03).



CONCLUSIONS: When combined with non nutritive sucking and oral sucrose, EMLA cream produces significant increase in heart rate compare with dorsal penile or ring block suggesting a stronger pain response. Other physiologic and behavioral parameters were not different between the groups indicating that the heart rate might be more sensitive marker of pain response in neonates.

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Withdrawn

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Fellow in Training

Initiation and Attainment of Full Nipple Feeding (FNF) Is Influenced by Post Menstrual Age (PMA) and Gestational Age (GA)

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BACKGROUND: Attainment of independent nipple feeding is a primary criterion & often final barrier to discharge of a premature infant. The ability to coordinate suck-swallow-breathe is essential to achieving this goal. This coordination is a variable developmental milestone usually achieved by 36 wks PMA.

OBJECTIVE: To determine whether 1. Maturity, as indicated by PMA, is the predominant factor modulating initiation and attainment of FNF. 2. Attainment of FNF is temporally associated with hospital discharge (DC). Hypothesis: Majority of infants (> 75%) will attain FNF by 36 wks PMA independent of GA & then be discharged within a week.

DESIGN/METHODS: Retrospective chart review of inborn infants < 34 wks GA born between 9/2010- 6/2011 admitted to the NICU & discharged on FNF. Infants were grouped by GA (Table). Data retrieved included DOL and PMA at first nipple feed, at full nipple feed and at DC.

RESULTS: Significant delays were seen across all 3 GA groups for PMA at first & full nipple feed, days between first & full nipple feed & days from FNF to DC; these delays were inversely related to GA [Table 1]. By 36wks PMA, 50% had achieved FNF & 77% by 38 wks. [Table 2] Attainment of FNF was followed by DC within a wk only for infants > 28 wk but took twice as long (15 d) for infants < 28 wk.

	<28 wks n=7	28-31.6wks n=35	>32 wks n=38	p-value
BW	697+/-126	126+/-265	1841+/-1235	
GA	25.6+/-1.2	29.6+/-1.2	32.6+/-0.6	
PMA at First Nipple	35.3	34.1	33.7	.004
PMA at FNF	39.1	37.1	35.2	<.001
PMA at DC	40.9	37.9	36	<.001
Days b/n First & FNF	26.6	21.4	10.8	<.001
Days b/n FNF & DC	15.4	6	5.7	.001

PMA	% taking 1st nipple feed	% achieving FNF
32.1-33	15%	0%
33.1-34	63%	3.7%
34.1-35	83%	26%
35.1-36	91%	50%
36.1-37	95%	66%
37.1-38	98%	77%
38.1-39	100%	88%
39.1-40		95%

CONCLUSIONS: These findings indicate that initiation and attainment of FNF is influenced by PMA as well as GA. It wasn't until 38 weeks that >75% of infants in the cohort achieved FNF. There was an incremental 2 week delay in achieving FNF with ↓ GA. Additionally, infants born at an earlier GA exhibited a 2-fold delay to DC after achieving FNF. The mechanisms contributing to delay to FNF and time to DC require further investigation.

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House Officer

Management of Patient Ductus Arteriosus (PDA) with Two Different Protocols: A 10-Year Retrospective Study of Outcomes in Premature Babies with Birth Weight (BW) ≤ 1250 grams

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BACKGROUND: Management of PDA is controversal among neonatologists. Different protocols are used and opinions and outcomes vary.

OBJECTIVE: To analyze and compare outcomes of premature babies, treated with 2 different protocols between 2002 and 2011.

DESIGN/METHODS: A retrospective medical chart review of premature babies with BW ≤ 1250 grams, diagnosed with PDA, was conducted. Babies from 2002-2007 (group 1) were treated aggressively as per protocol based only on PDA size ≥ 1.7mm by echocardiogram (ECHO). Babies from 2008-2011 (group 2) were treated conservatively as per protocol based on clinical and ECHO signs of more severe PDA. Demographic data and neonatal outcomes were analyzed using chi square test.

RESULTS: Data for 380 babies (group 1=199, group 2=181) were analyzed. 72% of babies from group 1 were treated with Indomethacin or Ibuprofen (Indo/Ibu) and 18% had ligation vs. 40% and 2.2% of babies from group 2, respectively (p<.0001). There were no statistical differences in BW, GA, sex, maternal use of steroids, Apgar score, PDA size, days of ventilation or CPAP. Group 2 had statistically significant decrease in mortality and intraventricular hemorrhage (IVH). The main neonatal outcomes are summarized in Table 1.

Outcomes	Group 1 (N=199), %	Group 2 (N=181), %	p-value
PDA Indo/Ibu treated	**72**	**40**	**<0.0001**
PDA ligation	**18**	**2.2**	**<0.0001**
Oxygen at 28 days	**62.3**	**50.3**	**<0.05**
Oxygen at 36 weeks	28.1	20.2	NS
Pulmonary hemorrhage	6.5	7.2	NS
IVH	**36.9**	**22.1**	**<0.01**
NEC	16.6	23.2	NS
Sepsis	35.7	37.6	NS
ROP	52.3	58	NS
Length of stay	68	73	NS
Mortality	**24.6**	**16.0**	**<0.05**

CONCLUSIONS: Aggressive early treatment with Indomethacin/Ibuprofen and ligation of PDA in premature babies with BW ≤ 1250 grams did not result in any improvement of neonatal outcomes. Babies treated selectively had lower mortality and IVH. Careful clinical evaluation of the signs of PDA and ECHO assessment of cardiac function seem helpful to define the group of babies for treatment. This approach also significantly decreased the number of babies exposed to the risks, side effects and cost of medications and ligation.

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Wielding Technology To Transform NICU Model of Care: Large Scale Operations Testing Is Feasible with Little Prior Simulation Experience

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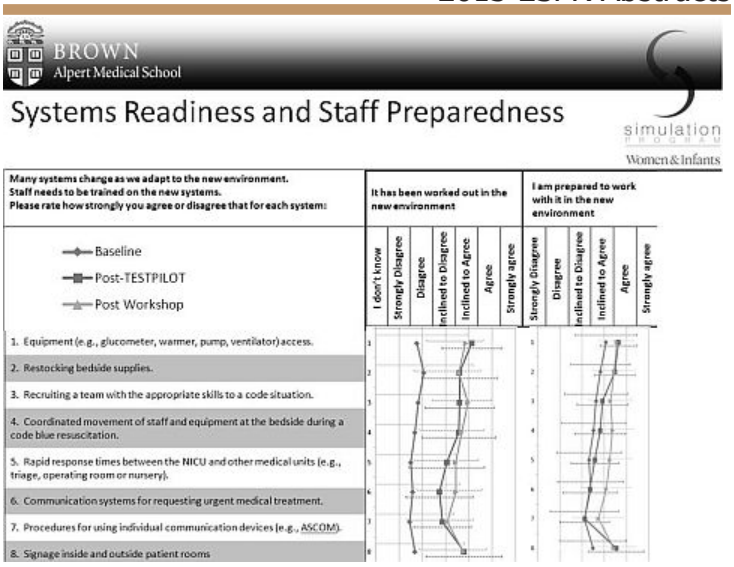
BACKGROUND: Single Family Room (SFR) Neonatal Intensive Care Units (NICUs) enhance development of the tiniest infants. Care practices translate imperfectly from the bay model to SFR, requiring a transformation of staff attitudes, practices and processes. Transportable Enhanced Simulation Technologies for Pre-Implementation Limited Operations Testing (TESTPILOT) was developed to improve patient safety.

OBJECTIVE: TESTPILOT aimed to simulate a functional intensive care unit, assess translation of existing processes and enable all shifts to explore new environment. Full scale, immersive, macro-systems simulation has had limited application due to cost and complexity. 1. Demonstrate that an organization with less simulation experience can accomplish large scale macrosystems testing; 2. Develop a tool that distinguishes the progression of systems readiness versus staff preparedness.

DESIGN/METHODS: Woman's Hospital Baton Rouge (WHBR) adopted the TESTPILOT methodology, creating locally relevant scenarios, accruing requisite expertise, orchestrating the simulation and debriefing sessions. TESTPILOT instruments were revised by expert panel review and serial cognitive interviews to improve discernment of system readiness and staff preparedness. WHBR staff completed serial surveys.

RESULTS: Launching from WIH lessons-learned, TESTPILOT-WHBR followed a similar trajectory of hazard discovery. Debriefing sessions generated >150 discrete latent hazards, many unexpected. Discoveries focused on workflow, code blue, family centered care, and communication devices. Simulations became the catalyst for iterative process refinement. Staff report documented progressive simulation competency, volunteering for a fourth round of simulations. Systems readiness increased from baseline through post-TESTPILOT.



CONCLUSIONS: The benefits for systems refinement and patient safety justify the extensive preparation required for macrosystems testing. WHBR demonstrated feasibility of adopting TESTPILOT.

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Fellow in Training

Communication Intervention in the NICU: Can It Backfire?

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BACKGROUND: For parents of a critically ill child, good communication is vital and may help alleviate stress and anxiety. We adapted the Seattle Decision Making Tool (DMT) for NICU parents to learn more about their values, beliefs, contextual family issues, and quality of life concerns for their infant.

OBJECTIVE: To encourage consideration of family concerns and preferences in daily plans for patient care.

DESIGN/METHODS: Parents of critically ill neonates (SNAP score >20) admitted to the NICU were randomized, within 7 days of admission, to an intervention group, where parents were interviewed using the DMT, or standard of care. DMT information was shared with the clinical team through the medical record and communicated directly to the primary NICU clinician via email. Daily rounds on all infants were audio recorded after enrollment, with clinician consent. Parents completed the State-Trait Anxiety Inventory (STAI) at enrollment. Two weeks later, parents completed 3 surveys: the Family Inventory of Needs - Pediatrics (FIN-PED), satisfaction with NICU care, and the STAI. Recordings were analyzed with the Roter Interaction Analysis System.

RESULTS: Complete data were obtained for 10 control and 9 intervention families. 11 different clinical teams were recorded. The groups did not differ on demographic characteristics of infants or families. Mean infant SNAP scores were around 40 in each group. Anxiety and FIN-PED scores were similar for both groups; state anxiety did not decrease over time. There was minimal psychosocial content in rounds, < 5% of content; the groups did not differ in amount, or duration of rounds. Controls reported higher satisfaction with NICU care, specifically in questions regarding communication.

CONCLUSIONS: This study presents pilot data using the modified DMT with NICU families and clinicians. We found that additional information about family concerns and beliefs was not incorporated into rounds and that families in the intervention group were less satisfied with communication than controls. This suggests that intervention families may have been primed to expect better communication than they received. In addition, giving family data directly to busy providers may not be sufficient. When testing a communication intervention, researchers should consider whether they are raising family expectations, and determine how best to integrate family psychosocial information into the daily reality of busy NICU clinicians.

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Fellow in Training

Early Caffeine Therapy for Prevention of Bronchopulmonary Dysplasia in Preterm Infants

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BACKGROUND: Caffeine therapy started during the first 10 days of life reduces the risk of bronchopulmonary dysplasia (BPD) in preterm infants. Hyperoxia and ventilator induced lung inflammation during the first few days of life contributes to the pathogenesis of BPD. Caffeine has anti-inflammatory properties. If therapy is initiated within the first 2 days of life, this may confer an additional advantage in preterm infants.

OBJECTIVE: To determine if the neonatal outcomes are better with the early commencement of

caffeine (within 2 days) in preterm infants.
DESIGN/METHODS: This study is a retrospective data analysis from the Alere Neonatal Database for infants born between June 2006 and May 2011, weighing ≤ 1250 grams, and treated with caffeine within the first 10 days of life. The baseline demographics, clinical characteristics, and the neonatal outcomes were compared between the infants who received early caffeine (0-2 days) with the infants who received delayed caffeine (3-10 days). Multivariate regression analysis was performed to control for the variables that differ in bivariate analysis.
RESULTS: A total of 2,951 preterm infants met the inclusion criteria. 1,986 infants received early caffeine (BW 938±201 g, GA 27.5±2.0 w) and 965 infants (BW 899±216 g, GA 27.2±2.1 w) received late caffeine. The early use of caffeine significantly reduced BPD and BPD or death. Other respiratory outcomes (days on ventilator, postmenstrual age to room air, infants discharged home on oxygen) also improved with the early commencement of caffeine. The frequency of severe intraventricular hemorrhage (IVH) and patent ductus arteriosus (PDA) was lower and the length of hospitalization was shorter in infants receiving early caffeine therapy. However, early use of caffeine was associated with an increased in the risk of necrotizing enterocolits (NEC) in preterm infants.

Outcomes of Infants Started Early on Caffeine			
	OR	95 CI	p
BPD	0.692	0.589-0.815	<0.001
BPD or died	0.767	0.646-0.910	0.002
Severe IVH	0.722	0.531-0.984	0.04
PDA	0.727	0.618-0.855	<0.001
Home on oxygen	0.724	0.587-0.892	0.002
NEC	1.411	1.022-1.949	0.036

CONCLUSIONS: Early commencement of caffeine improved survival without BPD in preterm infants. The risk of NEC with early caffeine use requires further investigation.

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Fellow in Training

Ear Drainage and the Role of Sepsis Evaluations in the Neonatal Intensive Care Unit

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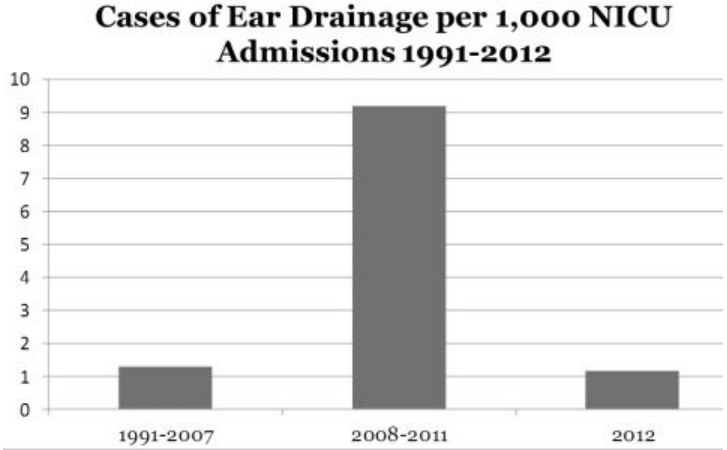
BACKGROUND: Ear drainage in NICU population occurs infrequently but is most often believed to be of an infectious etiology. Given the high risk of infection and difficulties with otoscopy in VLBW infants, a sepsis evaluation and treatment are often performed. From 2008-2011, we observed a dramatic increase in episodes of ear drainage in our NICU that warranted investigation.
OBJECTIVE: To design and implement an intervention to reduce ear drainage and subsequent sepsis evaluations and treatment in NICU.
DESIGN/METHODS: Data from 1991 to 2011 were collected on all cases of ear drainage, including demographics, hospital course, laboratory data, and physician's response to these finding. Preliminary data analysis revealed apparent association between timing of endotracheal tube tape changes and onset of ear drainage, that led us to speculate that leakage of anti-adhesive solution into the external auditory canal could result in local inflammation. A nursing education initiative was implemented to protect the ears during tape change/removal. Starting November 2011, post-initiative rates of discharge were collected.
RESULTS: 50 total cases were documented from 1991-2012 with 62% occurring between 2008-2011. Median GA 26 weeks and median BW 754 grams. In 86% of cases, an anti-adhesive solution was used on the face <48 hours prior to the onset of drainage. A sepsis evaluation was performed in 68%. Cultures of ear drainage were performed in 86% mostly yielded mixed flora. Two blood cultures were positive for *Candida albicans* in which ear cultures did not correlate. The rate of ear drainage reached a peak of 9.46 from 2008-2011. Post initiative rate 1.17 (Rate difference: -8.01; 95% CI: -11.98, -4.05).



CONCLUSIONS: Ear drainage in NICU mostly occurs in ELBW infants and may be of a non-infectious etiology. Cultures of ear drainage do not appear to yield any useful information. Protection of the ear from anti-adhesive solutions may reduce rates of non-infectious ear discharge and thereby limit unnecessary interventions and exposure to broad spectrum antimicrobials.

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Fellow in Training

Cumulative Diagnostic Imaging Radiation Exposure in Premature Neonates

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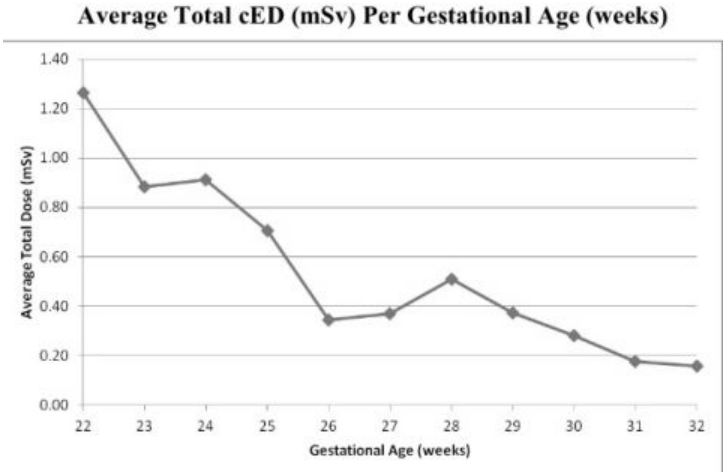
BACKGROUND: Lower ages of viability and improvements in survival rates of extremely premature (PT) infants raise a new public health concern, namely the consequent increase in diagnostic ionizing radiation exposure. PT neonates are highly radiosensitive and at a high risk from the cumulative effects of ionizing radiation exposures received during a prolonged stay in NICU. The international recommended radiation exposure limit for general population is 1 mSv/year.
OBJECTIVE: To provide an estimate of the average total cumulative effective ionizing radiation dose (cED) received by PT infants ≤ 32 weeks gestation from diagnostic imaging studies performed throughout their stay in a level IV NICU in the United States.
DESIGN/METHODS: Retrospective analysis was performed on the data collected from all NICU patients ≤ 32 weeks gestation from 2004 to 2011. Exclusion criteria were infant transfer or death. Data included demographics, hospital course, length of stay (LOS) and all radiological studies involving ionizing radiation performed during the hospital stay. A typical effective dose for studies in question was used to calculate the average cED for each gestational age (GA).
RESULTS: 1052 charts were reviewed. Median GA 30 weeks (range 22-32), Median birth weight (BW) 1340grams (range 420- 2470). Mean cED by GA= 0.91 mSv for GA 22-24w, 0.48 mSv for GA 25-28w and 0.22mSv for GA 29-32w. Mean cED by BW= 0.90mSv for BW 420-700g, 0.48 mSv for 701-1000g and 0.24 mSv >1000g. Mean cED by LOS= 0.22 mSv for 0-90 days, 0.81mSv >90-180 days and 1.43 mSv >180days. 3.8% of subjects had at least 1 CT scan. Cumulative dose exceeded 0.5 mSv in 14% of cases.
CONCLUSIONS: PT infants are exposed to a higher cED than previously reported in the USA and Europe and this is most marked in extreme PT. Exposures are more than 6x higher in 22w compared to 32w infants. Efforts to minimize ionizing radiation exposure in NICU and increased use of non-ionizing radiation imaging studies are needed. Further investigation into the effects of radiation exposure on PT infant's cells is warranted.



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Fellow in Training

Utilization of Photographic Images during Prenatal Consultation to Potentially Alleviate Parental Stress and Anxiety Associated with Infants' Admission to a Neonatal Intensive Care Unit (NICU)

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BACKGROUND: Parents of extremely premature infants frequently experience significant anxiety, stress, and depression especially if prematurity was unanticipated. The unfamiliar and intimidating NICU environment may result in delayed maternal attachment. The initial visit to the infant in the NICU, especially those requiring highly technical, life-sustaining therapies, may lead to further emotional distress.
OBJECTIVE: To attempt to reduce the emotional and psychological stress associated with the initial parental visits to their infant in the NICU through the use of photographs intended to familiarize parents with the NICU environment, monitoring equipment, and invasive procedures.
DESIGN/METHODS: A NICU photo album was developed to be utilized with inpatient prenatal consults starting January 2012. Included were photographs of the NICU resuscitation room/patient rooms, monitoring devices and life-sustaining equipment. Pictorial representation of the range of head circumference and footprint sizes throughout gestation were included, as well as images of infants of various gestational ages. A survey was completed prior to the prenatal consultation, and again following delivery and NICU admission to assess parental emotions and experience with neonatal intensive care unit and procedures.
RESULTS: To date, a total of 54 prenatal and 25 post-delivery surveys were collected. In 96% of prenatal surveys, parents reported mixed emotions (anxious, sad, angry, nervous, scared, confused, denial). 100% of the parents consulted using the NICU photo album including those who had prior prenatal consults in previous admissions reported better understanding of their infant's expected size and hospital course. They appreciated the use of visual aids during the consult as an extra step taken by the physician to decrease their anxiety during their initial NICU visit. 100% of parents

recommended use of the NICU album during prenatal consults for other parents.
CONCLUSIONS: Providing information and photographs describing the NICU environment and potentially necessary equipment and procedures during the prenatal consult may help to alleviate some of the stress associated with preterm delivery and neonatal care. Use of the NICU photo album during the prenatal consult improves parental perception of the medical team's emotional support.

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Fellow in Training

Factors and Outcomes Associated with the Speed of Rewarming Hypothermic VLBW Infants

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BACKGROUND: Amongst very low birth weight (VLBW ≤1500 grams) infants, hypothermia (<36.5° C) at birth is associated with an increased risk of adverse outcomes. The World Health Organization (WHO) recommends that, "Newborns found to be hypothermic must be rewarmed as soon as possible." To date, no optimal speed for rewarming the cold infant has been identified.
OBJECTIVE: We seek to determine if there is a correlation between the speed of rewarming hypothermic VLBW infants and morbidities or mortality in these infants.
DESIGN/METHODS: This is a retrospective nested cohort study of VLBW infants born and resuscitated in Westchester Medical Center between January 1, 2010 and December 31, 2011 who were hypothermic upon NICU admission. Exclusion criteria include: major congenital malformation or genetic syndrome diagnosed in the antenatal or postnatal period. Hypothermic infants are categorized as having undergone rapid rewarming (≤1 hour to euthermia: ≥36.5° C) or not. The relationships of maternal, antenatal and infant conditions were correlated to **clinical outcome** variables (death, intraventricular hemorrhage, sepsis, Bronchopulmonary dysplasia, necrotizing enterocolitis, and periventricular leucomalacia). Categorical variables were compared utilizing chi square analysis. Student's T-test was used to compare continuous variables. P<.05 is considered significant. Results are based upon the interim review of 166/249 charts.
RESULTS: During this time, 92/166 (55%) of VLBW infants were hypothermic upon admission to the NICU. 44 infants were rapidly rewarmed and 48 took greater than 1 hour. Rapidly rewarmed infants were found to have a decreased incidence of IVH [9 (20.5%) v 19 (40.4%)]. Rates of all other **clinical outcomes** tested were similar. Of those variables which may affect the rate of rewarming and **clinical outcomes**, only (*rapidly rewarmed vs rewarming for greater than one hour*) maternal age (27.68 ± 6.26 v 30.79 ± 7.32) and cesarean delivery (70.5% v 87.5%) were associated with rewarming rates. There was no difference in initial temperature, birth weight, gestational age, five minute APGAR score or delivery room resuscitation between those who were rewarmed rapidly or not.
CONCLUSIONS: Hypothermia is a significant problem in VLBW infants. Based on preliminary data, rapid rewarming is associated with decreased incidence of IVH. Further study of optimal rewarming speed is needed to ensure best outcomes for VLBW infants.

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Respiratory Morbidity in Infants with Myelomeningocele

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BACKGROUND: The most common complications of myelomeningocele (MMC) include urologic, neurologic, and orthopaedic issues. However, there is no published data on respiratory morbidity in infants with MMC.
OBJECTIVE: The purpose of this observational study was to characterize the incidence of respiratory morbidity in late preterm and term infants with MMC.
DESIGN/METHODS: All late preterm and term infants admitted to the Children's Hospital of Philadelphia NICU between Aug 2008 and Sept 2012 with a diagnosis of MMC were included. Those delivered vaginally and those with other congenital anomalies were excluded. Records were reviewed for demographic data, repair type (fetal or postnatal) and respiratory support in the delivery room and in the first 24 hours in the NICU. The relationships between gestational age, type of repair, and need for respiratory support were modeled using logistic regression.
RESULTS: 100 infants met eligibility criteria, including 23 born late preterm. The median length of stay was 9 days (IQR 7-14). In the delivery room, 49% of the infants received some form of respiratory support and 33% required positive airway pressure. The majority (52%) of late preterm and a large portion (21%) of term infants required positive airway pressure in the following 24 hours in the NICU (see Table). As expected, the need for positive pressure in the NICU was inversely associated with gestational age (p=0.002) while type of repair was not associated with this outcome (p=0.124).

Respiratory Support in First 24 hours in NICU	Late Preterm (n=23)	Term (n=77)	Total (n=100)
None	9 (39)	46 (60)	55 (55)
Blow-by oxygen	1 (4)		1 (1)
Nasal cannula	1 (4)	15 (19)	16 (16)
High flow nasal cannula	1 (4)		1 (1)
CPAP/NIMV	5 (22)	16 (21)	21 (21)
Mechanical ventilation	6 (26)		6 (6)
Positive pressure	12 (52)	16 (21)	28 (28)
**Data presented as n(%)*			

CONCLUSIONS: The need for respiratory support is extremely high among infants with MMC, especially those born late preterm. Further research into the pulmonary development of fetuses with MMC may be warranted to help explain this finding.

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Defining Successful Extubation in Very Preterm Infants: What Is the Evidence?

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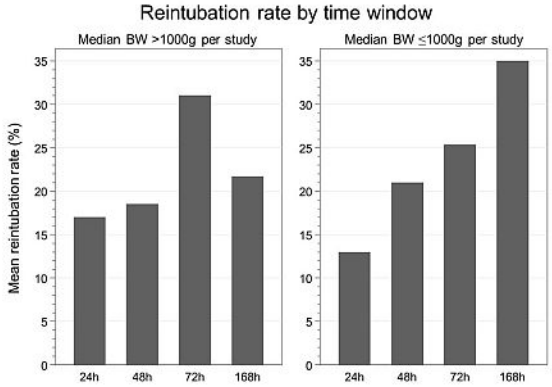
BACKGROUND: Studies of extubation strategies in very preterm infants often report the rate of reintubation within a pre-determined time window as their main outcome. However, the choice of the time window may not be evidence-based.
OBJECTIVE: To systematically review published studies for their definitions of extubation success and failure in very preterm infants.
DESIGN/METHODS: Eligible studies were published between 2002-2012 and reported reintubation as an outcome. Two independent observers abstracted trial characteristics, duration of the post-extubation observation window, reintubation criteria, and rates of reintubation. Relationships between trial characteristics and reintubation rates were modeled using linear regression.
RESULTS: Forty-four studies were eligible (κ=0.93), but only 27 (61%) defined extubation success and reported the rate of this outcome. The duration of observation after extubation varied from 12-168 hours with all but 3 studies using a window of at least 48 hours. Reintubation criteria were defined in 25 studies. Most studies used apnea (92%), acidosis (88%), FiO2 (80%) or PaCO2 (76%) with a wide range of cutoff values. The mean±SD reintubation rate across all studies was 24±11%. In studies of infants with median birth weights ≤1000g, the reintubation rate increased with longer duration of observation (p=.001), in contrast to studies of larger infants (p=0.37) (Figure).



CONCLUSIONS: The definition of extubation success varies greatly in recent studies of very preterm infants. Investigators studying extremely low birth weight infants should consider post-extubation observation periods of at least one week in order to accurately measure extubation success or failure.

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House Officer

Does Extremely Preterm Infants Needs Screening for Retinopathy of Prematurity Earlier Than 31 Weeks Post Menstrual Age?

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BACKGROUND: The guidelines for screening and treatment of retinopathy of prematurity (ROP) was revised by the American Academy of Pediatrics (AAP) in 2006. The first screening for ROP is performed at 31 weeks postmenstrual age (PMA) in premature infants born at < 27 weeks of gestation. The retinal findings that required ablative therapy was also modified and the treatment was recommended for less severe ROP. At our institution ROP screening is initiated earlier than 31 weeks PMA (at 4 weeks corrected age) for extremely premature infants.
OBJECTIVE: To determine the utility of screening all extremely preterm infants for ROP earlier then AAP suggested guidelines.
DESIGN/METHODS: This study is a retrospective data analysis from a single center for preterm infants (< 27 weeks) born between 06/2006 and 08/2012 and survived till first eye examination. The eye examination findings and PMA for laser therapy were extracted from the database.
RESULTS: 165 infants were included (23 w = 23, 24 w = 44, 25 w = 51 and 26 w = 47). 58 infants were screened before 30 weeks PMA, 57 (98%) had immature eyes and only one infant had stage 1 ROP. However, at 30 weeks PMA 2 infants met the criteria for laser therapy and at 31 weeks 3 additional infants received laser therapy.

	27 w PMA (10)	28 w PMA (18)	29 w PMA (30)	30 w PMA (56)	31w PMA (52)
Immature	10	18	27	42	17
ROP stage 1	0	0	1	7	17
ROP stage 2	0	0	0	1	4
ROP stage 3	0	0	0	2	3
Plus disease	0	0	0	2	3
Meeting criteria for laser therapy	0	0	0	2	3

CONCLUSIONS: Extremely premature infants born before 27 weeks gestation may not need screening for ROP before 30 weeks PMA. As two infants developed ROP at 30 weeks PMA which required laser therapy, premature infants born before 27 weeks may benefit with earlier ROP screening at 30 weeks PMA.

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Abstract Withdrawn

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Fellow in Training

Acute Effects of Hyperoxia on Gene Expression in Lipopolysaccharide-Treated Newborn Rat Lung

Jagadish Elumalai, Esther Speer, Avinash Chander.
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BACKGROUND: Perinatal infection and oxygen toxicity play a significant role in the pathogenesis of bronchopulmonary dysplasia. The net effect of the injurious insults is a persistent airway inflammation.

OBJECTIVE: To evaluate acute effects of short term hyperoxia on expression of genes associated with inflammation, antioxidant defense and lung development in newborn rat lung following intranasal lipopolysaccharide (LPS) administration.

DESIGN/METHODS: Sixteen Sprague-Dawley rat pups (2-day-old) were randomized to receive intranasal LPS (10µg/5µl) or normal saline (n=8 in each group). After 24hrs, four rat pups from each group were exposed for 6hrs to hyperoxia (100% O_2) or room air. Immediately after this exposure, lung tissue was harvested and RNA extracted. Real-time PCR was performed with a custom-made TaqMan array plate containing 43 target genes (associated with inflammation, antioxidant defense and lung development). All values were normalized to the housekeeping gene, ß-actin. One-way ANOVA test with bonferroni's correction was used to compare the changes in mRNA expression, among different groups compared to saline-room air group. Results were considered significant at $p < 0.05^*$.

RESULTS: The mRNA for two inflammation associated genes Interferon-γ and Macrophage inflammatory protein-1α were higher by 94% and 32% respectively with combined but not with individual insults. Hyperoxia down-regulated immune response signaling genes like Myeloid differentiation primary response gene-88* by 47%, Toll-like receptor 2 (31%), Interleukin-1 receptor-associated kinase 4 (33%), Nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-α (28%) and this change was prevented by prior exposure to LPS. Pre-exposure to LPS also prevented hyperoxia down-regulation of endothelial cells marker Angiotensin converting enzyme-2* by 36%, type-2 alveolar epithelial cell marker Surfactant protein A1* (32%), as well as, antioxidant genes like NADPH oxidase p91 subunit* by 49% and Heme Oxygenase-1 (22%).

CONCLUSIONS: This animal model indicates that short term hyperoxia and airway LPS exposure have an additive effect on pro-inflammatory cytokine expression. Conversely LPS pretreatment followed by hyperoxia prevented the down-regulation of lung remodeling, antioxidant and Toll-like receptor signaling genes. Our study suggests that prior exposure of the newborn lung to LPS has potentially differential effects on gene expression upon exposure to short term hyperoxia.

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Fellow in Training

Expression Profiling of microRNAs Related to Heme Oxygenase-1 in a Mouse Model of Hyperoxic Lung Injury

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Pediatrics, University of Pennsylvania, Philadelphia, PA.

BACKGROUND: Lung heme oxygenase-1 (HO-1), the rate-limiting enzyme of heme degradation and an antioxidant defense protein, is induced in animals exposed to hyperoxia. We have previously demonstrated that despite increased HO-1 protein levels, neonates don't induce HO-1 mRNA in response to hyperoxia whereas adults do, suggesting that there may be posttranscriptional modification of HO-1 in the newborn lung. MicoRNAs (miRNAs) are noncoding RNAs play essential roles in numerous cellular and developmental. They bind to the 3'UTR of target genes and thereby repress translation. We hypothesize that developmental changes in miRNA expression in the lung may explain the discrepancy between HO-1 protein and mRNA expression after exposure to hyperoxia in newborns.

OBJECTIVE: To determine whether miRNAs and HO-1 related target genes are altered in the newborn lung exposed to hyperoxia.

DESIGN/METHODS: Neonatal mice were exposed to 21% or 95% O_2 for 3 days. Lung HO-1 protein and mRNA levels were determined by Western blot and q-PCR, respectively. Lung RNA was extracted from whole lung homogenates using mirVANA-RNA isolation kit (Applied Biosystems, Carlsbad, CA). A total of 335 miRNAs were analyzed using TaqMan Low Density Arrays(TLDA rodent miRNA v1.0; Applied Biosystems, Carlsbad, CA). Potential miRNA gene targets were identified using the TargetScan version5.1 (http://www.targetscan.org/index.html) search engines.

RESULTS: 10 miRNAs were significantly (>2.0 fold) down-regulated in response to hyperoxia (miR-370, miR-335-3p, miR-298, miR-409-3p, miR-543, miR-134, miR-376b, miR-296-3p, miR-503, and miR-351; and 10 were significantly up-regulated (miR-29b, miR-34a, miR-582-3p, miR-29c, miR-328, miR-296-5p, miR-582-5p, miR-551b, miR-29a, and miR-155). Of these miR-298, miR-409-3p, and miR-543 were increased whereas miRNA, miR-582-3p, miR-551, miR-582-5p were decreased during embryonic and early postnatal development. MiR-155, which binds to Bach1 mRNA, was identified as a potential miRNA related to HO-1 and was also significantly up-regulated in response to hyperoxia.

CONCLUSIONS: Hyperoxia alters lung miRNA profiles in the newborn. Since Bach1 injhibits HO-1 protein expression in vitro, we speculate that up-regulated miR-155 in neonatal lungs exposed to hyperoxia could reduce Bach1 protein levels and subsequently increase HO-1 protein levels in vivo.

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House Officer

Correlates of Term and Preterm Infants Undergoing Unattended Sleep Studies

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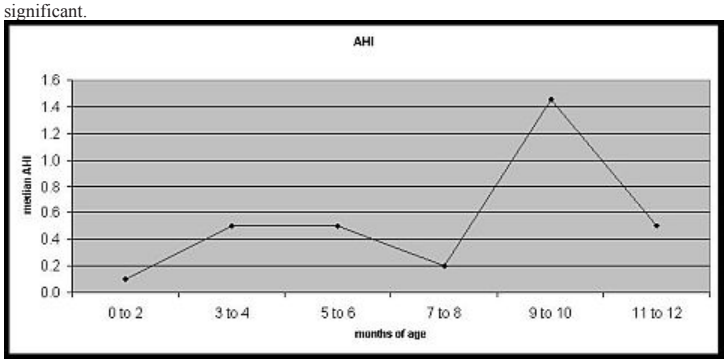
BACKGROUND: Preterm and term infants are not routinely evaluated by unattended sleep studies before the age of 2 years. However, there is increasing concern that obstructive sleep apnea remains an underdiagnosed condition and linked to cognitive and physiological sequelae. Obstructive hypopnea is more common in this age range and has been hypothesized as a risk factor in the development of obstructive apnea.

OBJECTIVE: To characterize the frequency and nature of all respiratory events in infants and children under the age of 2 years during clinically indicated unattended sleep studies.

DESIGN/METHODS: Obstructive hypopneas, obstructive apneas, and central apneas were reviewed from unattended polysomnography studies performed between 10/2011 and 10/2012 at a pediatric hospital on children < 24 months. Studies were perfomed utilizing Somnostar somnographic equiptment following standard protocol for pediatric studies. The apnea hypopnea index (AHI)= total number of obstructive apneas, hypopneas, central apneas and mixed apneas divided by total sleep time in hours. All values were compared by Student's t test with $p<0.05$ as significant.



RESULTS: Studies and clinical records were retrospectively reviewed of 32 patients, mean age of 8.5 months ± 5 months, 34% preterm and 66% term gestation, p value for age NS. There were 21 males and 11 females who presented with indications for study: snoring (38%), apnea monitor alarms (18%), ALTE (9%), not otherwise specified (9%), stridor (3%), difficulty breathing (3%). The AHI was 0.5 ± 19.4 for preterm and 0.5 ± 1.2 for term, p NS These data are represented in graphic form demonstrating a peak in AHI approaching 12 months of age for both preterm and term infants.

CONCLUSIONS: These data represent a trend in increased AHI and snoring as a presenting symptom in infants younger than previously reported. This may suggest that these infants are at increased risk for obstructive events as they mature. This also brings into question whether infants should be considered for evaluation and intervention at a younger age.

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LPS Induced Chorioamnionitis Decreases Sirtuin1 and HDAC2 in Fetal Membranes and Lungs of Neonatal Rats

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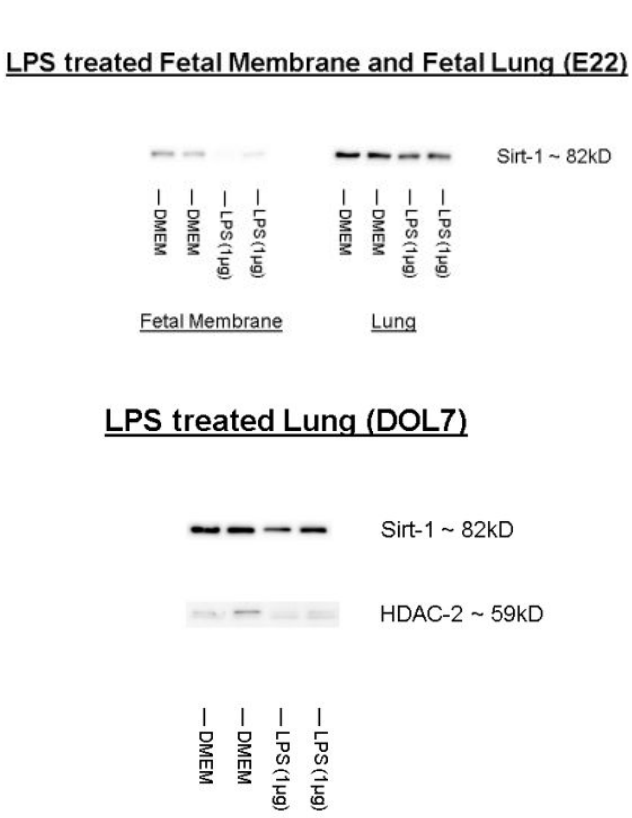
BACKGROUND: Histone deacetylases (HDACs) inhibit gene expression by blocking the binding of transcription factors to DNA promoter sequences. HDAC's plays a role in regulating key inflammatory mediators. Sirtuin1 (SIRT-1) and HDAC-2 are histone deacetylators and are protective against inflammation.

OBJECTIVE: To study the effects of LPS induced chorioamnionitis on expression of SIRT-1 and HDAC-2 in fetal membranes and fetal/neonatal lungs in a rat model.

DESIGN/METHODS: Timed Pregnant Sprague-Dawley Rats were anesthetized on gestational day of 20 (E20) and either DMEM (control) or 1µg of LPS was injected in to the amniotic sac. In one group fetal membrane and fetal lung tissues were collected on gestational day of 22 (E22). In another group, dams were allowed to give birth and pups were harvested for lung tissue collection on day of life 7 (DOL7). Nuclear proteins were extracted from both fetal membrane and lung tissues followed by analysis for SIRT-1 and HDAC-2 by Western Blot.

RESULTS: LPS treated fetal membrane showed significant percent decrease in both SIRT-1 (87.3 ± 9.82) and HDAC-2 (60.2 ± 8.12) as compared to the control on E22 (figure 1). However, the lung showed a little decrease in SIRT-1 (7.61 ± 3.65) and HDAC-2 (16.0 ± 0.21). The LPS effect further persisted in lung when tested for SIRT-1 (a decrease of 41.79 ± 23.83 %) or HDAC-2 (a decrease of 53 ± 1.29%) on DOL7 as compared to control lung (figure 2).



CONCLUSIONS: In a rat model, LPS induced chorioamnionitis reduced SIRT-1 and HDAC-2 expressions in fetal membranes and fetal/neonatal lungs.

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Fellow in Training

Hyperoxia Regulates the Circadian Rhythm Gene Rev-ERBa in the Neonatal Lung

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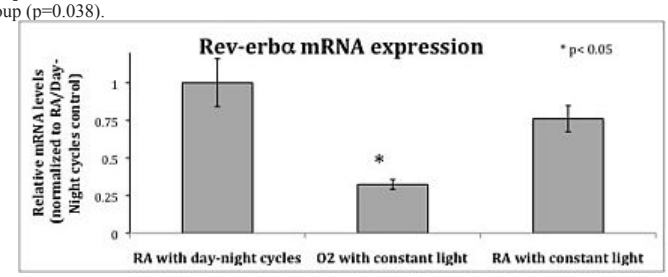
BACKGROUND: Exposure to cigarette smoke (oxidative stress), nutrient content, meal timing, drug administration have been associated with changes in lung circadian gene expression and lung function. Previously we showed that hyperoxia regulated Rev-erba expression in vitro, however, the role of circadian genes, especially Rev-erbα, in the developing lung in response to stressors such as hyperoxia is not clear. Given its roles in integrating various antioxidant and metabolic pathways as well as differentiation, we hypothesized that the expression of the key circadian genes. Rev-erbα, Bmal and Per1, is regulated by hyperoxia in neonatal mice.

OBJECTIVE: Given its roles in integrating various antioxidant and metabolic pathways as well as differentiation, we hypothesized that the expression of the key circadian genes. Rev-erbα, Bmal and Per1, is regulated by hyperoxia in neonatal mice.

DESIGN/METHODS: Newborn (<12 hours old) C57Bl/6 mice pups were exposed to >95% O_2 for 0-72 hrs (O_2) or room air (RA) with day-night cycling along with the nursing dams. To control for the effect of light, mice were also placed in constant (24 hrs) light and RA. The lungs removed on the third day after the exposure and assayed for steady state mRNA levels of Per1, Rev-erbα and Bmal.

RESULTS: For per1, Bmal and Rev-erbα genes, the highest mRNA levels were observed in the RA/day-night cycle group (baseline). While the Rev-erbα mRNA levels decreased upon exposure to O_2 as well as constant light, the decrease was statistically significant only for the hyperoxia group (p=0.038).



The mRNA levels of Per1 and Bmal also decreased in the constant light and O_2 groups, but these decreases did not reach statistical significance.

CONCLUSIONS: Lung Rev-erbα mRNA levels are altered in the neonatal mouse lung after exposure to hyperoxia, but not to constant light alone. We speculate that, unlike other circadian genes, Rev-erbα may be unique in its cytoprotective role in the neonatal lung undergoing oxidative stress.

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Fellow in Training

Using Lung Ultrasound To Diagnose TTN and HMD in Neonates ≥ 28 Weeks Gestation

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BACKGROUND: Hyaline Membrane Disease (HMD) and Transient Tachypnea of the Newborn (TTN) are common neonatal respiratory disorders with overlapping clinical presentations, gestational ages, and radiographic pictures. Ultrasonographic findings may distinguish these disorders; however, data comparing diagnoses and disease severity by lung ultrasound with those by chest radiograph and clinical impression are lacking.

OBJECTIVE: This study aims to determine if ultrasound (1) can predict severity of clinical course and (2) is diagnostically consistent with chest radiograph and clinical impression.

DESIGN/METHODS: We conducted a prospective study of infants ≥28 weeks gestation admitted from 10/15/11 to 10/15/12 with respiratory distress. A group of similar but well patients were enrolled as controls. Demographic data, duration of respiratory support (DRS), surfactant administration, radiographic diagnosis, and clinical diagnosis were collected. An expert blinded to clinical data determined ultrasonic diagnoses and percentage B-line confluence (PBC). Primary outcome was to correlate ultrasound PBC with DRS. Secondary outcomes were comparisons of ultrasound diagnoses with those by radiograph and clinical impression.

RESULTS: 33 neonates (920–4430 gm; 28-40 weeks) were enrolled. 14 had clinical diagnosis of TTN; 12, HMD; and 7, normal. DRS ranged from 0-1495 hours. Linear regression gave significant correlation of DRS with PBC (R=0.496, p=0.003), improved by gestational age in a multivariable model (R=0.590, p=0.038) but not by birthweight, age at ultrasound, maternal steroids, surfactant and mode of delivery. Ultrasound had a sensitivity of 77% and specificity of 100% to diagnose HMD (using clinical diagnosis as gold standard) as compared to chest radiograph which had a sensitivity of 77% and specificity of 95%.

CONCLUSIONS: Although this limited data do not allow us to determine whether ultrasound can distinguish HMD from TTN, this pilot study suggests that PBC on lung ultrasound is predictive of duration of respiratory support. Ultrasound was as sensitive, and slightly more specific than chest radiograph to diagnose HMD.

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Fellow in Training

Anti-Gastroesophageal Reflux Surgery in Infants with Severe Chronic Lung Disease

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BACKGROUND: Gastroesophageal reflux (GER) may exacerbate respiratory disease in infants with chronic lung disease (CLD). Anti-GER surgery may therefore reduce the severity of this disease in some infants.

OBJECTIVE: Evaluate change in several clinical measures of CLD severity following Anti-GER surgery.

DESIGN/METHODS: Retrospective case series of infants with severe CLD (by NIH consensus definition) undergoing anti-GER surgery between Sept. 2010 and April 2012 at one tertiary center. Disease severity was measured by mode of support, inspired oxygen (FiO_2), and maximum respiratory rate on 5 days spaced over 2 weeks directly pre-op and on the day 2 weeks post-op. For ventilated patients, a composite score of mean airway pressure x FiO_2 was calculated. Values recorded 1 day pre-op and 2 weeks post-op were compared using paired t-tests or Wilcoxon sign rank tests. In the case of a significant difference (p<0.05), generalized estimating equations were used to compare all pre-op to post-op values.

RESULTS: We identified 22 infants. Three had shortened follow-up due to early transfer, in which case values from the last admitted day were used. Mean gestational age was 26.4 weeks (range 23-30) and birth weight 853g (range 510-1390). Mean conceptual age at surgery was 52.5 weeks (range 47.3-65.6). Nissen fundoplication was performed in all but one infant, who underwent a Toupet. All procedures were well tolerated. Nine also underwent tracheostomy during their admission and all but one received post-pyloric feeds for at least 2 weeks pre-op. Prior to surgery, 10 patients were managed with mechanical ventilation (6 via tracheostomy) and 12 with nasal positive pressure. By 2 weeks post-op all had returned to their pre-op mode of support except 2 who remained intubated after being on nCPAP. Of the recorded measures, only FiO_2 changed significantly with a median of 35% (IQR: 28-40) 1 day pre-op compared to 30% (IQR: 26-40; p<0.001) 2 weeks post-op. In the longitudinal model comparing all pre-op to post-op values, the difference remained significant (p = 0.02).

CONCLUSIONS: Fundoplasty can be safely performed in infants with severe BPD. In this series, respiratory disease severity did not rapidly improve post-op, although a modest but significant reduction in FiO_2 was observed. Efficacy and timing of anti-GER surgery in infants with CLD needs further evaluation. Outcomes such as simplification of care and ability to safely administer gastric feeds should be considered.

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Fellow in Training

Monitoring Tidal Volume (Vt) on Neonatal Transport: Opportunity for Improvement in Ventilator Management

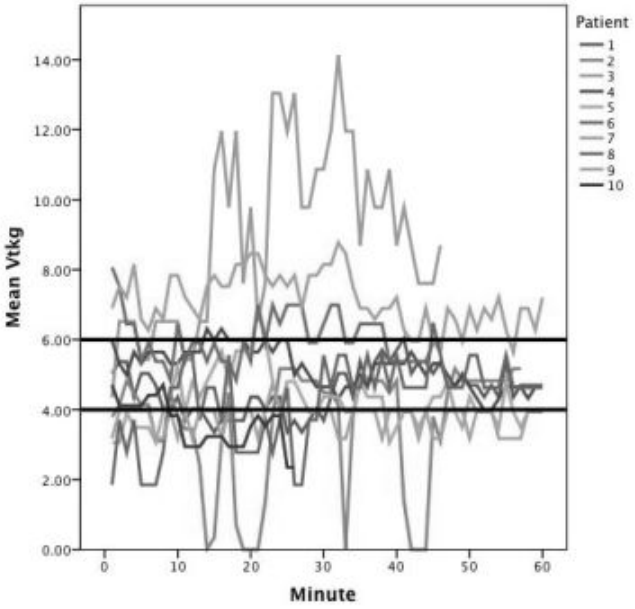
Jennifer J. Hesler, Robert Locke, John Emberger, Theresa McGreevy, Amy M. Mackley, Wendy Sturtz, Tamie Hotchkiss, Tammy Search, David A. Paul.
Pediatrics/Neonatology, Christiana Care Health System, Newark, DE.

BACKGROUND: Ventilator associated lung injury is an important risk factor in the development of bronchopulmonary dysplasia. While volume-targeted ventilation modes using appropriate tidal volume (4-6 mL/kg) may provide lung protection, mechanical ventilation during transport is usually limited to time cycled pressure limited ventilation (TCPL). Transport often involves situations in which there is changing pulmonary compliance and delivery of Vt may be variable using the transport TCPL ventilator.

OBJECTIVE: To determine if Vt during neonatal transport is maintained within the recommended 4–6 mL/kg range.

DESIGN/METHODS: This performance improvement project included intubated and ventilated infants transported to or from Christiana Care Health System NICU. Vt/breath was measured and transport personnel were blinded to the measurement. Goal Vt was defined as 4-6 mL/kg. Transports were supervised by a transport nurse, a neonatal nurse practitioner, and respiratory therapist all experienced in the NICU setting. IRB approval was obtained prior to start of study.

RESULTS: In our initial study sample (n=10), gestational age ranged from 26 to 40 weeks and weight from 0.92 to 3.44 kg. One infant (10%) had Vt within the desired range (4-6 mL/kg) >95% of the transport time. The remaining infants were within the desired Vt range 11% to 83% of the transport time. With increasing time of transport, the Vt/kg was more likely to be out-of-range (p=0.024). Patients with higher weights were more likely to have Vt out-of-range (p=0.032).



CONCLUSIONS: Our study sample reveals a significant problem with excess or insufficient tidal volume using TCPL ventilation mode during neonatal transport. Opportunities exist to engage in strategies that could reduce the risk of volutrauma during neonatal transport.

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Fellow in Training

Isolation of Urinary Exosomes in Neonates To Determine Presence and Development of Renal NA+ Transporters

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BACKGROUND: Furosemide is routinely administered to premature newborns with pulmonary or cardiac disease. While this drug effectively promotes a diuresis in these infants, animal studies predict that the target of furosemide, the Na-K-2Cl cotransporter (NKCC2) in the renal thick ascending limb of Henle, is either not present or is minimally active in fetal life. These observations raise a question as to the mechanism of action of furosemide in this population of neonates. To the extent that urinary exosomes, 30-100 nm vesicles secreted into urinary fluid and representing invaginations of the apical cell membrane of the cell from which they are derived, contain integral membrane proteins, mRNAs, and other cytosolic components, their isolation and analysis provides a noninvasive tool to assess the developmental state of maturation of the kidney.

OBJECTIVE: To trace the developmental expression of total RNA encoding major Na transporting proteins expressed sequentially along the nephron: NKCC2, the Na-Cl cotransporter (NCC) and epithelial Na channel (ENaC), in urinary exosomes collected from a cohort of premature newborns.

DESIGN/METHODS: A >6 ml sample of urine is collected at birth and then at regular intervals from newborns born at <28 wks gestation age (GA). Exosomes are isolated using a differential ultracentrifugation technique (Pisitkun et al, 2004) Exosome RNA is quantified using RT-PCR using the Taqman assay, with primers and probes specific for target genes.

RESULTS: Initial studies reveal that we are able to detect total RNA for actin and ENaC in ~6 ml of urine collected from premature infants, a volume significantly lower than that needed in adults (~60 ml in parallel experiments ongoing in our lab), suggesting that developmental changes in membrane properties may modulate the efficiency of exosome release. In 3 initial subjects, steady state abundance of NKCC2 increases with GA when normalized to uromodulin as a housekeeping gene.

CONCLUSIONS: The ability to detect RNA in urinary exosomes from premature infants allows us to explore concordance between results of studies performed in animal models with the observed physiology of the developing human subject. Molecular data will be interpreted in the context of our ongoing longitudinal analysis of Na and water balance in the same infants to ultimately determine whether furosemide's actions in the premature infant reflects inhibition of its presumed target (NKCC2).

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House Officer

Relationship of Urinary Excretion of Magnesium, Potassium, Sodium and Calcium with Arterial Blood Pressure

Ameya P. Patil, Susana Rapaport, Kelly Cervellione, Fernanda Kupferman, Robert P. Woroniecki.
Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Pediatric Nephrology, Columbia University Medical Center, New York, NY; Research, Jamaica Hospital Medical Center, Jamaica, NY.

BACKGROUND: Hypertension is a modifiable risk factor for cardiovascular disease. Lower dietary intake of magnesium (Mg) and potassium (K), and higher intake of sodium (Na) and calcium (Ca) have been associated with elevated blood pressure (BP) in adults. Physiologic 24-hour urinary excretion (U24) of these ions can reflect their bodily levels in adults. The associations of U24 Mg, Na, Ca and K with BP have not been studied in children and adolescents.

OBJECTIVE: To determine the association of U24 Mg, K, Ca and Na with BP measurements in children and adolescents.

DESIGN/METHODS: We collected data retrospectively from 176 subjects referred to nephrology clinic for hematuria/crystalluria. Patient height, weight, BPs and U24 for Mg, K, Ca and Na were recorded and used to compute U24/body weight for each ion: Mg/kg (MgWT), K/kg (KWT), Ca/kg (CaWT) and Na/kg (NaWT). Indexed BPs (adjusted to 95th percentile for age, gender and height) were calculated for systolic (SBPi), diastolic (DBPi) and mean arterial (MAPi) BPs for each patient. Body-mass indices (BMI) were calculated, and BMI Z- and height Z-scores (HtZ) noted. Subjects with glomerulonephritis, structural renal abnormalities, or on medications were excluded. Descriptive data were analyzed with percentages, means and standard deviations. Relationships between MgWT, KWT, CaWT, NaWT and BPs were analyzed using Pearson correlations, and between HtZ and NaWT and CaWT by Spearman correlation. A p-value < 0.05 was considered significant.

RESULTS: Of the 176 subjects, 63 were female; mean age was 11.1±4.4 years, and mean BMI Z-score was 0.38±1.8. There were significant negative correlations between MgWT and both DBPi and MAPi, and between KWT and both SBPi and MAPi. NaWT and CaWT did not have significant correlations to BP indices (TABLE), nor were there significant correlations between NaWT and CaWT and HtZ.

U24	SBPi (p)	DBPi (p)	MAPi (p)
MgWT	-0.102 (0.177)	-0.278 (<0.001)	-0.231 (0.002)
KWT	-0.154 (0.041)	-0.144 (0.057)	-0.163 (0.031)
NaWT	-0.028 (0.715)	-0.080 (0.292)	-0.066 (0.387)
CaWT	0.108 (0.152)	-0.033 (0.668)	0.026 (0.735)

CONCLUSIONS: In children, lower U24 of Mg and K were associated with higher BPs, consistent with adult data. In contrast, BPs in children did not seem to correlate with U24 levels of Na and Ca. U24 of Na and Ca might be influenced by linear growth; however, we found no correlations between NaWT or CaWT and HtZ.

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Abstract Withdrawn

Emergency Medicine II
Platform Session

Sunday, March 24, 2013
9:45am–12:00pm

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9:45am

House Officer

Analgesia for Appendicitis in Children in Pediatric and General Emergency Departments

Kristen Delaney, Alexis Pankow, Jeffrey Avner, Joni Rabiner.
Pediatric Emergency Medicine, Children's Hospital at Montefiore, Bronx, NY.

BACKGROUND: Appendicitis is a significant cause of pain in the emergency department (ED), and studies have shown that analgesia significantly improves pain without affecting time to diagnosis or morbidity. It has also been shown that analgesia is utilized less frequently in children with appendicitis compared with adults.

OBJECTIVE: To compare analgesia prescribing practices and timing of analgesia administration between pediatric emergency medicine (PEM) and general emergency medicine (GEM) practitioners for children with appendicitis. Secondary objectives are to compare analgesia administration vs. triage pain score, pediatric appendicitis score (PAS), and body mass index (BMI).

DESIGN/METHODS: This was a retrospective chart review of patients < 21 years who presented

to an urban pediatric ED staffed by PEM physicians vs. 2 urban general EDs staffed by GEM physicians from July 2011 to June 2012 and were diagnosed with appendicitis. Charts were reviewed for patient demographics, clinical characteristics, and times to physician evaluation, analgesia administration, and imaging studies. PAS and BMI were calculated for each patient.
RESULTS: 218 charts were reviewed, 153 (70%) from the pediatric ED and 65 (30%) from the general EDs. Patients seen by PEM physicians were younger than patients seen by GEM physicians (mean 12.8 vs. 15.4 years, p=0.002). There was no difference in sex, triage pain score, time to physician evaluation, duration of abdominal pain, vomiting, fever, rebound, leukocytosis, PAS score, or time to ultrasound study between patients seen by PEM and GEM physicians (p=NS). Patients seen by GEM physicians had a higher mean BMI than patients seen by PEM physicians (25.9 vs. 23.5, p=0.021). Patients evaluated by GEM physicians were more likely to receive analgesia in the ED (82% vs. 60%, p=0.003) and received analgesia sooner (mean 178 vs. 239 minutes, p=0.026) than patients evaluated by PEM physicians. Patients with triage pain scores >/= 6 were more likely to receive analgesia than patients with pain scores < 6 (71% vs. 51%, p=0.015). There was no association between PAS or BMI and analgesia administration or time to analgesia (p=NS).
CONCLUSIONS: Patients with appendicitis evaluated by GEM physicians were more likely to receive analgesia and received analgesia more quickly than patients evaluated by PEM physicians. Patient with higher pain scores were more likely to receive analgesia, but PAS and BMI did not affect analgesia administration.

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10:00am

House Officer

Observation after Racemic Epinephrine for Croup in the Pediatric Emergency Department

Julia R. Tokarski, Jeffrey R. Avner, Joni E. Rabiner.
Pediatric Emergency Medicine, Children's Hospital at Montefiore, Bronx, NY.

BACKGROUND: Nebulized racemic epinephrine (RE) is used for the rapid treatment of stridor or respiratory distress in croup. Due to the short half-life of RE, it is standard practice to observe patients who receive RE prior to discharge home to ensure that stridor or respiratory distress does not return as the medication wears off. While data in the literature suggest that the effects of RE dissipate within 2 hours of administration, there is limited data regarding the recommended length of observation after administration of RE, with suggested periods of observation up to 4 hours.
OBJECTIVE: To determine the length of observation necessary for children with croup treated with RE in the emergency department (ED) prior to discharge home.
DESIGN/METHODS: This was a retrospective chart review of patients < 21 years who presented to the ED between July 2008 and June 2012, diagnosed with croup, and treated with RE. Chart review included patient demographic and clinical characteristics, timing of RE administration, other interventions performed, disposition from the ED, and time of ED discharge.
RESULTS: 183 patients were enrolled with a mean age of 2.2 years (SD 2.1). Patients had respiratory symptoms for a mean of 32.1 hours (SD 28.3) prior to the ED visit, and 50 (27%) patients had a history of croup. 157 (86%) patients had stridor, and 81 (44%) patients had retractions. In addition to RE, 174 (95%) patients received dexamethasone. For the 48 (26%) patients requiring a second dose of RE in the ED, the median time between the first and second doses of RE was 135 minutes (25^{th} to 75^{th} IQR 79.5 to 192.5 minutes). For the 107 (58%) patients receiving only one dose of RE and discharged home, the median time of observation in the ED was 217 minutes (25^{th} to 75^{th} IQR 167 to 260 minutes).
CONCLUSIONS: The majority of patients requiring a second dose of RE for the treatment of stridor or respiratory distress due to croup in the ED required the second dose of RE over 2 hours after the first dose. Patients receiving RE for croup should be observed for 3-4 hours in the ED prior to discharge home.

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10:15am

Fellow in Training

Performance in Trauma Resuscitation at a Pediatric Trauma Center

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Emergency Medicine, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: The role of the surveyor in trauma resuscitations is to identify life-threatening injuries and is meant to be conducted by a set protocol for every patient. Pediatric residents infrequently perform this role and data on their performance is lacking.
OBJECTIVE: To summarize primary and secondary survey performance in pediatric trauma resuscitation and determine association between provider characteristics and survey quality.
DESIGN/METHODS: Retrospective review of ED trauma activations captured by videorecording between 06/2009 and 12/2011. Video recorded resuscitations were reviewed and survey performance was scored using a novel assessment tool applying a trichotomous scoring system (0, 1, or 2 points) for each essential element (airway, breathing, circulation, etc.) accounting for quality, sequence, and timing of assessments. Maximum score was 8 points for the primary survey and 22 points for the secondary survey. Time to completion of survey elements was recorded. Chart review identified surveyor characteristics (level of training, type of training program). Descriptive statistics and univariate analysis was performed.
RESULTS: Of 663 eligible trauma activations, 209 consented for enrollment with complete data for 186 patients. PGY-3 residents performed 45% of surveys; PGY-2 23%, PGY-4 12%, and PGY-1 7%. Pediatric residents performed 46% of surveys, emergency medicine (EM) residents 39%, and PEM fellows 8%. Median scores on primary and secondary surveys were 7 and 12; median time to completion was 82 seconds and 254 seconds, respectively. Only 23% of primary surveys and 0% of secondary surveys were performed completely. PEM fellows had the highest mean score on primary (7.17) and secondary survey (12.64). PEM fellows took longest to perform primary survey (94 seconds) and shortest to complete secondary survey (219 s). Mean scores on primary and secondary survey were not significantly different between pediatric and EM residents (6.8 vs. 6.7; 12.4 vs. 11.4). There was no association between survey scores and level or type of training. EM residents spent less time on the secondary survey (250 s vs. 294 s, p=0.044).
CONCLUSIONS: Primary and secondary surveys are frequently performed incompletely regardless of level of training or type of training program. There is no difference in measured performance among different programs. The impact of trauma resuscitation education on improved survey performance should be studied prospectively.

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10:30am

House Officer

Capnography during Critical Events in the Emergency Department: Impact of the 2010 American Heart Association Guidelines

Adam Bullock, Melissa L. Langhan.
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BACKGROUND: The 2010 American Heart Association (AHA) Adult and Pediatric Advanced Life Support guidelines recommend the routine use of capnography to confirm and monitor endotracheal tube (ETT) placement and during cardiopulmonary resuscitation (CPR) as a guide to effective compressions, as well as to detect the return of spontaneous circulation (ROSC). It is unclear whether these updates are being adhered to in the Emergency Department (ED) and the impact capnography has on these critical events.
OBJECTIVE: To determine if the new guidelines have led to improved use of capnography for CPR and ETTs by Pediatric Emergency Medicine trained physicians and how capnography affected those events.
DESIGN/METHODS: A retrospective chart review was performed on children age birth to 21 years who were intubated or received CPR in an urban, tertiary care Pediatric ED between January 2009 and September 2012. Potential patients were identified through the hospital database as those that accrued both ED and intensive care unit charges or who expired in the ED. Two investigators extracted data and resolved discrepancies by consensus. Age, gender, time of arrival, medical or traumatic cause, length and success of CPR, documented use of continuous waveform capnography and colorimetry (eg. EasyCap), capnography values, and adverse events were recorded.
RESULTS: In this ongoing study, 142 patients were identified and analyzed. Median age was 2 years, 62% male; 74% of events were medical and 26% traumatic in origin. While 97% of cases were intubated, colorimetry was documented in 78% (110/142) and capnography in 54% (77/110). Colorimetry detected 5 esophageal intubations (5%). CPR occurred in 39 cases (27%) with mean length of resuscitation being 25 minutes and ROSC in 15 subjects (38%). Capnography was only used in 17% of all CPR cases. There were no significant differences in the use of capnography before and after the AHA guidelines for ETTs (55% vs. 53%) or CPR (18% vs 17%). Capnography was used significantly less often if CPR was performed ($p<0.001$), but was associated with longer length of CPR (32min vs. 24 min) when used. There was no significant difference in capnography use by medical vs. traumatic cause.
CONCLUSIONS: In our institution, the 2010 AHA recommendations have not impacted actual use of capnography in patients who are intubated or receive CPR. Further education and promotion of capnography should take place to improve implementation of these guidelines.

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10:45am

Fellow in Training

Rapid Trichomonas Testing for Adolescents with Suspected Sexually Transmitted Infections (STIs) in the Emergency Department (ED)

Heather M. Territo, Gale R. Burstein, Scott Bouton, Brian Wrotniak, Haiping Qiao.
Pediatric Emergency Medicine, Women and Childrens Hospital of Buffalo, Buffalo, NY; Pediatrics, SUNY at Buffalo School of Medicine and Biomedical Sciences, Amherst.

BACKGROUND: Trichomonas vaginalis (TV) is a common STI. TV diagnosis is often based on microscopy exam of vaginal secretions which has 60-70% sensitivity. The OSOM Trichomonas Rapid Test (Sekisui Diagnostics) is a CLIA-waived, point of care test with a sensitivity >83% and results in 10 minutes.
OBJECTIVE: The study purpose was to determine if making a systems change of adding TV testing to all routine STI laboratory evaluations increased TV diagnoses in the ED.
DESIGN/METHODS: Setting: Western New York State (NYS) urban, academic children's hospital ED. Population: 13 – 20 year old females presenting to the ED and evaluated for STIs. Time periods: Study time 1 (T1) was prior to routine TV ED testing implementation: April to September, 2011; Study time 2 (T2) was after TV testing was incorporated as part of routine ED STI evaluation: November, 2011 to October 2012. Methods: We performed a retrospective review of consecutive medical records of eligible patients during T1. We conducted a prospective study of enrolled females who presented to the ED with suspected STI during T2. An OSOM Trichomonas Rapid test and a TV nucleic acid amplification test (NAAT; Aptima, GenProbe) were ordered for enrolled patients. Chi-square tests and logistic regression were used to assess statistical significance.
RESULTS: During T1, 234 ED patients met study inclusion criteria, of which 15% (35/234) were tested for TV with 8.5% (3/35) testing positive. During T2, 163 eligible females were enrolled. All (163) were tested for TV; 20 (12.3%) of 163 rapid TV test were positive ($\chi^2 = 289$, $p<.001$) and 25 (18.0%) of 139 TV NAATs were positive ($\chi^2 = 210$, $p<.001$). In 129/139 (92.8%) patients rapid TV test results were concordat with TV NAAT results, with 15 testing positive and 114 testing negative with both tests. Ten (60%) of 25 TV NAAT positive patients had negative rapid TV test results. TV treatment was given to 6.9% (16/233) of patients during T1 compared to 20.2% (33/163) during T2 ($\chi^2 = 33$, $p<.001$).

CONCLUSIONS: TV was a common STI in adolescent females presenting to a Western NYS children's hospital ED. By making a simple systems change of adding TV testing to routine adolescent STI laboratory regimens, a significant increased proportion of adolescent females with suspected STIs were diagnosed and treated for TV. Using a rapid TV test facilitates on site TV diagnosis and treatment.

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11:00am

House Officer

Comparison of Appendicitis Risk Scoring Protocols and the Need for Imaging in Diagnosing Appendicitis

Sangeetha B. Rao, David Listman, Uri Belkind, Stasha O'Callaghan, Rosemary Thomas, Andrew Schneider, David H. Rubin.
Pediatrics, St. Barnabas Hospital, Bronx, NY; Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Diagnosing appendicitis in the emergency department (ED) is challenging. The Alvarado Score (AS) and Pediatric Appendicitis Score (PAS) scoring systems were developed to aid clinicians in diagnosis. Despite having been validated in large trials, they are infrequently used by clinicians who mainly rely on imaging for diagnosis. Prior studies demonstrated a reduction in the use of CT scans by using the modified AS scoring. However, these studies were limited by small sample size and failure to compare different scoring systems.
OBJECTIVE: To determine the usefulness of the AS & PAS scoring systems as compared to imaging in the diagnosis of appendicitis.
DESIGN/METHODS: We analyzed a retrospective cohort of patients 2-18 years (mean±SD=12.2±5.3) that presented to the emergency department (ED) of a large urban, community teaching hospital from 2001- 2010 in whom appendicitis was suspected, and had imaging done as part of their workup. PAS & AS scores were calculated for each subject based on the ED record. Performance of scoring systems was calculated using ROC curves and chi-square when scores were dichotomized into high vs low scores.
RESULTS: Of 286 patients (51.1% male), 98 (34.3%) were diagnosed with appendicitis after imaging. Available pathology results (70/98) showed perfect correlation with CT diagnosis of appendicitis. 43.8% males compared with 24.3% females were diagnosed with appendicitis (OR 2.43, 95%CI: 1.47-4.04, p=0.001). 20.8 % vs 58.3% of patients with low (≤5) vs high (≥6) PAS score, respectively, had appendicitis (OR 5.32, 95%CI: 3.13-9.04, p<0.001). Similarly, 14% with low (<6) vs 56.6 % with high (≥6) AS score were diagnosed with appendicitis (OR 8.02, CI 4.52-14.21, p<0.001). The ROC area for AS (0.77, 95%CI: 0.72-0.83) and PAS (0.75, 95%CI: 0.70-0.81) were not statistically different (p=0.12).
CONCLUSIONS: Our data suggest that both scoring systems are helpful predictors of appendicitis in our population and show comparable performance. However, the use of either scoring system alone would result in an unacceptable number of missed diagnosis and unnecessary interventions, therefore imaging remains a vital tool in diagnosing appendicitis.

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11:15am

Fellow in Training

National Study of Children's Hospital Safety Centers

Sadiqa A. Edmonds, Mike Gittelman, Karen S. Hill, Mark R. Zonfrillo.
Center for Injury Research & Prevention, The Children's Hospital of Philadelphia, Philadelphia, PA; Division of Emergency Medicine, Cincinnati Children's Hospital, Cincinnati, OH; Children's Hospital Association, Washington, DC.

BACKGROUND: Safety Centers (SCs) (also known as Safety Stores) are children's hospital-based retail outlets that provide families with safety products and educate them about best injury prevention (IP) practices. No study has attempted to compare approximately 40 SCs nationally to develop best practices.
OBJECTIVE: To describe the location, staffing, clientele, education provided and sustainability of these stores nationally.
DESIGN/METHODS: All SC directors known by the Children's Hospital Association were emailed a REDCap survey link to participate. Survey categories included: funding sources, customer base, items sold, items given away, education provided, and directors' needs. Two follow-up emails and phone calls were made as reminders.
RESULTS: 32/38 (84%) SC sites (affiliated with 29 hospitals) completed the survey. SCs were in many hospital locations including: lobby (28%), family resource centers (13%), gift shop/retail space (16%), mobile units (9%), and patient clinics (9%). 19% of respondents reported that their SC was financially self-sustainable. Sales to patients predominated (mean of 44%); however hospital employees made up a mean of 20% (range 0-60%) of sales. 78% of SCs had products for children with special health care needs. Documentation kept at SC sites included: items purchased (97%), items given away (66%), and customer demographics (50%). 56% of SCs provided formal IP education classes. The SCs' directors' most important needs were: finances (71%), staffing (61%), and space (61%). 100% of directors were 'somewhat interested' or 'very interested' in each of the following: creation of a common SC list serve, national SC data bank and multi-site SC research platform.
CONCLUSIONS: SCs are located in many US children's hospitals, and can be characterized as heterogenous in location, products sold, data kept, and ability to be financially sustained. Further research is needed to determine best practices for SCs to maximize their impact on injury prevention.

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11:30am

Characteristics Associated with Thromboprophylaxis in Critically Ill Children

E. Vincent S. Faustino.
Department of Pediatrics, Yale School of Medicine, New Haven, CT.

BACKGROUND: Thromboprophylaxis is an emerging practice for children at risk of venous thromboembolism, such as those who are critically ill. Because there is paucity of evidence to guide practice, we hypothesize that there is significant variability in thromboprophylaxis in critically ill children.
OBJECTIVE: We aim to determine patient, physician and intensive care unit (ICU) characteristics that are associated with thromboprophylaxis in critically ill children.
DESIGN/METHODS: We conducted a prospective multinational cross-sectional study on thromboprophylaxis in critically ill children. We included children hospitalized in the ICU on 3 study dates spread across the year who were not on therapeutic anticoagulation. We collected data on patient, physician and ICU characteristics, as well as data on pharmacologic (PT) and mechanical thromboprophylaxis (MT). We determined the associations between these characteristics and thromboprophylaxis using a nonlinear mixed effects model and reported the associations as odds ratio (OR) and 95% confidence interval (CI). Because MT could only be used for children ≥8 years old, that analysis was limited to this age group.
RESULTS: A total of 1,935 children from 59 ICUs in 7 countries were included. Of these, 230 (11.9%) children were receiving PT with aspirin (103, 5.3%) as the most common agent. Lower extremity fracture or surgery (OR: 10.57, 95% CI: 4.32-25.87), cyanotic congenital heart disease (OR: 8.42, 95% CI: 5.05-14.03), dilated cardiomyopathy (OR: 5.31, 95% CI: 2.21-12.77), obesity (OR: 5.02, 95% CI: 1.96-12.85), prior thrombosis (OR: 4.73, 95% CI: 2.61-8.57), cavopulmonary anastomosis (OR: 3.90, 95% CI: 1.87-8.10), adolescents (vs. infants, OR: 2.92, 95% CI: 1.66-5.16), acyanotic congenital heart disease (OR: 2.30, 95% CI: 1.30-4.08) and central venous catheter (OR: 2.20, 95% CI: 1.45-3.35) were associated with PT. A total of 149 (26.0%) of 571 children ≥8 years old were on MT. Spinal cord injury (OR: 5.12, 95% CI: 1.06-24.75), spine surgery (OR: 3.64, 95% CI: 1.71-7.74), obesity (OR: 3.52, 95% CI: 1.43-8.64), adolescents (vs. infants, OR: 2.14, 95% CI: 1.31-3.49) and admission in a free-standing children's hospital (OR: 0.29, 95% CI: 0.10-0.88) were associated with MT. No physician characteristic was associated with PT or MT.
CONCLUSIONS: We identified characteristics associated with thromboprophylaxis in critically ill children. These characteristics are likely important in the decision to provide thromboprophylaxis and may be targeted for future studies.

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11:45am

Fellow in Training

Detection of Optic Nerve Head Elevation (ONHE) in Children with Increased Intracranial Pressure (IICP) Using Bedside Ocular Ultrasound (BOUS)

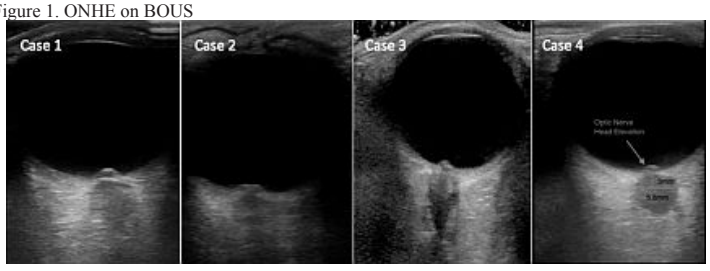
Ronald F. Marchese, Aaron E. Chen, Rakesh D. Mistry.
Emergency Department, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Direct funduscopic examination, advanced imaging and lumbar puncture are often utilized in suspected IICP, but each has limitations, including operator dependence, radiation exposure and expense. BOUS has gained attention as a potentially useful, non-invasive method for detecting IICP; however ONHE has not been previously described in children.
OBJECTIVE: To demonstrate ONHE using BOUS in children.
DESIGN/METHODS: We present a case series of children with suspected IICP evaluated in an urban tertiary-care pediatric emergency department(ED). Using standard technique, BOUS was accomplished through closed eyelids. Findings of ONHE included detection of elevation 1mm or greater above the retina. B-scan in the axial orientation(3mm behind the retina) was used to assess optic nerve sheath diameter(ONSD) above normal of 4.5mm in the right(R) and left(L) eyes.
RESULTS: Four children between the ages of 7-17 years had a BOUS(Table 1). Two had a past history(PH) of shunted hydrocephalus(SH), one with pseudotumor cerebri(PC) and one was previously healthy. On ED presentation, all subjects reported a history of headache, and two reported emesis. The average duration of symptoms was 9 days(range 3-14 days). ONHE was detected in all subjects(Figure 1), as was increased ONSD(mean 6.34 ± 0.44mm).

Table 1. Characteristics of Four Cases

	Age (yrs)	PH	ONHE present	ONSD in mm (R,L)	Diagnosis	Evidence of IICP
Case 1	17	PC	Y	6.5,7.0	PC	Papilledema
Case 2	7	None	Y	6.3,6.3	PC	Opening pressure >36 mmHg
Case 3	17	SH	Y	5.9,6.9	Shunt malfunction (SM)	Distal shunt disruption
Case 4	9	SH	Y	6.0,5.8	SM	Proximal shunt obstruction

Figure 1. ONHE on BOUS



CONCLUSIONS: BOUS can be successfully accomplished in children, and is a potentially useful, non-invasive modality in the assessment of IICP in the ED. Assessments for ONHE and ONSD may be useful in the detection of optic nerve swelling and therefore IICP. These metrics should be considered to determine test characteristics of BOUS in children in future studies.

Endocrinology Platform Session

Sunday, March 24, 2013
9:45am–12:00pm

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9:45am

Targeting Nicotinic Acetylcholine Receptors Ameliorates Defective Counterregulatory Hormonal Responses in Animal Model of Hypoglycemia Associated Autonomic Failure (HAAF)

Necla Kirtok, Uduak Akpan, Bistra Nankova, Edmund F. LaGamma.
Division of Newborn Medicine Department of Pediatrics, Maria Fareri Children's Hospital Westchester Medical Center at NYMC, Valhalla, NY.

BACKGROUND: Intensive glycemic control achieved with insulin increases the incidence of hypoglycemia. Repeated hypoglycemia is further associated with HAAF; a syndrome of impaired counterregulation. Hypoglycemia triggers the autonomic nervous system to release acetylcholine (ACh) which initiates both release and biosynthesis of epinephrine (Epi) via nicotinic ACh receptors (nAChRs) at adrenal chromaffin cells. Hypoglycemicia also alters neurally mediated glucagon secretion from pancreatic islet alpha cells. Cytisine is a nAchR partial agonist, its effects on autonomic neurotransmission have not been addressed.

OBJECTIVE: To determine whether the nAChR partial agonist cytisine can modulate excessive cholinergic stimulation during recurrent hypoglycemia and thus restore normal counterregulatory hormonal responses in HAAF.

DESIGN/METHODS: Non-diabetic male Sprague-Dawley rats with vascular catheterization were individually housed under controlled conditions. Hypoglycemia was induced by i.p. injection of 2 U/kg regular human insulin twice daily for 3 consecutive days. Control animals received i.p. saline or cytisine (1mg/kg). In the combined treatment, cytisine was given 30 min before insulin. A hyperinsulinemic hypoglycemic glucose clamp was performed on day 4 following overnight fasting. Blood was collected during the clamp for plasma hormone analyses.

RESULTS: Recurrent 3-day antecedent hypoglycemia caused marked deterioration of day 4 hormonal responses to hypoglycemia consistent with HAAF - i.e. decreased plasma epi and glucagon (3020 + 162 pg/ml vs. 1060 + 95 pg/ml, 492 + 130 pg/ml vs. 314 + 20 pg/ml, respectively; P< 0.05). Pretreatment with cytisine during recurrent 3-day antecedent hypoglycemia ameloriated epi and glucagon responses on day 4. (1616 + 230 pg/ml vs. 1060 + 95 pg/ml, 490 + 80 pg/ml vs. 314 + 20 pg/ml, respectively; P< 0.05). Corresponding increase in steady state TH mRNA levels (a surrogate marker of epi biosynthesis) were also observed in cytisine pretreatment group.

CONCLUSIONS: Pre-treatment with cytisine, a nAChR partial agonists, during antecedent hypoglycemia improves epi and glucagon responses to recurrent hypoglycemia. Modulation of receptor overstimulation restores epi biosynthesis and thus offers promise as a translational adjunctive therapy for insulin-dependent diabetes.

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10:00am

House Officer

Association between the Degree of Control of Children and Adolescents with Diabetes Mellitus and QTc Prolongation on EKG

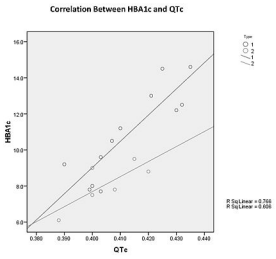
Hariram Ganesh, Lily Q. Lew, Fernanda Kupferman, Kelly Cervellione, Susana Rapaport, Jeffrey H. Kern.
Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Clinical Research, Jamaica Hospital Medical Center, Jamaica.

BACKGROUND: The QT interval represents ventricular depolarization and repolarization. Prolonged QTc has been associated with an increased risk of sudden cardiac death. Prevalence of prolonged QTc on the electrocardiogram (EKG) in the pediatric population is 2.5%. Data have showed an increased association of prolonged QTc in children and adolescents with diabetes mellitus. There has not been any data comparing the degree of glycemic control, as measured by hemoglobin A1c (A1c) with the severity of prolongation of QTc. The mean QTc in children is 0.404.

OBJECTIVE: To determine if there is an association between glycemic control, as measured by A1c and prolongation of the QTc on EKG. To determine whether type 1 (T1DM) or type 2 (T2DM) diabetes mellitus causes a greater prolongation of QTc on EKG.

DESIGN/METHODS: A prospective study of children and adolescents between 8 and 17 years visiting our pediatric clinic or admitted to Flushing Hospital Medical Center with a known history of (T1DM) or (T2DM) was done. Patients with a cardiac anomaly or who were taking any medications causing prolonged QTc were excluded. An EKG was done and the QTc was calculated on all subjects. Two observers with no previous knowledge of the patients' A1c values reviewed the EKGs. A chart review was done to determine the most recent A1c value. A correlation study was done, comparing A1c to QTc values in patients with T1DM and T2DM.

RESULTS: Eighteen patients, 12 with T1DM (58% males) and 6 with T2DM (67% males) participated in study. The range of A1c was 6.1 to 14.6 % (mean = 9.97% SD 2.5). The range of QTc was between 0.388 and 0.435 (mean= 0.410, SD 0.014). The linear correlation between A1c and QTc was 0.84 at the 0.01 level. There was a greater fluctuation in QTc values in patients with T1DM than T2DM.



CONCLUSIONS: There was a positive linear association between A1c and QTc on EKG. There was a higher mean QTc in children with diabetes mellitus than in the general population.

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10:15am

Fellow in Training

Hyperinsulinism Profile: Emerging Biomarkers for Diagnosing Disease

Christine T. Ferrara, Charles A. Stanley, Andrea Kelly.
Endocrinology Division, Children's Hospital of Philadelphia, Pennsylvania, PA.

BACKGROUND: Congenital hyperinsulinism (HI) is the most common cause of recurrent hypoglycemia in the neonate, but treatment delay may arise from failed recognition of this disorder. For instance, the insulin level at the time of hypoglycemia may be undetectable but this finding does not exclude the diagnosis of HI.

OBJECTIVE: To investigate the sensitivity of C-peptide and IGF-BP1, the latter a protein regulated by insulin, in diagnosing congenital HI.

DESIGN/METHODS: A retrospective chart review was conducted examining diagnostic fasting tests of patients admitted to the Children's Hospital of Philadelphia from 2002-2010 with genetically or pathology confirmed congenital HI, treated with neither octreotide nor diazoxide at the time of testing(n=30); children with ketotic hypoglycemia served as controls(n=26). Data obtained at the time of hypoglycemia (plasma glucose <50mg/dL) included serum insulin, C-peptide, and IGF-BP1. Elevated C-peptide at the time of hypoglycemia was defined as >0.55 ng/dL and suppressed IGF-BP1 as <100uM.

RESULTS: Plasma insulin at the time of hypoglycemia was undetectable in 2 of 30 HI subjects and appropriately suppressed in all subjects with ketotic hypoglycemia, p<0.0001, (93% sensitivity; 100% specificity). C-peptide and IGF-BP1 data at time of hypoglycemia differed between groups.

Variable median (min,max)	Hyperinsulinism n=30	Ketotic Hypoglycemia n=26	p value
Age	1.6mo (6d,14y)	11mo (10d,8y)	0.02
Fast Duration (hrs)	2 (1,22)	18.5 (12,31,5)	<0.001
Final Glucose (mg/dL)	37 (15,50)	46 (14,50)	0.007
Insulin (uIU/mL)	0.3 (2.6,41.9)	N/A	<0.001
Detectable Insulin	**28/30**	**0/26**	**<0.001**
C-peptide (ng/mL)	1.97 (0.56,8.4)	0.11 (0.06,0.35)	<0.001
Elevated C-peptide (>0.55ng/mL)	**22/22**	**0/18**	**<0.001**
IGF-BP1 (uM)	39 (3.5,122)	602 (109,1284)	<0.001
Suppressed IGF-BP1 (<100uM)	**12/13**	**0/20**	**<0.001**

Of 22 HI subjects with c-peptide measured, all had elevated levels versus none in the ketotic group (specificity and sensitivity 100%). IGF-BP1 was suppressed in 12 of 13 HI subjects tested while all control patients had levels above the 100uM threshold (92.3% sensitivity, 100% specificity).

CONCLUSIONS: The study confirms that while a detectable insulin level at the time of hypoglycemia is diagnostic of HI, an isolated undetectable insulin level at this time does not rule out this disease. We show that c-peptide >0.55ng/mL and suppressed IGF-BP1 <100uM may be equally or more sensitive in identifying HI, especially when used in combination with other biomarkers of insulin activity.

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10:30am

House Officer

Growth Hormone Stimulation Testing: Area under Curve Correlates with Growth Hormone Peak but Not with IGF-1 or Pituitary Volume

Laurie R. Braun, Molly O. Regelmann, Bradley N. Delman, Andrew Tenore, Robert Rapaport.
Division of Pediatric Endocrinology & Diabetes, Kravis Children's Hospital, Mount Sinai School of Medicine, New York, NY; Department of Radiology, Mount Sinai School of Medicine, New York, NY; Department of Pediatrics, University of Udine, Udine, Italy.

BACKGROUND: In the course of evaluation of children with growth failure, assessment of the growth hormone (GH)-insulin-like growth factor-1 (IGF-1) axis by GH stimulation testing (GH ST) and MRI of the pituitary gland may be indicated. We have previously suggested that pituitary volume (PV) by MRI correlated with IGF-1 levels, but not with GH peak response to stimulation. Some studies have used GH ST area under curve (AUC) as a measure of cumulative GH production and have shown that AUC is positively correlated to GH peak, as well as IGF-1. To our knowledge, GH ST AUC has not been evaluated with respect to PV.

OBJECTIVE: We hypothesize that GH ST AUC correlates with PV, as well as IGF-1.

DESIGN/METHODS: We performed a retrospective chart review of children followed for growth

failure. Inclusion criteria for the study were MRI of the pituitary read by the same neuroradiologist (BD), GH ST using arginine and L-dopa, and GH, IGF-1 and IGFBP-3 measured by the same laboratory (Esoterix Inc., Calabasas Hills, CA). Anthropometric measurements were performed and bone ages were read by pediatric endocrinologists. All Patients had measurements of GH at 6 timepoints. PV was calculated using (4pi/3)x(LxHxW). AUC was calculated using the trapezoidal rule. Statistical analysis consisted of Pearson correlations.
RESULTS: Data on 143 patients (106 males), with a mean age of 11.6±2.3 years were reviewed. The AUC positively correlated with the GH peak (r= 0.894, p<0.05) but not PV (r= -0.11, p=0.19) or IGF-1 levels (r= -0.095, p=0.26). A negative correlation was found between AUC and height SD (r= -0.367, p<0.05) as well as BMI SD (r= -0.167, p<0.05). Analyses including only patients with GH peaks <7 ng/mL (n=41) and <10 ng/mL (n=85) produced similar results.
Correlations of AUC

Significant Correlation			No Significant Correlation		
Parameter	**r coefficient**	**p value**	**Parameter**	**r coefficient**	**p value**
GH Peak	0.893	<0.01	IGFBP-3 SD	0.122	0.137
BMI SD	-0.164	0.045	IGFBP-3	0.006	0.943
Height SD	-0.360	0.045	IGF-1 SD	-0.104	0.204
			PV	-0.110	0.182
			IGF-1	-0.151	0.066
			Age	-0.159	0.052
			Bone Age	-0.158	0.060

CONCLUSIONS: GH AUC does not correlate with PV by MRI or with IGF-1 levels. These findings suggest that PV may be more reflective of circulating IGF-1 levels than acute GH response to stimulation. Further studies are needed to assess the potential utility of GH AUC as part of the evaluation of children with growth failure.

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10:45am

Fellow in Training

Hypoglycemia and Increased Insulin Secretion in a New Form of Glycogen Storage Disease Due to Phosphoglucomutase-1 Deficiency

Amanda A. Misfeldt, Hudson H. Freeze, Eva Morava, Can Ficicioglu, Charles A. Stanley.
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BACKGROUND: Phosphoglucomutase-1 (PGM1) catalyzes the interconversion of glucose-1-P and glucose-6-P for glycogen synthesis and degradation. PGM1 deficiency was recently reported in a child with cleft palate, hypotonia, hepatopathy, abnormal protein glycosylation, and has been termed glycogen storage disorder type XIV.
OBJECTIVE: This report describes hypoglycemia in an infant with PGM1 deficiency, suggesting a role for PGM1 in ß cell insulin regulation.
DESIGN/METHODS: To characterize hypoglycemia, the patient underwent fasting studies; acute insulin response tests with IV calcium, leucine, and glucose; oral glucose tolerance test; and oral protein tolerance test.
RESULTS: At birth this boy had cleft palate and micrognathia requiring tracheostomy and gastrostomy tube. After cleft palate repair at age 1, a hypoglycemic seizure occurred when attempting oral feeds. Multiple fasting evaluations revealed hypoketotic hypoglycemia, consistent with hyperinsulinism, without response to glucagon. Insulin was markedly increased in response to glucose: plasma insulin increased from <1.5 µU/mL to 82 µU/mL at 120 minutes after oral glucose and from <3 µU/mL to 115 µU/mL at 1 minute after IV glucose. There was no acute insulin response to calcium or leucine (plasma insulin <3 µU/mL during both tests). He had no hypoglycemia after an oral protein challenge. Diazoxide and octreotide failed to control hypoglycemia; he was managed with continuous enteral dextrose at a low rate of 2 mg/kg/min. Transferrin isoelectric focusing studies revealed abnormal type 1 and type 2 glycosylation patterns. Genetic analysis of *PGM1* revealed a missense mutation (D263Y) and a nonsense mutation (Y517X); enzymatic activity in fibroblasts was 2.8% of normal. At age 9, re-evaluation of the hypoglycemia revealed good control on oral cornstarch and a fasting pattern of early-onset hyperketonemia typical of mild defects in glycogen synthesis and release.
CONCLUSIONS: PGM1 is expressed in pancreatic islets, where its function is unclear since ß cells have little or no glycogen. Results from our patient indicate that PGM1 deficiency increases ß cell glucose stimulated insulin secretion, resulting in a phenotype of post-prandial hyperinsulinemic hypoglycemia not seen in other glycogenoses. PGM1 appears to play an important role in regulating ß cell glucose metabolism not previously recognized.

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Predictors of Diabetic Ketoacidosis in Hospitalized Children with Type 1 Diabetes Mellitus

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BACKGROUND: Despite improvements in management of type 1 Diabetes Mellitus (DM1), diabetic ketoacidosis (DKA) continues to occur among children hospitalized for diabetes. Although predictors of DKA in pediatric diabetes have been studied, few national representative samples have been used.
OBJECTIVE: The purpose of this study is to use administrative data to determine whether DKA in children DM1 is related to specific clinical and non-clinical patient characteristics.
DESIGN/METHODS: The National Hospital Discharge Survey for 2005-2009 was used to examine predictors of DKA among hospitalized children 2-18 years with DM1. The outcome was defined as children who were admitted with DKA/who developed DKA during hospitalization. Clinical predictors examined included internalizing and externalizing psychiatric conditions; obesity; and skin infections. Non-clinical predictors were race, age, gender, region and insurance. Multivariate analysis using logistic regression measured the adjusted association of independent variables with outcome to develop a predictive model.
RESULTS: Out of a weighted sample of 153,706 children aged 2-18 years, we found that majority (70%) hospitalized with DM1 had DKA sometime during the hospitalization. After adjusting for confounding the following were found as predictors for DKA development: children with age 5-11 yrs (OR=1.51; 95% CI: 1.44-1.58) and 12-18 yrs of age (OR=2.40; 95% CI: 2.30- 2.51) as compared to younger children; black race (OR=1.47; 95% CI: 1.41-1.53) as compared to white race; females (OR=1.32; 95% CI: 1.29-1.35) as compared to males; and those with Medicaid (OR=1.80; 95% CI: 1.76-1.86) or uninsured (OR=6.44; 95% CI: 5.66-7.32). Study patients form the South region (OR=2.19; 95% CI: 2.12-2.27) and Northeast (OR=1.94; 95% CI: 1.87-2.00); clinical variables of internalizing psychiatric conditions (OR=3.60; 95% CI: 3.35- 3.87) and obesity (OR=1.57; 95% CI: 1.51-1.61); and the presence of skin infections were associated with increased odds of having DKA (OR=18.75; 95% CI: 12.58-27.96). In contrast, those with externalizing psychiatric conditions had decreased odds of having DKA (OR=0.44; 95% CI: 0.42-0.47).
CONCLUSIONS: Some children with Type 1 diabetes remain at high risk for ketoacidosis including black race, female gender and adolescence. Those with certain psychiatric conditions, skin infections, and those without insurance have potentially modifiable risk factors that could be addressed with targeted interventions.

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Medical Student

National Survey on Metabolic Bone Disease of Prematurity

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BACKGROUND: Metabolic bone disease (MBD) is common in preterm, low birth weight, and chronically ill neonates and can increase fracture risk, compromise pulmonary status, and impair future growth. While screening and treatment strategies are used in clinical practice, no consensus for either currently exists.
OBJECTIVE: The aim of this survey was to assess criteria used for screening and diagnosing MBD, as well as determine current therapies, in U.S. level IIIB and IIIC NICUs.
DESIGN/METHODS: An anonymous online survey was distributed via e-mail to AAP Perinatal Section members working in level IIIB or greater NICUs. Responses for 2 demographic, 12 screening, 3 diagnosis, and 12 treatment questions were analyzed. Zip code identified duplicate NICUs.
RESULTS: 338 neonatologists, representing 248 separate NICUs, responded. 86% reported screening for MBD in their primary NICU. Screening was primarily based on gestational age (70%), with thresholds varying from <26 to <36 weeks. Other criteria included birth weight (64%), TPN duration (48%), X-ray findings (56%), diuretic use (41%), and feeding method (9.6%). For diagnosis of MBD, 67% used multiple concurrent tests, including serum alkaline phosphatase (ALP; 99%), phosphate (93%) and calcium (88%) plus other tests (urine calcium, X-ray, 25(OH)D, PTH, magnesium, tubular phosphate reabsorption; each <20%). Elevated ALP was almost universally used as a diagnostic criterion, most commonly >500 U/L (58.6%), with reported thresholds from >300 to >1000 U/L. Other diagnostic measures included X-ray (52%) and serum phosphate (31%). The most common intervention to both prevent and treat MBD in high risk infants was human milk fortification (83%), although vitamin D, calcium, and phosphorus supplementation were also widely used (67%, 65%, 65%, respectively). Alternative treatments included physical therapy (19%), calcitriol (29%), and i.v. bisphosphonates (<1%). Use of bedside alerts (64%), handling precautions (83%), and staff education (73%) were also reported. Treatment discontinuation was largely based on lab values (75%).
CONCLUSIONS: Increasing survivability of low birth weight neonates places these infants at high risk for MBD, raising concern for early fragility fractures and compromised growth. Our survey confirms the widespread awareness of MBD by providers but highlights the lack of consensus regarding its definition, screening, and treatment. Further research is needed to optimize strategies to recognize and manage MBD in these infants.

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Association of Serum Vitamin D Levels and Surgical Pediatric Orthopedic Fractures

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BACKGROUND: Increasing concerns have been raised regarding vitamin D deficiency in the pediatric population. Pediatric orthopedic fracture management should include not only surgical but medical care as well.
OBJECTIVE: To assess the association of serum vitamin D levels with pediatric orthopedic fractures requiring surgical management.
DESIGN/METHODS: This case-control IRB approved study included patients less than 19 years of age seen at a single pediatric orthopedic practice from 5/1/10 to 10/31/12 for fracture management. Primary outcome was fracture requiring surgical management (Surg); primary exposure was serum vitamin D (VitD) level at the time of initial assessment. VitD was categorized using three cut-off values: 12 (VitD12), 20 (VitD20), and 30 (VitD30) ng/ml. Additional demographic and laboratory

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values were analyzed and multivariate logistic regression (MLR) analysis assessed the association of Surg with VitD categories, serum parathyroid hormone > 65 pg/mL (PTH65), breastfeeding > 6 months (BF6M), and regular dietary dairy intake (Dairy).
RESULTS: 201 patients were studied (age 10y±4y, VitD 28±10 ng/ml, PTH 27±19 pg/ml); 30% were categorized as Surg; 58% were male. VitD categories, PTH65, and BF6M were statistically associated with and Dairy trended towards an association with Surg. Serum Ca, PO4, alkaline phosphatase were not associated with Surg; sex, BMI, skin tone, multivitamin intake, time spent outdoors, and sunscreen use were not statistically associated with Surg. In MLR analyses, PTH65, VitD20, and VitD30 remained significantly associated with Surg.

	Endocrine Society Guidelines (ng/ml)	Institute of Medicine Guidelines (ng/mL)
Deficient	< 20: 15%	< 12: 5%
Insufficient	20-29: 43%	12-19: 15%
Normal	≥ 30: 42%	≥ 20: 80%

	OR (Surg)	p-value
VitD<12	5.1	0.02
VitD<20	3.8	<0.001
VitD<30	2.6	0.003
PTH>65	23.3	<0.001
BF6M	3.1	0.02
Dairy	2.3	0.09

CONCLUSIONS: Among "healthy" pediatric patients with fracture injuries, poor bone health may underlie a significant proportion of medical disease, particularly VitD deficiency and PTH abnormalities. These findings suggest that surgical orthopedic patients should routinely have serum VitD levels and secondary hyperparathyroidism monitored and abnormalities addressed.

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Fellow in Training

Nicotinic Receptor Partial Agonists Attenuate Norepinephrine Release and Suppress Tyrosine Hydroxylase Protein Levels in PC 12 Cells: Implicatons for Sympathoadrenal Stress-Responsiveness

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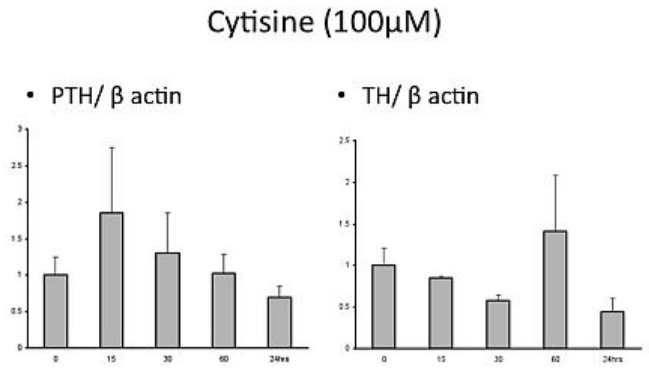
BACKGROUND: Nicotinic acetlycholine receptor (nAchR) partial agonists bind to nAchRs and may alter signaling pathways involved in the biosynthesis and release of catecholamines distinct from nicotine.
OBJECTIVE: To determine the effects of nAchR stimulation using partial agonists compared to Nicotine in PC 12 cells.
DESIGN/METHODS: PC 12 cells (rat pheochromocytoma, normally expressing A3B4 and A7 nAchRs similar to adrenal chromaffin cells) were grown in culture and treated with 3 compounds characterized previously by electrophysiologic testing as nAchR partial agonists (2F1, 8F1 and 9F1) and cytisine (major chemical component of Chantix®, an established nAchR partial agonist). These were compared to the full agonist nicotine (100µM); untreated cells were used as controls. Norepinephrine (NE) levels of media were determined by ELISA. Tyrosine hydroxlyase (TH) (rate limiting enzyme in catecholamine biosynthesis) protein content and phosphorylation were measured by Western blot.
RESULTS: Nicotine is known to increase Ser40 TH phosphorylation with sustained effect up to 48h with an *increase* in TH protein. In these experiments, cytisine led to a 75% increase in phosphorylation at Ser40 evident by 15 min with a return to baseline by 24h in association with a 50% *decrease* in TH protein at 24h.



Of the 3 new compounds tested, 8F1 and 9F1 were confirmed as partial agonists *in vitro* based on the attenuated amount of NE released in comparison to nicotine.
CONCLUSIONS: Partial agonists release little norepinephrine but affect TH activity in a manner distinct from nicotine. The fall in TH protein with partial agonists suggests there are independent mechanisms governing catecholamine release and TH protein levels that may have physiologic impact as pharmacological therapies to alter stress responsiveness.

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9:45am

House Officer

Secondhand Smoke Exposure in Multiunit Housing: What's the Drift?

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BACKGROUND: Children living in multiunit housing (MUH) have higher levels of secondhand smoke (SHS) exposure compared to children living in detached homes. Many children in inner-cities live in MUH, and may be at disproportionate risk from harmful effects of SHS. Limited data exist to compare the burden of SHS exposure in public vs. private MUH, and such data could support local smoke-free housing policy initiatives.
OBJECTIVE: The objectives of this study were to 1) examine factors associated with SHS exposure in the homes and common areas of MUH, and 2) assess the support for smoke-free building policies among parents in an inner-city pediatric practice.
DESIGN/METHODS: A convenience sample of parents in an inner-city pediatric practice located in Bronx, NY completed a verbally administered survey. Respondents were asked their gender, smoking status, if they lived in public or private housing, smelled SHS in common areas of MUH or through SHS drift into their home ("drift"), and their opinion on smoke-free policies. Chi-square analyses were done using STATA.
RESULTS: 60 parents completed the survey; 93% were female and 22% were smokers. All 60 respondents reported living in MUH (90% in apartments and 10% in multi-family houses), with 47% living in public housing, 48% living in private housing, and 5% unsure. Respondents reported that in the last 12 months, 72% smelled SHS in an indoor common area of their building; 77% smelled SHS in an outdoor common area. 40% reported SHS drifted into their home frequently (daily or a few times per week), and 22% reported occasional drift (a few times per month or year). Respondents living in public housing were more likely to report SHS drift compared to private housing residents (OR=5.2, p=0.004) and were also more likely to report smelling SHS in indoor common areas (OR=4.9, p=0.02) and outdoor common areas (OR=7.9, p=0.01). The majority of respondents (90%) stated that they would prefer to live in a completely smoke-free building, with no significant difference in preference between public and private housing residents.
CONCLUSIONS: The majority of respondents reported smelling SHS in common areas, SHS drift into the home, or both. SHS exposure was significantly more commonly reported among public than private MUH residents. These results suggest that indoor smoke-free policies may be accepted and preferred by inner-city parents. Future studies should address whether children who live in public housing benefit from living in smoke-free buildings.

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10:00am

Cost Analysis of Staffing Options for Inpatient Care

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BACKGROUND: Data on the costs of staffing different types of frontline ordering clinicians (FLOCs) (e.g. resident-trainees, nurse practitioners, physician assistants, house physicians, hospitalists, etc.) in children's hospitals are limited, particularly as related to changing duty hour regulations and proposals for graduate medical education (GME) funding.
OBJECTIVE: Develop a financial model to compare the costs of various unit-level staffing options and understand the role of GME funding on the costs of staffing with resident-trainees.
DESIGN/METHODS: Financial modeling of staffing cost for a hypothetical 20-bed pediatric unit under 4 coverage models: (1A,1B) intern/senior residents with attending supervision (1A: post- / 1B: pre-2003 ACGME duty-hour restriction); (2) hospitalist only; and (3) nurse practitioner (NP) & attending physician. Cost estimate based on effective annual compensation for inpatient time of clinicians only, accounting for number of employees, difference in resource utilization efficiency, and GME subsidy. Sensitivity analysis to obtain range of cost estimates with different mixes of full-time clinicians vs. rotating academic attendings.
RESULTS: The most expensive option is residents & attendings without GME subsidy ($1.42 million/year or $163/hour). The least expensive is NPs & attendings ($793,750/year or $91/hour). The duty-hour regulations increase costs significantly. One example of clinical resource inefficiency (e.g. extra testing) estimated at the 10% level also illustrates the costs of an institution of having trainees as FLOCs. Including GME funding reduces cost to comparable levels with staffing either hospitalists or NP & attendings (Table 1).

Table 1: Cost Scenarios of Frontline Ordering Clinician (FLOC) Staffing Hypothetical 20-Bed Inpatient Unit at Per Hour Cost

		Staffing Model #1A: Residents & Attendings, ACGME 2011	Staffing Model #1B: Residents & Attendings, Pre-ACGME	Staffing Model #2: Hospitalist only	Staffing Model #3: NPs & Attendings
		Per Hour	*Per Hour*	*Per Hour*	*Per Hour*
Resident Resource Inefficiencies	No Resident Clinical Resource Use Inefficiency (Without GME)	$125	$97	-	-
	No Resident Clinical Resource Use Inefficiency (With GME)	$73	$62	-	-
	10% Resident Clinical Resource Use Inefficiency (Without GME)	$163	$134	-	-
	10% Resident Clinical Resource Use Inefficiency (With GME)	$111	$100	-	-
Attending Physicians	100% Rotating Academic / 0% Full-time Attendings	$125*	$97*	-	$91
	50% Rotating Academic / 50% Full-time Attendings	$133*	$104*	-	$98
	0% Rotating Academic / 100% Full-time Attendings	$140*	$112*	$93	$106

*This modeling assumes no GME subsidy.

CONCLUSIONS: The cost of staffing an inpatient unit varies across a number of parameters, but trainees are not the obvious least expensive option. GME funding is important to offset the costs of trainee and supervisor staffing, especially with duty-hour rules. Government support of medical training via GME subsidy is important to maintain the public good of and prevent market failure in physician training.

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High School Student

Smoking Policy on College Campuses: Influence of Sociodemographic Factors

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BACKGROUND: Smoking in the United States continues to be epidemic among teens and young adults -- stages of life with undue peer influences and increased vulnerability to tobacco use. The Surgeon General's 2012 Report, "Preventing Tobacco Use Among Youth and Young Adults" notes that, with 99% of all first use of tobacco occurring by age 26, if youth and young adults remain tobacco-free, very few people will begin to smoke or use smokeless products." With more than 72% of 2011 high school students going to college, smoking policies on college campuses play a critical public health role in smoking prevention.
OBJECTIVE: To gather data about tobacco smoking policies (TSP) on college/university campuses (CUC) around the United States, and identify sociodemographic variables associated with TSP.
DESIGN/METHODS: Tobacco smoking policies on college/university campuses nation-wide were reviewed and classified, focusing on the single largest public, private and community/technical school in each of the 50 states. Based on its TSP, each school was classified as having either a complete smoking ban (CSB) or smoking restrictions (SR). Chi square/Fisher Exact analyses were performed on all sociodemographic variables tested.
RESULTS: When states were ranked in terms of 2011 cigarette tax revenue, CSB was more common in the lowest quintile states than the highest (31.0% vs. 9.7%; p<.04). When TSP were analyzed based on which political party received the majority of votes in the 2012 presidential election, CSB was more common in the 24 "red" (Republican) states than the 26 "blue" (Democratic) states (38.9% vs 13.0%; p<0.0001). Although only 14 schools with religious affiliation were included (due to our selection criteria of undergraduate student body size), CSB was more common in schools with a religious affiliation (71.4% vs. 19.9%; p< .0001). No association was found between CSB and state-wide prevalence of tobacco smoking. No difference in CSB was seen between private and public schools, or between 4 year programs and CC/T schools.
CONCLUSIONS: People who start smoking before the age of 21 have the hardest time quitting; thus, colleges play a critical public health role through their smoking policies. TSPs vary among colleges. Most schools allow smoking in selected areas (either indoors or outdoors). A complete ban is more common in schools with a religious affiliation, in states that voted Republican in 2012 and in states that collected the least money in revenue from cigarette taxes in 2011.

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10:30am

Making Needles Easier To Bear: Parental Perception of Child's Comfort after Interdisciplinary Initiative

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BACKGROUND: Studies of hospitalized pediatric patients suggest more needs to be done to control painful experiences, the most common of which is venipuncture. At the Children's Hospital at Montefiore (CHAM) in 2008, an interdisciplinary group was formed to improve children's comfort during venipuncture. The group conducted a "Making Needles Easier to Bear" campaign to have most routine venipuncture for hospitalized children occur during waking hours, with a dedicated Children's Hospital phlebotomist and child life specialist. Automatic orders for topical anesthetic and electronic alerts for nurses to apply anesthetic were also added as part of the initiative.
OBJECTIVE: To compare rates of parental satisfaction with their child's comfort, presence of a child life specialist, and use of topical anesthetic during venipuncture by surveying parents of children hospitalized before and after an interdisciplinary improvement initiative.
DESIGN/METHODS: We surveyed a total of 151 parents of children aged 0-12 years admitted to the hospital about their child's comfort, the use of topical anesthetic and the presence of a child life specialist for their child's venipuncture. Exclusion criteria: children with chronic illness, admitted following surgical procedure or with severe cognitive impairment. Mean survey responses were compared before and after the interdisciplinary initiative using Stata with t-test for continuous variables and test of two proportions for categorical variables.
RESULTS:

	Before n=71	After n=81	p value
Child Life present	41%	63%	0.016
Numbing Medicine used	19%	43%	0.002
Skill of person who drew blood (1-5)	3.97	4.32	0.067
Child's Pain was adequately controlled (1-5)	3.76	4.2	0.03
FACES Score (0-5)	3.4	2.9	0.11

There were no significant differences in gender of child, proportion of infants, parental age, parental education, ethnicity or race between groups of parents surveyed.
CONCLUSIONS: The efforts of the "Making Needles Easier to Bear" interdisciplinary initiative have led to more consistent presence of child life specialists and the use of more topical anesthetic during routine venipuncture at CHAM. Parent's assessment of their child's comfort during venipuncture have significantly improved since the initiative has begun, suggesting the efforts of the interdisciplinary initiative have been successful at making venipuncture less painful.

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10:45am

House Officer

Prediction of Spinal Needle Depth for Successful Lumbar Puncture Using Weight, Height and Body Surface Area

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BACKGROUND: Estimating the spinal needle depth of insertion for lumbar puncture (LP) in children is challenging. A practical guide to estimate the correct depth of insertion based on anthropometric measurements might help reduce unsuccessful LP attempts and bloody taps.
OBJECTIVE: Correlate anthropometric measurements with the depth of spinal needle insertion in children and develop a predictive model for depth of spinal needle insertion.
DESIGN/METHODS: The author conducted a prospective study of children <19 years of age who required LP for treatment or diagnosis. Data collected included age and anthropometrics: weight, height and body surface area (BSA = Square root of [(wt x ht)/3600]). The outcome measure was the depth insertion of the spinal needle in successful LPs. Correlation and regression analysis were used to develop a predictive model for spinal needle depth insertion.
RESULTS: 41/45 children underwent successful non-bloody LPs. 34 were oncology patients while 7 had LPs to rule out meningitis. The mean age of the population was 5.6 ± 4.0 years (Range 0.1-17.4), mean weight 19.39 ± 12.25 Kg (3 – 61), mean height 102.86 ± 26.98 cm (49 – 161), mean BSA 0.73 ± 0.32 m^2 (0.18 – 1.65), mean depth insertion of the spinal needle 26.56 ± 9.45 mm (8 – 52). In decreasing order, BSA, height, weight and age showed a strong correlation with the depth of spinal needle insertion.

Variable	Pearson Correlation with Depth	Regression analysis with Depth (R^2)
BSA (m^2)	0.944 (p<0.01)	0.891
Height (cm)	0.930 (p<0.01)	0.865
Weight (kg)	0.923 (p<0.01)	0.853
Age (yr)	0.896 (p<0.01)	0.803

BSA was the best predictor of the depth of spinal needle insertion in both correlation and regression models. Using regression equation, a practical guide to estimate the depth of spinal needle insertion (in mm) is (28 x BSA) + 6.
CONCLUSIONS: Among children, the depth of insertion of spinal needle for lumbar puncture can be approximated by using a simple equation based on BSA. This model needs to be validated in future studies.

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11:00am

Fellow in Training

Determinants of Late Acute Rejection in Pediatric & Adolescent Kidney Transplant Recipients

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BACKGROUND: Long-term graft function has not kept pace with short-term graft survival in children. Late Acute Rejection (LAR) episodes are in part responsible for the lack of long-term graft survival. The risk factors for LAR in pediatric & adolescent in kidney transplant (Tx) recipients are not well defined.
OBJECTIVE: To identify the determinants for LAR in pediatric & adolescent kidney Tx recipients.
DESIGN/METHODS: A retrospective analysis of pediatric & adolescent kidney Tx recipients ≤23 yrs of age at the time of Tx with at least 1 yr follow-up. Of 73 Tx recipients, 64 were included in the analysis. 9 recipients were excluded for either graft loss or early acute rejection(occurring ≤6 months post-Tx). The included patients were divided into 2 cohorts; control group-41 & LAR group-23 patients (≥6 months at time of rejection). Donor-Specific Antibodies (DSA) were obtained at the time of clinical suspicion of LAR.
RESULTS: LAR was diagnosed by clinical & histological criteria in 23 (35.9%) Tx recipients. Mean age at Tx was not different in the groups (13.3±5.2 yrs in controls vs. 12.6±5.6 yrs in LAR). Mean age at the time of LAR was 14.7±4.8 yrs with 60.8% ≥12 yrs of age. Mean follow-up period was 31.2 (3.9-79) months. Significant clinical & demographic factors that were associated with LAR by univariate analyses in the cohort are shown below

Significant Variables- Total n 64 n(%)	LAR		Control		*p*
	23(35.9)	95% CI	41(64.1)	95% CI	
DSA 26(40.6)	15(65.2)	0.22-0.63	11(26.8)	0.33-0.24	0.003
Delayed Graft Function (DGF) 16(25)	10(43.4)	0.45-0.84	6(14.6)	0.13-0.40	0.0096
Non-adherence 11(17.2)	8(34.8)	0.15-0.54	3(7.3)	008-0.14	0.0043
Coefficient Variation (CV)% of Tacrolimus (TAC) Levels	41.8	34.2-49.4	34.6	31.7-37.4	0.03

Other variables with $p<0.10$ in univariate analyses were included in multivariate logistic-regression analyses with the odds ratio of each variable shown below

Clinical Characteristics	OR	SD(95% CI)	*p*
DSA	15	12.9(2.7-81.5)	**0.002**
DGF	14.4	13.1(2.4-85.6)	**0.003**
CV% of TAC Levels	1.06	0.03(0.99-1.1)	**0.057**
Non-adherence	4.4	5.3(0.39-47.6)	0.227
HLA DR-Mismatch(0 vs. Others)	2.2	3.1(0.13-34.1)	0.580
Age at Tx ≥12yrs	0.89	0.66(0.20-3.8)	0.880
Race(A-A vs. Others)	1.6	1.2(0.39-6.6)	0.498

CONCLUSIONS: Development of de-novo DSA, DGF, & increased variability of TAC levels are risk factors for LAR in pediatric & adolescent. The effect of non-adherence on LAR couldn't be demonstrated in multivariate analyses. These results need to be validated through a prospective multi-center study.

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11:15am

Preferences, Goals, and Treatment Initiation in ADHD

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BACKGROUND: Shared decision making involves the assessment of preferences and goals and is prioritized in national ADHD treatment guidelines, yet little work has examined the impact of preferences and goals on treatment receipt.

OBJECTIVE: To describe the association between parents' ADHD treatment preferences and goals and treatment initiation.

DESIGN/METHODS: Parents/guardians of children aged 6-12 years diagnosed with ADHD in the past 18 months and not receiving medication (MED), or behavior therapy (BT), or either treatment were recruited from 8 primary care sites and an ADHD treatment center. Parents completed the ADHD Preference and Goal Instrument, a validated measure, and reported treatment receipt at 6 months. Logistic regression measured the association of baseline preferences or goals with treatment initiation. Covariates included parent and child characteristics, time since diagnosis, ADHD subtype, impairment, and treatment history.

RESULTS: The study included 148 parents/guardians (47% African-American; 24 not receiving MED, 40 not receiving BT, and 84 neither at baseline). We found that parental treatment preferences, in particular greater acceptability and fewer concerns regarding medication side effects, were associated with treatment initiation for both BT and MED. In addition, having academic goals for treatment was associated with MED initiation, but behavioral and interpersonal relationship goals were related to BT initiation (Table).

Scale	Adjusted OR of MED Initiation (95% CI)[1]	Adjusted OR of BT Initiation (95% CI)[1]
MED Preference	2.7 (1.2, 6.1)	
Subscales:		
Acceptability	3.3 (1.7, 6.5)	
Feasibility	1.1 (0.7, 1.8)	
Stigma	0.8 (0.5, 1.3)	
Side effects	1.6 (1.1, 2.6)	
BT Preference		2.3 (1.0, 5.4)
Subscales:		
Acceptability		6.2 (2.2, 17.4)
Feasibility		1.1 (0.7, 1.8)
Adverse Effects		0.9 (0.6 ,1.6)
Goals		
Academic Goal	2.4 (1.4, 4.3)	1.1 (0.7, 1.6)
Behavioral Goal	1.2 (0.8, 1.9)	1.8 (1.1, 2.8)
Interpersonal Goal	1.0 (0.6, 1.8)	1.7 (1.0, 2.9)

[1]Odds ratio reflects the increase in odds of treatment initiation with each one-point increase in mean preference or goal score on a 0-4 scale.

CONCLUSIONS: Parental treatment preferences, especially greater acceptability and fewer medication side effect concerns, are associated with treatment initiation in ADHD. We found that those with distinct goals select different treatments, a novel result. Findings support the formal measurement of preferences and goals as part of ADHD treatment decision-making.

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11:30am

Impact of the Change in "Actionable" Lead Level from 10μg/dL to 5μg/dL in an Urban Community

Morgan Leafe, Matilde Irigoyen, Amman Hassan,
Leonard Braitman, Cynthia DeLago.
Department of Pediatrics, Einstein Medical Center Philadelphia, Philadelphia, PA.

BACKGROUND: In May 2012 the CDC endorsed a change in the "actionable" lead level from 10 μg/dL to 5 μg/dL, as recommended by the Advisory Committee on Childhood Lead Poisoning Prevention. This new reference value of 5 μg/dL is based on the 97.5th percentile of the blood lead level distribution in U.S. children aged 1–5 years. The impact of this new reference level in urban communities with old housing stock is not known.

OBJECTIVE: To compare the prevalence of children with positive lead screening tests at the 10 μg/dL and 5 μg/dL cutoff reference values in a inner city community.

DESIGN/METHODS: We conducted a retrospective cross-sectional study of lead screening tests done 2010-2012 for children <5 years of age at a hospital-based pediatric ambulatory center. Children were screened around their first and second birthdays or at any time before their fifth birthday, if not previously screened. The center serves a low income, minority community with old housing stock in Philadelphia, PA. Outcome measures are the prevalence of children who screened positive using the 10 μg/dL and the 5 μg/dL cutoffs. We compared those outcomes overall and stratified by years of age.

RESULTS: The number of lead screening tests done from 2010-2012 was 2205. Lead levels tended to increase with age (Spearman correlation=0.17, $p<0.0001$). Using the 10 μg/dL cutoff, the prevalence of positive screens was 1.2% (n=26); using the 5 μg/dL cutoff the prevalence increased to 9.1% (n=201), a 7.6 fold increase ($p<0.0001$). For example, in children between 24 and 35 months, the number of positive screens increased from 16 to 99.

Lead level	<12 months N=750	12-23 months N=510	24-35 months N=732	36-47 months N=144	>=48 months N=69	Total N=2205
≥ 10 μg/dL	0.1%	1.4%	2.2%	0.0%	2.9%	1.2%
5-9 μg/dL	2.3%	9.2%	11.3%	13.9%	11.6%	7.9%
Total ≥ 5μg/dL	2.4%	10.6%	13.5%	13.9%	14.5%	9.1%

CONCLUSIONS: In an urban community with old housing stock, the CDC's recommendation for change in the "actionable" lead level from 10 μg/dL to 5 μg/dL increased the prevalence of children with positive lead screens by 7.6-fold to 9.1%. This greatly exceeds the national average of 2.5%. The implementation of this new reference value will necessitate a substantial increase in clinical and public health resources for medical management, abatement, and education.

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11:45am

House Officer

Impact of Parental Support on Health Indicators/Utilization of High-Risk NICU Babies after Discharge

Maheswari Ekambaram, Cynthia DeLago.
Pediatrics, Einstein Healthcare Network, Philadelphia, PA.

BACKGROUND: Since 2009, high risk graduates from our neonatal intensive care unit (NICU) seeking primary care at our clinic have received health navigation services and support from a patient liaison (PL).

OBJECTIVE: To assess the impact of PL services on high-risk infants' health indicators and health care utilization.

DESIGN/METHODS: Retrospective review of medical charts and health insurance data comparing health indicators and health care utilization of high-risk infants whose parents received PL services compared to those receiving standard care at a hospital-based clinic serving a low-income, urban community. The study group met the following inclusion criteria: medical risk factors (preterm, birth weight < 2.5 kg, or medical conditions requiring subspecialty care); social criteria (parents with psychological, physical or substance abuse issues, age < 18 yrs., < 12th grade education or lacking social support); and enrollment in our primary care clinic. The control group met medical and social criteria but did not receive PL services because their parents declined them or did not intend to enroll at our clinic. Health indicators included receipt of vaccines, growth, development, well-child visits, emergency visits, and hospitalizations during the first year of life. The PL enrolled parents in the NICU, visited them at home to assess needs, reminded parents of appointments, helped with transportation, obtaining social/medical services, referrals and supplies, and liaised with medical providers.

RESULTS: 69 babies met inclusion criteria: 33 study group, 36 controls. 48% were male, 86% Black. There were no significant differences in sex, race, prenatal care, or other maternal factors (substance use, age, postpartum depression) between the groups ($p>.05$). Babies in the study group were more premature, weighed less, and had more medical conditions (apnea and retinopathy of prematurity) than controls ($p<.05$). Despite this, the study group had better attendance at the 1 ($p=.034$) and 2 month well-child visits ($p=.002$), and trended toward better attendance at the 6 months visit ($p=.099$), and had fewer non-urgent emergency room visits ($p=.077$). No differences were observed between the groups' growth, development, vaccine rates, emergency visits or hospitalizations.

CONCLUSIONS: Providing parents of high-risk infants with health navigation services and support demonstrates promise as a way to reduce unnecessary health care utilization.

General Pediatrics V
Platform Session

Sunday, March 24, 2013
9:45am–12:00pm

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9:45am

Clinical Decision Support and Premature Infants: A Means To Protect from Respiratory Syncytial Virus

Annique Hogan, Dean Karavite, Alexander Fiks, Scott Lorch, Lihai Song, Mark Ramos, Russell Localio, Robert Grundmeier.
Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Premature infants are at higher risk of serious infection with Respiratory Syncytial Virus (RSV) and timely vaccination with Palivizumab can protect this vulnerable population. However, there are multiple barriers to receiving this vaccine.

OBJECTIVE: 1. Compare the completion rate of the Palivizumab series before and after implementation of a clinical decision support (CDS) tool in the electronic health record (EHR) 2. Identify reasons for failure to complete the series and determine the impact of the CDS tool.

DESIGN/METHODS: We implemented a CDS tool embedded in the EHR that identified premature patients eligible to receive Palivizumab and provided nursing tools to track eligible patients in 22 primary care practices. We identified those eligible for the full series (5 doses) of Palivizumab during the 2010-2011 season (pre-intervention) and the 2011-2012 season (post-intervention). We compared the rates of completion of at least 4 doses before and after the implementation of the CDS tool. We completed a manual chart review to identify reasons for failure to complete the series both pre and post intervention.

RESULTS: In the pre-intervention season, 129 patients were eligible for 5 doses of Palivizumab compared to 157 patients in the post-intervention season. In the pre-intervention season, 72 (57%) of the eligible patients received at least 4 doses compared with 102 (65%) in the post-intervention season (p=0.15). Pre-intervention, the leading cause for missed doses was failure to recognize patients as eligible (N=27), followed by failure to schedule appointments (N=20), patients not arriving for appointments (N=20), and missed opportunities to vaccinate while in the office (N=10). Insurance denials (N=2) and family refusal (N=2) were much less frequent. Post-intervention, significantly fewer patients were not recognized as eligible (N=4, p<0.001), but there was an increase in all the other reasons why children did not receive doses. Many patients in both seasons had multiple reasons why doses were missed.

CONCLUSIONS: The CDS intervention was most effective at improving the recognition of eligible subjects. Rates of completing the Palivizumab series improved. Difficulty scheduling appointments and capturing vaccination opportunities in the office remain significant problems that should be addressed in future efforts.

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10:00am

Randomized Controlled Trial of the Efficacy of Nebulized 3% Saline without Bronchodilators for Infants Admitted with Bronchiolitis:Preliminary Data

Alyssa H. Silver, Katherine O'Connor, Ilir Agalliu, Gabriella Azzarone, Lindsey C. Douglas, Diana S. Lee, Sheila Liewehr, Joanne M. Nazif, Hai Jung H. Rhim, Susan Villegas, Nora Esteban-Cruciani.
Pediatrics, Children's Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY; Epidemiology and Population Health, Albert Einstein College of Medicine, Bronx, NY; Clinical Pharmacy, Children's Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Though bronchiolitis causes over 150,000 hospitalizations/year in infants, there remains no effective treatment. Recent studies outside the US suggest nebulized 3% saline (hypertonic saline-HS) decreases length of stay (LOS) in infants hospitalized with bronchiolitis.

OBJECTIVE: 1. To assess the effect of HS on LOS in infants admitted with bronchiolitis. 2. To assess safety of HS without adjunctive bronchodilators, regardless of history of prior wheeze.

DESIGN/METHODS: This is an IRB approved, prospective, randomized, double-blind, controlled clinical trial. Infants 0-12 months of age admitted with bronchiolitis to an urban tertiary care children's hospital were recruited within 12 hours of admission. Exclusion criteria: status asthmaticus, chronic cardiopulmonary disease, Trisomy 21, neuromuscular disease, admit to PICU, prior enrollment in the study within 72 hours. Randomized patients received 4mL of nebulized HS or normal saline (control) every 4 hours until discharge. Investigators remain blinded in this ongoing study. We compared demographics of the 2 groups using the t-test (continuous) and chi-square (categorical) test. For LOS outcomes distribution was log-normal, so the Wilcoxon rank-sum (Mann-Whitney) test was used to compare medians between the 2 groups. All tests were 2-sided with p<0.05 considered statistically significant.

RESULTS: 96 patients enrolled between 11/2011 and 11/2012. 9 patients withdrew in Group A;8 in Group B. Adverse events were similar.

	A (n=39)	B (n=40)	*p*-value
Median LOS, days	2.60	2.44	0.86
#adverse events	9	8	0.79

Groups were similar in race, ethnicity, age, gender, insurance, viral status, prematurity and previous wheeze.

Subgroup analysis: Median LOS,days

	A	B	*p*-value
Prematurity	n=2	n=6	
	3.98	2.58	0.32
Prior Wheeze	n=8	n=8	
	2.00	2.08	0.60
RSV+	n=32	n=23	
	2.94	2.54	0.46

CONCLUSIONS: Preliminary data from the first US prospective, randomized, double-blind, controlled clinical trial of nebulized HS without adjunctive bronchodilators including infants with a history of prior wheeze shows no significant difference in LOS between study groups in this ongoing trial (expected completion 4/2013). Rates of adverse events are similar between groups, suggesting HS alone is safe for infants with previous wheeze.

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10:15am

House Officer

Comparing the Clinical Severity of RSV + and RSV – Bronchiolitis

Kelly N.F. Fradin, Gabriella Azzarone, Nora Esteban-Cruciani, Joanne Nazif.
Pediatrics, Children's Hospital at Montefiore, Bronx, NY; Pediatrics, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Acute viral bronchiolitis is responsible for over 150,000 admissions per year in the United States. Respiratory syncytial virus (RSV) testing is frequently performed in this population but the differences in clinical severity between RSV+ and RSV- bronchiolitis are not well described.

OBJECTIVE: To assess whether children who are RSV + have more severe bronchiolitis than RSV - children, as determined by increased length of stay (LOS), use of supplemental oxygen, or rate of intensive care unit (ICU) admission.

DESIGN/METHODS: We conducted a retrospective cohort study involving electronic chart review of patients 0-24 months of age hospitalized between January 2007 and December 2010 for bronchiolitis, as determined by ICD-9 codes, in an inner city tertiary children's hospital. We excluded children with neuromuscular conditions, congenital heart disease, immunodeficiencies, chronic lung disease due to prematurity, tracheostomy, sickle cell, cystic fibrosis, and without laboratory testing of the virus by RSV rapid antigen testing by enzyme-linked immunosorbent assay. At our institution, viral testing is done routinely for cohorting purposes. Chi square and t-tests were used to compare patients who tested positive for RSV with those who tested negative, to assess various markers of illness severity. Data was analyzed using Stata.

RESULTS: We identified 1246 children admitted with viral bronchiolitis. 1153 had testing for RSV, and of those, 55% tested positive. RSV+ children were on average significantly younger than RSV – children (mean age in days 204 vs. 245 p=0.0002). RSV+ children were more likely to require oxygen and had longer hospital stays, but did not differ significantly in rate of ICU admission. However, when stratifying this analysis by age, these trends persisted but were not statistically significant.

	RSV - (n=519)	RSV + (n=634)	
% with ICU stay	8.3%	10.9%	p=0.14
% with supplemental oxygen	41.6%	50.2%	p=0.012
Mean LOS in days (median)	3.33 (2.69)	3.75(2.94)	p=0.015

CONCLUSIONS: In our institution, RSV + bronchiolitis appeared to be more severe than RSV - bronchiolitis as determined by LOS and supplemental oxygen use, but not rates of ICU admission. However when stratified by age, these differences were not statistically significant suggesting that younger age rather than RSV status was the predictor of more severe illness.

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10:30am

House Officer

Does New Prescription of Inhaled Corticosteroids on Hospital Discharge Decrease Hospitalizations and ED Visits for Asthma? Preliminary Data from a Retrospective Chart Review

Jessica M. Gold, Meera S. Meerkov, Gabriella Azzarone, Alyssa H. Silver, Katherine O'Connor.
Pediatrics, Children's Hospital at Montefiore, Bronx, NY.

BACKGROUND: Inhaled corticosteroids (ICS) have been shown to control asthma symptoms and to reduce frequency of acute exacerbations, ED visits, and total hospital admissions. Recent studies have examined rates of delivery of recommended preventive care, including presciption of ICS, to children hospitalized for asthma. However, whether prescription of ICS during hospitalization decreases rates of future hospitalization or ED visits for asthma remains unclear.

OBJECTIVE: To investigate whether new prescription of ICS to 2-20 year-olds hospitalized for status asthmaticus is associated with decreased readmission or ED visits for asthma-related symptoms, improving resource utilization.

DESIGN/METHODS: This is a retrospective study of children 2-20 years old admitted to an urban tertiary care children's hospital with a primary or secondary diagnosis of status asthmaticus between 2008 and 2010. Exclusion criteria: comorbid conditions (eg, prematurity or congenital heart disease), and current use of ICS. The primary outcome was the rate of any readmission for asthma at 180 days, with secondary outcomes of rates of readmission or ED visits at 30, 60, and 365 days. Data were analyzed in STATA with two-sample tests of proportions.

RESULTS: During the study period, 1510 patients were admitted with a primary or secondary diagnosis of status asthmaticus. On partial review of data (October 2008-April 2009) 565 patients were admitted, 235 of which met criteria for this study.

	Not prescribed ICS (n=103)	Prescribed ICS (n=132)	p
Readmissions			
30 days	3	5	0.456
60 days	3	5	0.692
180 days	8	9	0.816
365 days	14	25	0.245
ED visits			
30 days	4	8	0.431
60 days	9	17	0.29
365 days	31	47	0.447

CONCLUSIONS: Preliminary results for this cohort suggest no statistically significant difference in rates of readmission or ED visits between patients newly prescribed or not prescribed ICS when hospitalized for status asthmaticus. The preliminary results suggest a trend towards an increase in readmissions and ED visits in those newly prescribed ICS. This trend may suggest that ICS are only being prescribed for patients with more severe disease. If the completion of this study reveals increased resource utilization for patients prescribed ICS, the criteria used for choosing to prescribe ICS will need to be further examined.

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10:45am

House Officer

Hospitalist and Non-Hospitalist Adherence to Evidence-Based Guidelines for the Management of Community-Acquired Pneumonia

Clota Snow, Russell McCulloh, Zunaria Choudhary, Crystal-Rose Cuellar, Michael Koster, Brian Alverson.
Department of Pediatrics, Hasbro Children's Hospital, Providence, RI; The Warren Alpert Medical School, Brown University, Providence, RI.

BACKGROUND: Community-acquired pneumonia (CAP) is a common cause of hospitalization in the US. However, there is significant variability in how practitioners evaluate, diagnose and treat affected children. National guidelines were released in 2011 in an effort to provide an evidence-based guide for management of CAP.

OBJECTIVE: To assess trends in physician management, antimicrobial use, and clinical outcomes among children hospitalized for CAP who are treated by hospitalist or non-hospitalist pediatricians in light of recent national guidelines.

DESIGN/METHODS: A retrospective chart review was conducted of otherwise healthy patients hospitalized for CAP at a tertiary children's referral hospital from January 2011 to April 2012. Reviewers collected demographic data, evaluation data (including microbiologic testing and diagnostic radiography), antimicrobial use, therapeutic interventions, and clinical outcomes. Data were analyzed using Chi-square analysis for categorical variables, Wilcoxon rank-sum testing for continuous variables.

RESULTS: There were 314 patients that met inclusion criteria. There was no significant difference in baseline characteristics between hospitalist and non-hospitalist patients. Among immunized children, hospitalists more often prescribed ampicillin or amoxicillin at time of hospital admission (70.1% vs. 49.5%, p=0.002) and at discharge (78.2% vs. 46.7%, p<0.0001) than non-hospitalists. Among unimmunized or incompletely immunized children, third-generation cephalosporin use between hospitalists and non-hospitalists in these children did not differ (p=0.265). The two groups also did not differ in the use of azithomycin for patients with multifocal or interstitial CXR findings (p=0.400). Rates of diagnostic testing (including CBC, blood culture, and chest x-ray) between the two groups did not differ, although initial diagnostic evaluation occurred primarily in the ER. Length of stay (LOS) and rates of readmission were similar in hospitalists and non-hospitalists (1.97 vs. 1.75 days, p=0.192 for LOS; 2.2% vs. 3.0%, p=0.655 for readmission).There were no deaths in the cohort.

CONCLUSIONS: Our data show that in regards to antibiotic choice for the management of CAP, hospitalists adhere more closely to national guidelines than non-hospitalists. There was no significant difference between the groups in clinical outcomes measured in this study.

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11:00am

House Officer

Relationship between Asthma Control and Depression among Adolescents in an Urban Community

Vanessa Camino, Fernanda Kupferman, Kelly Cervellione, Vinod Dhar, Susana Rapaport, Won Baik-Han, Partha Chatterjee.
Pediatrics, Jamaica Hospital Medical Center, Jamaica, NY;
Pediatrics, Flushing Hospital Medical Center, Flushing, NY;
Psychiatry, Jamaica Hospital Medical Center, Jamaica, NY.

BACKGROUND: Previous studies have shown an increased prevalence of depression among patients with asthma. The presence of depression is highly associated with increased symptom burden for youth with asthma. Early diagnosis of depression can improve general health and quality of life.

OBJECTIVE: To investigate the relationship between depression and the level of asthma control in 12-18-year-old adolescents in an urban community.

DESIGN/METHODS: We conducted a case-control study with a sample of convenience of 12-18-year-old patients who attended the outpatient clinic or emergency department or were inpatients at Jamaica Hospital Medical Center. We obtained demographic data (age, gender and ethnicity) on all subjects and administered them the Patient Health Questionnaire-9 modified for teens (PHQ-9). It is a screening test (sensitivity 89.5%, specificity 77.5%), and is graded from 0-5 (0=no depression, 1=minimal, 2=mild, 3=moderate, 4=moderately severe, 5=severe depression) to determine the grade of depression (GD). Adolescents with a GD>2, or if they had a positive answer in the questions about suicide, were considered to have a positive screen for depression. Asthma control level was assessed with The Asthma Control Test (sensitivity and specificity of 71%) scored from 5-25 with scores of <20 identifying patients with poorly controlled asthma. Subjects were divided into 3 groups: G1=no asthma, G2=well controlled asthma and G3=poorly controlled asthma. Levels of asthma control were compared with GD. Data were analyzed statistically with SPSS software; comparisons between groups were done using Chi-square and ANOVA, with p-values <0.05 considered significant.

RESULTS: A total of 74 subjects completed the study (G1=21, G2=32, G3=21). No significant differences in age or gender among the 3 groups were noted; there were more Black and Hispanic subjects in G3 (p=0.03). Patients with poorly controlled asthma were more likely to screen positive for depression (p=0.004). In particular, patients with poorly controlled asthma were more likely to have a grade 3 or 4 of depression than those with controlled asthma (p<0.01).

CONCLUSIONS: In our study, adolescents with poorly controlled asthma had a higher rate and severity of depression compared to patients with no asthma or well controlled asthma. We proprose consideration of screening for depression in patients with poorly controlled asthma.

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11:15am

House Officer

Children with Asthma in the Emergency Department; What Did the Chest X-Ray Change?

Panagiotis Kratimenos, Ioannis Koutroulis, Dante Marconi, Geoffrey F. Lim, Daniel R. Rubio, Joseph Jaeger, Janice Lichtenberger.
Dept of Pediatrics, Drexel University & The Children's Hospital at Monmouth Medical Center, Long Branch, NJ; Dept of Emergency Medicine, St. Christopher's Hospital for Children, Philadelphia, PA.

BACKGROUND: The Expert Panel Report 3 "Guidelines for the Diagnosis and Management of Asthma" (EPR3) does not recommend the routine use of a chest x-ray (CXR) in the evaluation of children with asthma exacerbations unless they are in severe respiratory distress or have not responded to treatment. However, many children who come to the emergency department (ED) with an asthma exacerbation receive a CXR. Along with unnecessary radiation exposure and increased medical costs, these children many times receive antibiotics since the CXR findings in asthma can be interpreted as pneumonia. We hypothesize that the CXR does not usually alter the management of their asthma exacerbation.

OBJECTIVE: To assess the use and utility of CXR in the evaluation of children with asthma in the ED.

DESIGN/METHODS: Retrospective chart review was performed including patients, already diagnosed with asthma, aged 1-18 years with asthma exacerbations who were evaluated in the ED and received a CXR between 2010-2012. Patients with an indication for CXR other than respiratory symptoms were excluded. The subjects were grouped based on their CXR findings and were compared with regards to their disposition status, the use of antibiotics and their clinical course (vital signs, oxygen saturation, response to treatments) in the ED based on the EPR3 guidelines for CXR. The CXR readings by the ED physician and the radiologists were compared. Results were analyzed using frequencies and χ^2.

RESULTS: Data of 561 patients were analyzed and from those, 16% (n=91) were admitted. The children who were admitted and met the EPR3 criteria for CXR (31%, n=29), 51% had normal CXR and 49% had pneumonia. The admitted children who did not meet the EPR3 criteria for CXR (69%, n=62), 50% had normal CXR and 50% had pneumonia. Out of the 561 patients, 30.1% (n=169) received antibiotics and, from those patients, 50% had normal CXR and 50% pneumonia. There was no significant difference between the CXR findings, the antibiotic therapy, the disposition status and the fulfillment of the EPR-3 criteria for CXR (p>0.1). There was no significant difference between the radiologists and the PED physicians CXR reading, (p>0.1). Almost 68% (n=381) of the patients had received ≥3 previous CXR.

CONCLUSIONS: This data shows that the CXR did not alter the management and thus should not be a part of the routine evaluation of children with asthma exacerbation.

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11:30am

House Officer

Cognitive and Emotional Morbidity Following Youth Concussions

Daniel J. Corwin, Christina L. Master, Kristy B. Arbogast, Mark R. Zonfrillo.
Division of Pediatrics, Children's Hopsital of Philadelphia, Philadelphia, PA; Sports Medicine and Performance Center, Children's Hopsital of Philadelphia, Philadelphia, PA; Center for Injury Research and Prevention, Children's Hopsital of Philadelphia, Philadelphia, PA.

BACKGROUND: Sports- and recreation-related concussions are common injuries sustained by youth and adolescent athletes. Little is known about the cognitive and emotional morbidity of pediatric concussion patients followed longitudinally by clinicians.

OBJECTIVE: To characterize the prevalence of specific co-morbidities, cognitive and emotional outcomes, and subspecialist referral in a sample of concussion patients cared for in a sports medicine clinic.

DESIGN/METHODS: Of a sample of 3740 unique patients seen in a tertiary pediatric hospital affiliated sports medicine clinic from 7/1/2010-12/31/2011 and diagnosed with concussion, a 5% random sample (187) of medical records was reviewed. Of the random sample of patients, all visits for concussion were examined.

RESULTS: 73% of concussions were sports-related. Patients missed a median of 37 days of school (mean 81), including school vacations. 13% missed greater than 6 months of school. 66% required some form of school accommodation, and 27% required home schooling. 61% of patients reported a decline in grades during recovery. Only 53% had been prescribed cognitive rest by the referring provider prior to their first subspecialty visit. 28% of patients seen had a co-morbid condition, including attention deficit hyperactivity disorder, anxiety, depression, and learning disabilities.

18% required the care of a psychiatrist, 17% of a neuropsychologist, and 14% of a neurologist. Patients required a median of 66 days (mean 95) before they were symptom-free.
CONCLUSIONS: Patients with concussion experience cognitive and emotional burden that can last for several months following injury. Patients with concussion and pre-existing co-morbidities may have specific needs following injury that need to be addressed by specialists. Future work should determine the effect of pre-existing conditions and concussion treatments on outcomes.

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11:45am

Undergraduate Student

Symptom Guided Emergency Department Discharge Instructions for Children with Mild Traumatic Brain Injury

Adam Bartholomeo, Danielle Miano, Emily Ly, Sharon R. Smith.
Molecular and Cell Biology, University of Connecticut, Storrs, CT;
Pediatrics, Connecticut Children's Medical Center, Hartford, CT.

BACKGROUND: Mild traumatic brain injury (TBI) symptoms can vary and persist over an indefinite period of time depending on the patient and extent of the brain injury.
OBJECTIVE: To evaluate symptom guided discharge instructions for children with TBI to better facilitate care of somatic, emotional and cognitive signs and symptoms.
DESIGN/METHODS: A randomized trial comparing the symptom guided discharge instructions and the standard discharge instructions was conducted. Patients ages 7-17 diagnosed with a TBI within 24 hours of the emergency department visit were enrolled into the study. The patient had to be presenting with at least 1 TBI symptom provided on a graded symptom checklist, and could not be admitted to the hospital. A graded symptom checklist was given to the patient and caregiver to complete over the course of a week after the ED visit and return. A phone interview was given to the caregiver at the conclusion of the week to assess satisfaction of discharge instructions. Data analyzed included location and cause of TBI, sign and symptom duration, and family demographic information. A $10 gift card was provided upon completion of the study.
RESULTS: To date, 98 patients have been enrolled. Demographic characteristics comprised of 71% white, 12% black, 12% hispanic and 5% other. Caregiver education was 70% at some college or greater level (college graduate, post-graduate, etc). The significant differences between the intervention and control group were: the average period of time symptoms persisted to the day the patient returned to school (8.5 vs 10 days, p=0.005); average period of time symptoms persisted to the day the patient returned to watching television (4 vs 5 days, p<.005); the average period of time symptoms persisted to how helpful the respective instructions were when deciding when the patient returns to school (1.5 vs 1.0 days, p=0.034); and average period of time symptoms persisted to how helpful the respective instructions were when deciding when the patient returns to physical activities (sports, walking, etc) (1.5 vs 1.0 days, p=0.005).
CONCLUSIONS: The symptom guided discharge instructions appear to be more useful when aiding caregivers' decision allowing the patient to return to school, to return to physical activities, and to watch television.

Neonatal Pulmonology Platform Session

Sunday, March 24, 2013
9:45am–12:00pm

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9:45am

Tracheal Suctioning Does Not Alter Pulmonary Vascular Resistance (PVR) in Asphyxiated, Non-Vigorous Lambs with Meconium Aspiration

Satyan Lakshminrusimha, Bobby Mathew, Sylvia F. Gugino, Carmon Koenigsknecht, Jayasree Nair, Devaraj Sambalingam, Melissa Carmen, Daniel D. Swartz.
Pediatrics, University of Buffalo, Buffalo, NY; Pediatrics, University at Rochester, Rochester, NY; Department of Physiology, University of Buffalo, Buffalo, NY.

BACKGROUND: Depressed infants born through meconium-stained amniotic fluid (MSAF) are at risk for meconium aspiration syndrome (MAS). Current guidelines recommend tracheal suctioning for non-vigorous neonates born through MSAF.
OBJECTIVE: To evaluate the effect of tracheal suctioning of MSAF at birth on gas exchange and PVR in depressed lambs asphyxiated by umbilical cord occlusion.
DESIGN/METHODS: Near-term gestation (141d,term 145d) lambs were instrumented to measure PVR. Meconium (5 ml/kg 20% in amniotic fluid) was labeled with fluorospheres and added to a funnel attached to the endotracheal tube (ETT). The umbilical cord was occluded for 5min to induce asphyxia and gasping leading to "spontaneous" aspiration of meconium. After 10min of recovery, cord occlusion was repeated. Lambs were randomized to no suction (replacing the stained ETT with fresh ETT) or suction (aspiration of the ETT with suction followed by intubation with fresh ETT). Lambs were ventilated for 6h. BAL and lung sections were analyzed for fluorescence.
RESULTS: Lambs were severely asphyxiated (cord pH 6.92±0.02) and aspirated meconium during gasps. 3 lambs had cardiac arrest. Tracheal suctioning at birth (n=12) resulted in removal of 62±20% of instilled meconium. Tracheal suctioning did not alter PVR but marginally improved oxygenation and ventilation. Higher PIP (29±3 vs. 23±2cmH_2O), rate (34±5 vs. 23±2) and inspired oxygen (73±5 vs.57±9%) were required in the "no suction" group to maintain pCO_2 at 40-50mmHg and preductal SpO_2 between 90-94%. There was no significant difference in fluorescence in BAL (16±3 vs. 8±2% of instilled meconium) or in lung sections (25±2 vs. 6±3 particles/unit area of lung) after 6h of ventilation.
CONCLUSIONS: In depressed lambs with asphyxia and meconium aspiration in the immediate antenatal period, effective tracheal suctioning at birth does not alter PVR but may reduce the severity of MAS.

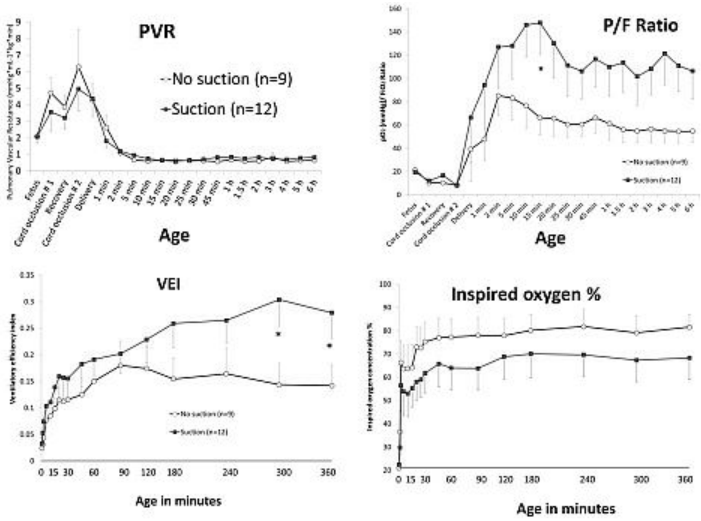

Figure. Changes in PVR and PaO_2 (during fetal life) and PaO_2/FiO_2 ratio (during postnatal life) during umbilical cord occlusion, recovery, second episode of occlusion, delivery and ventilation for 6h are shown in the top panel. Changes in ventilatory efficiency index (VEI = 3800/[(PIP-PEEP)*rate*$paCO_2$] and inspired oxygen concentration during 6h of ventilation are shown in the bottom panel. (* p < 0.05 compared to "no suction" group),

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10:00am

Fellow in Training

TRPV4 Regulates Fetal Lung Development and Injury

Sujir Pritha Nayak, Yulian Wang, Xiaodi Chen, Barbara Stonestreet, Juan Sanchez-Esteban.
Pediatrics, Women and Infants Hospital/ Alpert Medical School of Brown University, Providence, RI.

BACKGROUND: Mechanical forces play a key role in lung development and lung injury. Transient Receptor Potential-Vallinoid 4 (TRPV4) is a calcium channel known to respond to mechanical signals in several tissues and to contribute to inflammation and pulmonary edema in adult lungs. However, the role of this channel in fetal lung is unknown.
OBJECTIVE: To describe the fetal ontogeny of TRPV4 in murine lung development and to investigate the role of TRPV4 in lung differentiation and injury mediated by mechanical forces.
DESIGN/METHODS: Type II epithelial cells were isolated from mice on E17-19 of gestation and exposed to 5% or 20% cyclic strain to simulate normal fetal lung development or lung injury, respectively.TRPV4 mRNA was analyzed by real-time PCR; TRPV4 protein was evaluated by Western blot. Type II cell differentiation was assessed by SP-C mRNA expression. Lung injury was investigated by measuring release of the pro-inflammatory IL-6 into the supernatant by ELISA.
RESULTS: TRPV4 mRNA is present to similar levels on E17 and E18 type II cells but decreases by 50% on E19. Mechanical strain increases TRPV4 mRNA and protein abundance by 70% only on E17 of gestation. As expected, 5% stretch increased SP-C mRNA by 2-fold; incubation with the TRPV4 agonist GSK 1016790A further increased SP-C mRNA by 50% when compared to stretch samples without agonist. In contrast, incubation with the TRPV4 antagonist HC 067047 had the opposite effect. Lastly, mechanical strain for 48 h released IL-6 into the supernatant by 2-fold when compared to controls. Incubation with TRPV4 antagonist decreased IL-6 release to the control levels.
CONCLUSIONS: TRPV4 expression is developmentally regulated and responds to mechanical strain only during the canalicular stage of lung development. TRPV4 participates in strain-induced type II cell differentiation and release of pro-inflammatory cytokines. These studies unveil a potential novel role of this channel not only in fetal lung development but also in the injury of premature lungs.

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10:15am

Fellow in Training

Is the Higher Expression of Matrix Metalloproteinase-9 Associated with Bronchopulmonary Dysplasia in ELBW Infants?

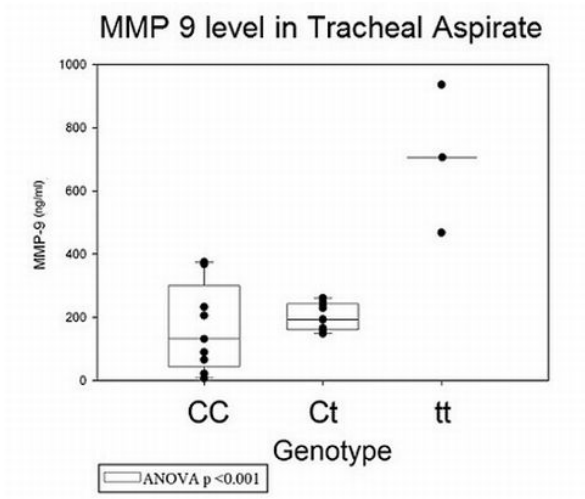
Umesh Paudel, Narendra Dereddy, Nayan Patel, Joseph Telliard, Vanessa Mercado, Johanna Calo, Lance A. Parton.
Div Newborn Med, Maria Fareri Child's Hosp-NYMC, Valhalla; New York Medical College, Valhalla, NY.

BACKGROUND: BPD is characterized by abnormal alveolar septation and microvascular maturation. Alveolarization requires extracellular matrix remodeling, a process in which matrix metalloproteinases (MMP) play an important role**.** MMP-9 has proteolytic activity against connective tissue and its functional polymorphism (C-1562T) is associated with COPD in adults. We therefore considered the functional polymorphism of MMP-9 (C-1562T) as the candidate genes in the susceptibility to BPD.
OBJECTIVE: Hypothesis:MMP 9 (C-1562T) is associated with susceptibility to BPD in ELBW infants.
DESIGN/METHODS: This is an ongoing cohort study that enrolls infants <1 kg at birth, without

congenital or chromosomal anomalies. BPD is defined as need for O_2 at 36 weeks PMA. DNA was isolated from buccal mucosal swabs (N=110) and subjected to allelic discrimination using specific probes for MMP 9(C-1562T) during real-time PCR. Tracheal aspirate was collected (N=21) and MMP 9 level measured by ELISA. ANOVA, X^2 test and t-test were performed with $P<0.05$.
RESULTS:

	No BPD (n=42)	BPD (n=68)	BPD (n=68)
Gestational age (mean± SD)	26.2 ±1.6	25.3 ±1.6	0.003
Birth weight (mean± SD)	840.1 ±144	712 ±141	<0.001
Male Gender	16 (38%)	33 (48%)	0.38
Race- Caucasian	16 (38%)	23 (34%)	0.86
Black	10 (24%)	23 (34%)	
Hispanic	15 (36%)	18 (26%)	
Other	1 (2%)	4 (6%)	

rs3918242 (C-1562T)	No BPD (n=42)	BPD (n=68)	*p* value
CC	16	12	0.04
Ct	22	42	
tt	4	14	



BW and GA were lower in BPD group. Genotype distributions for MMP 9 SNP was significantly high in BPD (P=0.04). MMP 9 expression in tracheal aspirate was higher among tt genotype ($p<0.001$).
CONCLUSIONS: In this pilot study, ELBW infants who progressed to BPD were more likely to contain the minor allele for MMP-9 (C-1562T) and higher expression of protein in tracheal aspirate. We speculate that this functional polymorphism increases expression of MMP-9 proteolytic enzyme in lung parenchyma and places preterm infants at increased risk for BPD.

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10:30am

Fellow in Training

B Type Natriuretic Peptide Levels in Preterm Neonates: A Marker of Severe Bronchopulmonary Dysplasia?

Vaneet K. Kalra, Sanjeev Aggarwal, Prem Arora, Girija Natarajan.
Pediatrics, Wayne State University, Detroit, MI.

BACKGROUND: B type natriuretic peptide (BNP) is a hormone released in response to ventricular wall stress. The role of BNP as a biomarker of bronchopulmonary dysplasia (BPD) has not been elucidated.
OBJECTIVE: (a) To determine if BNP levels at 36 ± 2 weeks postmenstrual age (PMA) correlate with the presence and severity of BPD (b) To examine the utility of BNP at 28 (± 7) days of age in the prediction of BPD.
DESIGN/METHODS: In a prospective observational case-control study, preterm (≤ 32 weeks) infants were enrolled after obtaining parental consent. Congenital cardiac malformations, genetic syndromes, renal failure, sepsis or PDA were exclusion criteria. BNP levels were measured using the triage BNP meter at one or both of 2 time points: 28 (± 7) days and at 36 ± 2 weeks PMA or discharge home. Statistical analysis (SPSS version 19.0) included chi square, non-parametric tests and bivariate regression, as appropriate.
RESULTS: Our cohort (n=60) had a median (IQR) gestational age (GA) of 26 (24-28) weeks, birth weight of 885 (700-1125) gms and was predominantly male (58.3%) and black (68.3%). Median (IQR) BNP levels in infants with moderate /severe BPD (n=33) was significantly higher compared with no/mild BPD group (n=27) {26.5 (10.3- 43.4) vs 9.3 (6.2-24.1) pg/ml, p<0.05, Mann Whitney U}. Median (IQR) BNP levels in infants with severe BPD (n=14), 43.4 (28.4-189) pg/ml differed significantly from levels in groups with moderate (n=19), 21 (9.3-27.1) pg/ml; mild (n=16), 12.1 (7.9-48 pg/ml); or no (n=11), 8.1 (5-12.6 pg/ml) BPD (p <0.001 Kruskal Wallis). On regression analysis, with GA and chorioamnionitis as covariates, BNP levels at 36 ± 2 weeks PMA were significantly associated with severe BPD (p=0.017) but not with moderate/severe BPD. When ROC curves were constructed, at a cut-off of 24.4 pg/ml, BNP had a AUC of 0.8 (95% CI 0.64-0.97) and a sensitivity of 86% and specificity of 76%. BNP levels at 28 days and at 36 weeks correlated significantly (r=0.48, p=0.045). There were no independent associations between BNP at 28 days and BPD outcomes.
CONCLUSIONS: Plasma BNP at 36 weeks PMA was significantly elevated in preterm infants with severe BPD and at > 24.4 pg/ml was fairly sensitive and specific for severe BPD. BNP levels at an earlier time point of 28 days lacked predictive value for pulmonary outcomes at term corrected age. Plasma BNP measurement in infants with established BPD may aid in risk-stratification and further targeted therapies.

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10:45am

House Officer

Single-Course Antenatal Betamethasone Alters Lung Morphometry in Late Preterm Lambs

Sushma Krishna, Shetal Shah, Sylvia Gugino, Satyan Lakshminrusimha.
Pediatrics, Stony Brook Long Island Children's Hospital, Stony Brook, NY; Pediatrics, State University of New York at Buffalo, Buffalo, NY.

BACKGROUND: Antenatal steroids accelerate fetal lung maturation & function, reducing mortality and severity of respiratory distress syndrome. Late preterm infants exhibit high rates of respiratory distress, but antenatal steroid use at these gestations has not been fully evaluated. In animal models, antenatal steroid use at late preterm gestation improves lung compliance, and decreases pulmonary vascular resistance. Yet, the effect on lung histology has not been characterized.
OBJECTIVE: To determine the effect of antenatal betamethasone on lung histology in late preterm fetal lambs.
DESIGN/METHODS: Time-dated pregnant ewes received betamethasone (15mg/day) or placebo on day of life (DOL) 132 & 133 (term -147 days) (N=12 each). C-section was performed on DOL 134. Lungs from 6 lambs from each group were harvested prior to first breath. Six remaining lambs were ventilated for six hours. Blind morphometric analysis were performed on 7mm H & E, fixed-inflated lung sections. A 56-point-counting grid was superimposed onto each image. Air space, alveolar tissue, parenchyma, air-tissue intercepts, sampled radial alveolar count, number of alveoli-per-linear field, & mean alveolar width were counted. Alveolar density & total alveolar surface area were calculated. Pulmonary arteriole cross sections were evaluated for lumen diameter, media & adventitia size. One-way ANOVA testing was used in analysis.
RESULTS: Similar to term animals, steroid-treated sheep exhibited lower radial alveolar counts & decreased alveoli-per-linear field measurements compared to control ($p<0.001$, $p<0.01$). Mean alveolar width was increased in steroid-treated animals compared to controls ($p<0.05$) but reduced in comparison to term sheep ($p<0.001$). Total calculated alveolar surface area was increased in the term sheep compared to either the control or steroid-treated groups ($p<0.001$ for both). Mean arteriole lumen diameter was increased in steroid-treated animals with & without the use of mechanical ventilation compared to controls ($p<0.01$ for both). No differences in the percentage of air space, parenchyma, vascularity, air space/parenchyma ratio, alveolar density, alveolar surface area, or media-to-arteriole diameter ratio were observed.
CONCLUSIONS: Exposure to antenatal betamethasone in the late-preterm period increases the size, but reduces the number of alveoli, resulting in the same percentage of air space and unchanged alveolar surface area.

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11:00am

Graduate Student

HO-1 Nuclear Localization Enhances DNA Repair by Increasing Availability of the DNA Repair Enzyme OGG1

Monica L. Williams, Amal P. Fernando, Phyllis A. Dennery.
The Children's Hospiatal of Philadelphia, Philadelphia, PA; Drexel University, Philadelphia, PA; The University of Pennsylvania, Philadelphia, PA.

BACKGROUND: Heme oxygenase (HO) is the rate-limiting enzyme in the degradation of heme and its inducible form HO-1, is highly expressed in the neonatal lung. We have shown that HO-1 protein is truncated at the C-terminus, becomes catalytically inactive and can migrate to the nucleus under certain stress conditions, however, its role is poorly defined. Neonatal rodents are more tolerant to hyperoxia and have more nuclear HO-1 than adults. Preliminary data show several DNA repair proteins associate with nuclear HO-1 after oxidative stress. We hypothesize that nuclear HO-1 provides cytoprotection by enhancing the function of DNA repair proteins.
OBJECTIVE: To determine the mechanisms by which nuclear HO-1 enhances DNA repair and tolerance to hyperoxia.
DESIGN/METHODS: HO-1 null mutant mouse embryonic fibroblasts (MEF) cells were stably infected with retroviruses expressing full-length (FL) or C-terminal truncated (TR) HO-1 cDNA, or empty vector (VEC) as a control. To evaluate oxidative stress response, cells were exposed to 95% O_2/5%CO_2 (hyperoxia) or room air/5%CO_2 (normoxia) for 28 hours. Cells were counted at 0,4,8, and 24hrs to assess cell viability using the Moxi Z automated cell counter (Orflo). DNA fragmentation as a marker of apoptosis was evaluated by DNA laddering and oxidative DNA damage was assessed by immunostaining for 8-hydroxy-2'-deoxyguanosine(8-oxo-dG). mRNA and protein levels of the DNA repair enzyme 8-oxoguanine DNA glycosylase (OGG-1), were assessed by quantitative polymerase chain reaction(qPCR), western analysis, and immunostaining.
RESULTS: After hyperoxia, TR cells survived better than both VEC and FL. Both DNA laddering and immunofluorescence staining for 8-oxo-dG were decreased in TR cells, demonstrating less oxidatively damaged DNA. Although qPCR revealed a three fold increase in OGG-1 mRNA in TR cells at 28 hrs hyperoxia cellular OGG-1 protein was not increased at this point. Interestingly, immunostaining for OGG-1 protein showed increased nuclear localization in TR cells.
CONCLUSIONS: Truncated HO-1 inhibited apoptosis and improved survival in MEF cells. This was associated with less oxidative DNA damage and apoptosis. The likely mechanism is enhanced nuclear translocation of OGG-1 rather than up-regulation of OGG-1 protein since this occurred later. We speculate that nuclear translocation of HO-1 mitigates hyperoxic injury in neonates by enhancing repair or obviating oxidative damage of DNA. Funded by NIHRO1HL058752(P.A.D).

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11:15am

Ph.D. Student

Effect of Nitric Oxide with Vitamin A on Altered Lung Airway and Microvasculature Development during O_2-Induced Lung Injury

Sana Mujahid, Courtney Thomas, Heber Nielsen, MaryAnn Volpe.
Newborn Medicine, Floating Hospital for Children at Tufts Medical Center, Boston, MA; The Sackler School of Biomedical Studies, Tufts University School of Medicine, Boston, MA.

BACKGROUND: Lung disease remains a major cause of morbidity and mortality for infants born at 23-24 wks gestation. We have previously shown that 0.4FiO_2 exposure to *ex vivo* developing mouse lungs dramatically alters lung airway and microvascular development by adversely changing the expression patterns of the transcription factors, Hoxb5 and Hoxa5 and other developmentally important signaling molecules. Nitric oxide (NO) and Vitamin A (retinoic acid, RetA) are important regulators of lung morphogenesis and regulate blood vessel formation and function through independent and potentially interrelated mechanisms. These therapies evaluated in isolation have led to only minimal reductions in preterm infant pulmonary morbidity.

OBJECTIVE: We hypothesize that NO and RetA used in combination will attenuate O_2-induced altered lung airway and vascular development.

DESIGN/METHODS: Whole fetal mouse lungs (E14 at 48 hrs culture) and fetal mouse lung endothelial (MFLM) cells were cultured in Room Air, 0.4FiO_2, O_2 + NO (2 or 10 ppm) ± RetA 10^{-6}M for 48 hrs. Airway structural development was microscopically evaluated daily and by E-cadherin whole mount immunoflouresence (IF) at end of culture. Hoxb5, Hoxa5, VEGFR2, eNOS, and Akt-P protein levels were analyzed using western blot.

RESULTS: Real-time imaging and E-Cadherin IF showed that 0.4FiO_2 arrested airway branching and dilated distal airways as we have reported. Addition of 10 ppm NO plus RetA to 0.4FiO_2 increased branch generations. Distal airway dilation was less than with O_2 ± NO or RetA and airway patterning was structurally more primitive. Compared to O_2 alone, O_{2+} 10 ppm NO + RetA increased protein levels of proangiogenic Hoxb5 (↑560%), decreased angiostatic Hoxa5 (↓27%) and increased VEGFR2 (↑ 213%) and eNOS (↑1000%) with no change in AKT-P; responss more robust than either NO or RetA alone. NO 10 ppm + RetA treatment of MLFM cells led to similar but less robust changes in these proteins; but NO 2ppm + RetA showed minimal changes.

CONCLUSIONS: NO(10 ppm) + RetA treatment reversed the O_2-induced changes in proteins important for lung microvascular and airway development. Further experiments evaluating a dose-response for NO and RetA are underway. Given the varied response of fetal lung endothelial cells vs. whole lung, use of both models is necessary in evaluating effects of NO and RetA combined therapy.

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11:30am

Optimizing HFNC and Nasal CPAP Support in Preterm Infants Using Respiratory Inductive Plethysmography

Soraya Abbasi, Emidio M. Sivieri, Jeffrey S. Gerdes.
Pediatrics, Division of Neonatology, The Children's Hospital of Philadelphia, Philadelphia, PA; Pennsylvania Hospital, Philadelphia, PA; Pediatrics, Perelman School of Medicine, Univ of PA, Philadelphia, PA.

BACKGROUND: Asynchrony between ribcage and abdominal motion (paradoxical breathing) has been used clinically as a measure of respiratory distress and the adequacy of respiratory support. Respiratory inductive plethysmography (RIP) is a non-invasive bedside technique for evaluation of chest wall movement. When properly calibrated, it can measure respiratory function in infants who are on non-invasive respiratory support which precludes use of a traditional airway flow sensor for obtaining respiratory mechanics measurements.

OBJECTIVE: To measure respiratory mechanics and thoracoabdominal asynchrony (TAA) indices in premature infants with RDS treated with humidified high flow nasal cannula (HFNC) and nasal continuous positive airway pressure (nCPAP).

DESIGN/METHODS: 17 infants (11 HFNC, 6 nCPAP) with GA 31.5±1.8 wks, BW 1720±460g were studied at age 5±6 days (1-22). Measurements were made at baseline, 2,3,4,5 L/m HFNC and 3,4,5,6 cmH_2O nCPAP. RIP was calibrated at baseline by multiple linear regression of pneumotach derived tidal volume with RIP ribcage and abdomen signals. Esophageal pressure was measured using a water filled catheter. Lung compliance (CL), airway resistance (R) and work of breathing (WOB) were computed by a least mean square technique. Labored breathing index (LBI), phase angle (phi) and phase relation total breath (PhRTB) were obtained from analysis of ribcage and abdomen excursions.

RESULTS: In our patient population LBI, phi and CL were optimum at 4-5 cmH_2O nCPAP and 3-4 L/min HFNC.

	LBI	Phi degrees	PhRTB %	CL ml/cmH_2O/kg	R cmH_2O/L/sec	WOB gm-cm/kg
nCPAP baseline	1.25±0.30	62.0±41.0	34.8±20.1	0.85±0.25	109±37	14.4±5.1
3 cmH_2O	1.23±0.36	63.6±45.8	39.0±21.6	0.85±0.12	88±22	6.3±1.4
4 cmH_2O	1.18±0.39	48.9±48.7	33.7±25.2	0.99±0.27	87±34	8.4±1.3
5 cmH_2O	1.30±0.44	50.8±51.5	32.2±27.6	0.84±0.09	56±19	6.6±1.5
6 cmH_2O	1.24±0.38	54.3±37.7	33.4±21.2	0.70±0.08	115±18	9.5±3.5
HFNC baseline	1.27±0.40	59.0±38.9	36.4±21.5	0.88±0.09	109±13	20.9±2.0
2 L/min	1.23±0.38	59.4±39.7	33.6±21.0	0.98±0.11	114±20	21.9±4.8
3 L/min	1.09±0.15	41.6±41.2	28.5±20.3	1.00±0.14	110±16	16.7±2.4
4 L/min	1.15±0.29	45.6±40.8	29.0±22.0	0.97±0.11	118±15	19.0±2.8
5 L/min	1.22±0.37	58.4±54.5	33.2±28.0	0.77±0.07	131±21	11.0±2.1

CONCLUSIONS: Properly calibrated RIP appears to be a useful bedside technique to quantify the degree of chest wall asynchrony and overall respiratory function and to help optimize the level of non-invasive respiratory support in preterm infants.

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11:45am

Respiratory Mechanics Measurements by Respiratory Inductive Plethysmography in Infants on Non-Invasive Respiratory Support

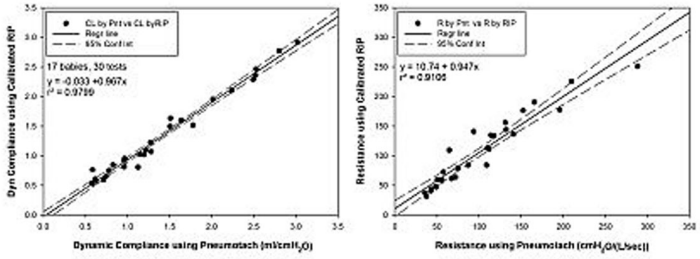
Emidio M. Sivieri, Jeffrey S. Gerdes, Soraya Abbasi.
Pediatrics, Division of Neonatology, The Children's Hospital of Philadelphia, Philadelphia, PA; Pennsylvania Hospital, Philadelphia, PA; Pediatrics, Perelman School of Medicine, Univ. of Pennsylvania, Philadelphia, PA.

BACKGROUND: In an effort to reduce the prevalence of chronic lung disease in premature infants, there is increased use of non-invasive forms of respiratory support such as nasal CPAP, nasal IMV and heated and humidified high flow nasal cannula (HFNC), all of which preclude use of a traditional airway flow sensor for making respiratory mechanics measurements. Respiratory inductive plethysmography (RIP), in addition to providing chest wall motion analysis, may also be used for respiratory mechanics measurements when properly calibrated.

OBJECTIVE: To compare in-vivo measurements of dynamic lung compliance (CL) and resistance (R) obtained using a calibrated pneumotachometer (PNT) with those obtained using calibrated RIP.

DESIGN/METHODS: Respiratory mechanics measurements were performed on 17 infants (GA 31.5±1.8 wks, BW 1720±460g) within the first 3 weeks of life and on either nasal CPAP or HFNC at various settings. Baseline measurements were also made with no therapy and lasting 1-2 minutes. At baseline, RIP ribcage (rc) and abdomen (ab) signals were recorded (200 HZ, 16 bit) simultaneously with the flow signal from a facemask attached PNT and transpulmonary pressure using a water-filled esophageal catheter to estimate intrapleural pressure. Both qualitative diagnostic calibration (QDC) and multiple linear regression algorithms were applied to low-pass filtered artifact-free infant breaths to obtain rc and ab scaling factors. The summated rc and ab RIP signal was differentiated to obtain a flow waveform using a sequence of optimizing iterations to obtain a best-fit regression coefficient with the PNT true flow signal. CL and R for RIP vs PNT measurements were plotted as shown and correlation coefficients obtained.

RESULTS: Correlation coefficients for CL and R by PNT vs. RIP were $r^2 = 0.9799$ and $r^2 = 0.9106$ respectively.



CONCLUSIONS: When properly calibrated, RIP derived pulmonary mechanics measurements provide sufficient diagnostic accuracy in infants receiving non-invasive respiratory support.

Neonatology III
Platform Session

Sunday, March 24, 2013
9:45am–12:00pm

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9:45am

Fellow in Training

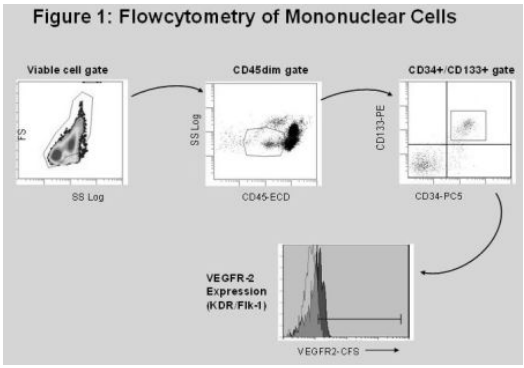
The Profile of Endothelial Progenitor Cells in the Peripheral Blood of Preterm and Term Neonates: Are There Any Differences?

Prem Arora, Sala Sadaps, Meena Sadaps, Vaneet Kalra, Steven Buck, Ranjan Monga, Nitin Chouthai.
The Carman and Ann Adams Department of Pediatrics, Division of Neonatal-Perinatal Medicine, Wayne State University School of Medicine, Detroit Medical Center, Children's Hospital of Michigan and Hutzel Women's Hospital, Detroit, MI; Jefferson Medical College, Thomas Jefferson University, Philadelphia, PA; The Carman and Ann Adams Department of Pediatrics, Division of Hematology-Oncology, Wayne State University School of Medicine, Detroit Medical Center, Children's Hospital of Michigan, Detroit, MI; Department of Pediatrics, Division of Neonatal-Perinatal Medicine, Hurley Medical Center, Flint, MI.

BACKGROUND: There are studies in neonates correlating endothelial progenitor cells (EPCs) in cord blood to various neonatal diseases and intrauterine conditions. But, there are no studies comparing different subtypes of EPCs in the peripheral blood of preterm and term neonates.

OBJECTIVE: To compare the percentage of different EPC subtypes in the peripheral blood of preterm and term newborns.

DESIGN/METHODS: Blood samples were collected from 43 newborns within first 24 hours of life. Mononuclear cells separated by gradient centrifugation were subjected to flow-cytometry.



RESULTS:

Clinical characteristics:

	Preterm (n=15)	Term (n=28)	P-Value
Birth-weight	1666 ± 770	3284 ± 482	**<0.001**
Gestational age	31 ± 5	39 ± 1	**<0.001**
Males	6 (40%)	9 (32%)	0.43
African-Americans	15 (100%)	20 (71%)	0.26
Age at sampling (hours)	15 ± 7	12 ± 8	0.19
C-section	10 (67%)	17 (61%)	0.48
Histological chorioamnionitis	7 (47%)	15 (54%)	0.46
PIH	6 (40%)	12 (43%)	0.56
IUGR	3 (20%)	1 (4%)	0.19

*P-values calculated using t-test and chi-square test.

Comparison of different EPC subtypes:

EPC Subtype (%) (CD45 dim cells)	Preterm (n=15) [Median (IQR)]	Term (n=28) [Median (IQR)]	P-Value
CD34+	0.61 (0.31-1.04)	0.36 (0.18-0.73)	0.114
CD133+	0.36 (0.17-0.73)	0.30 (0.14-0.58)	0.575
CD34+CD133+	0.35 (0.15-0.71)	0.25 (0.12-0.54)	0.359
CD34+CD133+VEGFR2+	0.029 (0.0084-0.059)	0.0076 (0.0019-0.026)	**0.006**
CD34+VEGFR2+	0.030 (0.013-0.051)	0.0067 (0.0016-0.025)	**0.008**

*EPC subtype values expressed as percentage of all mononuclear cells. Due to non-normal distribution of EPC subtypes in both groups, Mann-Whitney U test was used to calculate these p-values. Percentage of two EPC subtypes (CD34+CD133+VEGFR2+, CD34+VEGFR2+) was significantly higher in preterm neonates.

CONCLUSIONS: Circulating VEGFR2 expressing EPC subtypes are significantly higher in preterm newborns as compared to term newborns. Further studies are warranted to explore the changes in EPC milieu across different gestational ages.

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10:00am

Fellow in Training

Coagulopathy in Newborns with Hypoxic Ischemic Encephalopathy (HIE) Treated Wtih Therapeutic Hypothermia

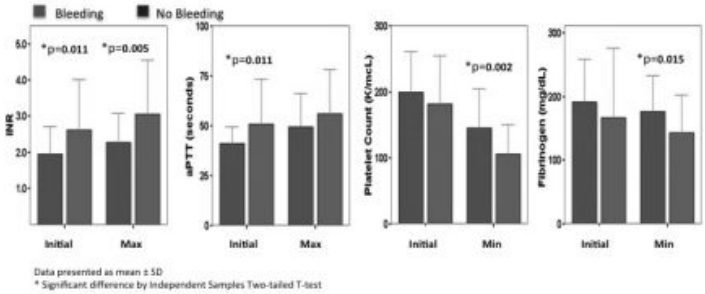
Katie R. Forman, Yaser Diab, Edward Wong, An N. Massaro.
Neonatology, Children's National Medical Center, Washington, DC; Hematology/ Oncology, Children's National Medical Center, Washington, DC; Laboratory Medicine, Children's National Medical Center, Washington, DC; Pediatrics, The George Washington University School of Medicine, Washington, DC.

BACKGROUND: Newborns with HIE are at risk for coagulopathy due to systemic oxygen deprivation. Additionally, therapeutic hypothermia (TH) slows enzymatic activity of the coagulation cascade, leading to prolongation of coagulation studies in these patients. The level of laboratory abnormality that predicts bleeding is unclear, leading to varying practice in transfusion therapy.

OBJECTIVE: To identify the thresholds of INR, aPTT, fibrinogen (Fib) and platelet count (Plt) that are associated with bleeding in HIE infants undergoing TH.

DESIGN/METHODS: HIE infants meeting criteria for TH (Shankaran, NEJM 2005) between 2008-2012 were included. Initial, min and max values of INR, aPTT, Fib and Plt (measured twice daily during TH) were collected retrospectively. Bleeding that 1) decreased Hb by 2g/dL in 24 hrs, 2) required blood products for hemostasis, or 3) was in a critical organ system (Goldenberg, J Thromb Haemost, 2011) was noted. Laboratory data between the bleeding group (BG) and non-bleeding group (NBG) were compared and significant variables were evaluated with ROC analyses to determine cut-points to predict bleeding.

RESULTS: A total of 76 infants (mean BW 3.34±0.67 kg, GA 38.6±1.9 wks, median pH 6.98 (IQR 0.35), 5-min Apgar 3 (IQR 2)) were enrolled. BG included 41 infants. Bleeding sites involved intracranial (n=13), GI (n=19), pulmonary (n=18), hematuria (n=11) or other (n=2). There were no differences between BG and NBG in baseline characteristics (p>0.05). BG had higher initial INR, max INR, initial aPTT, and lower min Plt and min Fib.



ROC analyses provided cutpoints for Fib (154.5, 71% sens, 68.6% spec, AUC = 0.695, p=0.004); Plt (130.5, 71% sens, 62.9% spec, AUC 0.695, p=0.004); and INR (1.985, 73.2% sens, 54.3% spec, AUC 0.666, p=0.013).

CONCLUSIONS: Laboratory evidence of coagulopathy is universal in HIE babies undergoing TH. Appropriate thresholds to prevent clinical bleeding may include maintaining platelet count >130K/mcL, fibrinogen level >150 mg/dL, and INR <2 in this population.

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10:15am

Fellow in Training

Protection Against Neonatal Candidiasis by a Monoclonal Antibody Targeting the *Candida albicans* Adhesin, Als3p

Anoop S. Pulickal, Sonia S. Laforce-Nesbitt, Lois L. Hoyer, Joseph M. Bliss.
Pediatrics, Brown University; Women & Infants Hospital, Providence, RI; Pathobiology, University of Illinois, Urbana, IL.

BACKGROUND: Neonatal candidiasis, with *Candida albicans* as the primary etiological agent, is the third most common cause of late-onset neonatal sepsis. Despite treatment, death or severe impairment is observed in 73% of infected extremely low birth weight infants.

OBJECTIVE: We evaluated the capacity of a monoclonal antibody targeting the *C. albicans* adhesin, Als3p (anti-Als3p MAb), to protect against neonatal candidiasis when used as a prophylactic or therapeutic agent in a mouse model. Transplacental and postnatal transfer of anti-Als3p MAb was also determined following administration in pregnancy and its humoral longevity was tested.

DESIGN/METHODS: Anti-Als3p MAb was administered by i.p. injection in 2-day old Balb/c mice daily for three days either before or after an i.p. challenge with 5 x 10^6 cfu/g of *C. albicans*. Control mice received either saline or isotype control antibody. Survival was the primary outcome measure; fungal burden in the kidney, liver, lung and brain was also determined at death or at 72 hours following infection in surviving pups. In other experiments, pregnant dams at E19 were injected with anti-Als3p MAb intravenously. The persistence of MAb was evaluated by immunofluorescence microscopy in timed sera following injection and at terminal bleed of neonatal mice born to these dams.

RESULTS: Significant improvements in survival were observed in vaccinated vs. control mice (91% vs. 30%, p<0.001) and in treated vs. control mice (100% vs. 50%, p=0.002). The median fungal colony counts (cfu/g) were significantly lower in the liver (960 vs. 79000, p<0.001), kidney (60 vs. 4840, p<0.001), lung (30 vs. 690, p<0.001) and brain (0 vs. 70, p<0.001) of vaccinated pups compared to control pups. Similarly, significant differences were observed in the median fungal colony counts in the liver (340 vs. 1860, p<0.05), kidney (150 vs. 805, p<0.05) and brain (0 vs. 55, p<0.05) of treated pups compared to control pups. Anti-Als3p MAb was detected in the sera of adult mice up to 7 days post-injection and in pups, born to dams given MAb in pregnancy, at 5 days of life.

CONCLUSIONS: These data indicate that in a mouse model of neonatal candidiasis, anti-Als3p MAb protects against *C. albicans*, has a sustained presence in sera and is perinatally transferred to neonates. Anti-Als3p MAb may have utility as an antenatal/neonatal passive vaccine and neonatal therapeutic agent in the management of invasive neonatal candidiasis.

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10:30am

Fellow in Training

Aquaporins as Possible Autoimmune Effectors of Preeclampsia

Nisreen S. Maari, Surendra Sharma.
Pediatrics, Women and Infants Hospital of RI, Providence, RI.

BACKGROUND: Pre-eclampsia (PE) is a late pregnancy complication, diagnosed by hypertension, proteinurea, and edema. Dysregulation in hormonal activity, angiogenesis, auto-antibodies and immunity are considered to contribute to the onset of PE. Our recent studies suggest that perturbed aquaporin water channels contribute to preterm birth, polyhydramnios and angiogenic defects associated with perinatal toxicant exposure in mouse models.

OBJECTIVE: We hypothesize that PE is an auto-immune disorder associated with auto-antibodies against aquaporin water channels. The objective of our study was to detect and establish an association between presence of circulating aquaporin auto-antibodies and PE.

DESIGN/METHODS: Aquaporin 1, 8, 9 expression in term normal and PE placenta were carried out on human placental sections by immunohistochemistry. Circulating auto-antibodies against aquaporins was demonstrated using IgG isolated from normal and PE serum samples (n=24) by immunoflorescence. First trimester trophoblasts HTR8 were used as target cells that expressed aquaporin protein antigen. Confirmatory studies were carried out by blocking experiments using epitope binding aquaporin peptides. Functional assay for the role of aquaporin antibodies in angiogenesis was demonstrated using three-dimensional dual cell endovascular activity using endothelial cells and HTR8 cells.

RESULTS: AQP9 expression, but not AQP1 and AQP8, was decreased in PE compared to normal placental sections. 75% of sample IgG (9 /12) isolated from PE serum demonstrated the presence of AQP 9 auto-antibodies as shown by its strong binding to the cytoplasmic antigen on HTR8 cells, compared to only 25% IgG (3/12) isolated from normal pregnancy serum. The binding of circulating AQP 9 auto-antibodies was reversed by AQP9 protein but not AQP 1, AQP 8 epitope binding peptide.
CONCLUSIONS: We believe that AQP9 autoantibody is a potential novel player in the etiology of preeclampsia.

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10:45am

Fellow in Training

CXC Chemokine Inhibitor Can Delay Preterm Delivery Induced by Chorioamnionitis and Reduce Neonatal Mortality and Morbidity

Ranjith Kamity, Hardik Patel, Sharif Younis, Edmund Miller, Mohamed Ahmed.
Neonatal-Perinatal Medicine, Cohen Children's Medical Center of New York, New Hyde Park, NY; Lilling Family Neonatal Research Lab, Feinstein Institute for Medical Research, Manhasset, NY.

BACKGROUND: Intrauterine infection is one of the main etiologies associated with preterm delivery. The associated inflammatory injury has been linked to bronchopulmonary dysplasia, periventricular leukomalacia, cerebral palsy, and poor neurodevelopmental outcome. Cytokines involved in the inflammatory process of chorioamnionitis include IL1, TNFα, IL8, IL6, MCP1, and IL10. Antileukinate (AL) is a potent selective IL8 inhibitor that binds to CXC receptors on neutrophils thereby inhibiting IL8-induced neutrophil chemotaxis and cytokine release.
OBJECTIVE: To determine if Antileukinate delays preterm delivery in a mouse model of chorioamnionitis.
DESIGN/METHODS: Timed pregnant adult C57BL6 mice were studied. The LPS group (n=8) received intraperitoneal (IP) injections of LPS (50 mcg/mouse) on gestational day (GD) 15 to induce preterm delivery. The AL group (n=8) received LPS on GD15 followed by daily IP injections of AL (1mg/mouse) on GD15, 16 and 17. Control groups received either saline (n=5) or no injections (n=5). Time to delivery and number of pups delivered (stillborn/ live) were recorded. Blood and uterine tissues from the dams and brain and lungs from surviving pups were collected. Histopathology was studied, and cytokines [IL1, TNF, IL6, KC (Mouse IL8 homologue), MCP1 and IL10] were measured using ELISA.
RESULTS: In the LPS group, 88% delivered within 24 hours after LPS compared to 25% in the AL group ($P<0.05$). The LPS group had 85% stillborn pups compared with 23% in the AL group ($P<0.001$). Uterine histopathology in the LPS group showed evidence of severe chorioamnionitis with inflammatory cell infiltration, abscess formation and necrosis while the AL group showed mild to no evidence of chorioamnionitis. Dams in the AL group had a significant reduction of KC, TNF and MCP1 in serum compared with LPS group ($P<0.05$). Cytokine levels in surviving pup brain and lungs in AL were not significantly different from those in the control groups ($P>0.05$).
CONCLUSIONS: Our data confirm that Antileukinate significantly delays preterm delivery in a mouse model of chorioamnionitis induced by LPS, and significantly reduces neonatal mortality and morbidity. Studying long term neurodevelopmental outcome of surviving pups in the Antileukinate group is planned.

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11:00am

Undergraduate Student

Risk Factors for Oropharyngeal Aspiration in Newborns with Congenital Diaphragmatic Hernia

Kara L. LaBarge, Rebecca A. Neth, Ann Liu, Natalie L. Davis, Catherine A. Sheils, Lawrence M. Rhein.
Boston University, Boston, MA; Emmanuel College, Boston, MA; Wake Forest School of Medicine, Winston-Salem, NC; Division of Newborn Medicine, Boston Children's Hospital, Boston, MA; Division of Respiratory Diseases, Boston Children's Hospital, Boston, MA.

BACKGROUND: Advances in neonatal care have improved the survival of patients with congenital diaphragmatic hernia (CDH). Along with better survival, infants with CDH also experience later morbidities. Oropharyngeal aspiration (OPA) is common in infants with neurologic dysfunction or prematurity, but its prevalence in CDH has not been well-described.
OBJECTIVE: This study seeks to determine demographic and clinical risk factors for OPA in full-term newborns with CDH.
DESIGN/METHODS: We identified full-term infants diagnosed with CDH who underwent surgical repair at Boston Children's Hospital from 1998 to 2012 and excluded all infants with cardiac, genetic, or anatomical co-morbidities. Demographic and clinical variables were extracted, and referral for Modified Barium Swallow (MBS) and failure of MBS were determined. Logistic regression analyses were used to identify factors associated with failure of MBS.
RESULTS: 23% of study subjects were referred for MBS; 10% of the total cohort failed. Predictors of failure of MBS identified by univariate analyses included longer initial hospitalization, longer duration of ventilator use, and discharge home with supplemental oxygen requirement.[figure1]When placed into a multivariate logistic regression model, respiratory medication use, inhaled nitric oxide use, need for ECMO, and use of reflux medications at discharge were not significantly associated with MBS failure. Only duration of ventilation predicted MBS failure. Receiver operator characteristic (ROC) analysis showed duration of ventilator use greater than 17 days was predictive of failure of MBS.

Table 1: Unadjusted Predictors of FAIL MBS vs. pass/not referred

	Pass/Not Referred MBS (n=86) *Estimate, error*	FAIL MBS (n=10) *Estimate, error*	*p-value*
GESTATIONAL AGE (days)			
Mean Birth Gestational Age (days)	267 (14)	261 (20)	*0.2502*
Median Birth Gestational Age (days)	266 (14)	270 (23)	*0.6885*
Admission Duration (days)	Median: 38 (48)	Median: 70 (51)	*0.0397*
Birth Weight	Mean: 2990 (699) Median: 3000 (900)	2714 (865) 2790 (1510)	*0.287* *0.2983*
DC Weight	Mean: 3156 (1707) Median: 3570 (1420)	Mean: 3851 (413) Median: 3850 (495)	*0.0075* *0.2606*
GENDER			*1*
Male	69% (59)	70% (7)	
Female	31% (27)	30% (3)	
RACE			*0.7665*
White	73% (63)	70% (7)	
Black	3% (3)	0% (0)	
Other/unknown	23% (20)	30% (3)	
GESTATION NUMBER			*1*
Singleton	92% (79)	100% (10)	
Multiples	8% (7)	0% (0)	
ECMO (yes)	23% (20)	20% (2)	*1*
iNO treatment	23% (20)	20% (2)	*1*
Ventilation duration, days	Mean: 16 (17) Median: 11 (18)	29 (15) 24 (27)	*0.00312* *0.0106*
Discharge Home on Oxygen	36% (29)	70% (7)	*0.0465*
MEDICATIONS			
Inhaled Corticosteroids	0% (0)	0% (0)	*n/a*
Bronchodilator	12% (10)	20% (2)	*0.611*
Diuretics	45% (39)	60% (6)	*0.3795*
Anti-Reflux	82% (68)	100% (10)	*0.357*

Table 2: Multivariable Model of Predictors of MBS Failure

	Adjusted Odds Ratio[a]	95% Confidence Interval	*P*
Ventilation Duration (days)	1.052	[1.009 – 1.096]	*0.016*
ECMO history	0.185	[0.017 – 2.025]	*0.167*

[a]Adjusting for gender, race, birth GA, birth weight, multiple gestation, discharge weight, reflux med use, diuretic use, bronchodilator use, inhaled corticosteroid use, iNO

CONCLUSIONS: We identified a relatively high percentage of infants with CDH who were referred for MBS, and a subset who demonstrated OPA. Infants with CDH who have prolonged course on mechanical ventilation were at highest risk of MBS failure. Our results suggest that infants with CDH who have prolonged need for mechanical ventilation may warrant early referral for MBS to allow prompt intervention.

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11:15am

Fellow in Training

Are Bone Morphogenetic Proteins Involved in Bronchopulmonary Dysplasia?

Jenda M. Arawiran, Johanna Calo, Lance Parton, Susan Olson.
Newborn Medicine, The Regional Neonatal Center, Maria Fareri Children's Hospital at Westchester Medical Center New York Medical College, Valhalla, NY; Biochemistry & Molecular Biology, New York Medical College, Valhalla, NY.

BACKGROUND: Bone morphogenetic proteins (BMPs)influence proliferation, growth, differentiation, and apoptosis of a number of cell types. Expression of BMPs as well as their receptor BMPRII and downstream targets such as nitric oxide synthase have been found to have a role in several disease states. This may also be applicable for bronchopulmonary dysplasia (BPD) which remains a common morbidity in preterm infants despite technological advances.
OBJECTIVE: The aim of this study was to determine the effect of hyperoxia on BMP4, phosphorylated eNOS, total eNOS and BMPRII expression in human pulmonary arterial endothelial cells (HPAEC).
DESIGN/METHODS: HPAECs were cultured at 37°C with 5% CO_2. Cells were passaged at 70-80% confluence with trypsin. Primary cultures of passages 5-6 were used in the experiments. HPAECs were plated in 6-welled plates, placed into chambers, and exposed to 95% O_2 and 5% CO_2 for up to 72 hours. Cell lysates were collected at 24, 48 and 72h. Antibodies to BMP4, eNOS and phosphorylated eNOS were used in Western blot assays to determine protein expression.
RESULTS:

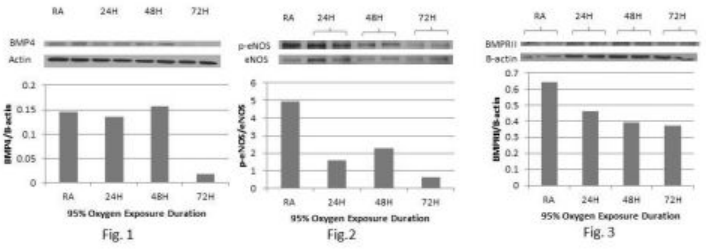

Fig. 1 Fig.2 Fig. 3

Preliminary results show that BMP4 expression is decreased in HPAECs exposed to hyperoxia for 72h (Fig 1). Published reports as well as work done in our lab show that BMP influences phosphorylation of eNOS. As such, the effect of hyperoxia on eNOS phosphorylation and eNOS protein expressed was assessed. eNOS phosphorylation was decreased with exposure to high oxygen for 72h (Fig 2). Initial upregulation of eNOS expression was seen at 24h but returned to basal levels by 72h (Fig 2). In addition, BMPRII appears to be decreasing with increasing duration of oxygen exposure (Fig 3).
CONCLUSIONS: Preliminary results demonstrate that hyperoxia decreased BMP4 expression and eNOS phosphorylation at 72h. Our study in its entirety may provide an alternative pathogenesis and may ultimately lead to new pharmacological targets for the prevention and treatment of BPD.

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11:30am

Fellow in Training

Standardized Early Transition from Parenteral-to-Enteral Nutrition Will Decrease Central Line Utilization in Preterm Infants ≤1500 grams

Lakshmi Vaithilingam, Lisa Saiman, Inga Gukhman,
Eleanor Estebanez, Rakesh Sahni.
Pediatrics, Columbia University College of Physicians and Surgeons, New York, NY.

BACKGROUND: Central line associated blood stream infections (CLABSIs) are common, costly and significant cause of morbidity and mortality in hospitalized patients. Among the factors associated with CLABSI in neonates, the duration of percutaneous central venous catheter (PCVC) utilization and the use of total parenteral nutrition (TPN) have been shown to be the significant independent risk factors. Standardizing early transition from parenteral-to-enteral nutrition and timely removal of PCVC can potentially decrease PCVC utilization and reduce CLABSI rates without adverse outcomes.

OBJECTIVE: In an ongoing quality improvement initiative we evaluated whether standardized early transition from parenteral-to-enteral nutrition will decrease the central line utilization and reduce CLABSI rates without adverse outcomes in preterm infants with birth weight ≤1500g.

DESIGN/METHODS: To meet the objective of consistent timely removal of PCVC and limiting TPN exposure once adequate enteral feeding was established, we developed, agreed and instituted feeding guidelines for early parenteral-to-enteral nutritional transition in our NICU. This transition is initiated when infants reach enteral intake of 80cc/kg/day and completed over next 48 hours. Data from three periods, i.e., pre-standardization phase (May'09-to-Dec'10), transitional phase (Jan'11-to-Dec'11, during which early transition was gradually developed and adopted but not closely monitored for adherence), and standardization phase (Jan'12 onwards) are being compared.

RESULTS: Preliminary analysis demonstrates decreases in both PCVC utilization rate (0.4 to 0.29, $p<0.05$, 2010 to 2011) and CLABSI rate (3.4 to 1.3, $p<0.05$, 2010 to 2012) without any increase in adverse outcomes.

CONCLUSIONS: Structured intervention approach to quality improvement in the NICU setting, using standardized early parenteral-to-enteral nutritional transition, focused on limiting the use of invasive devices, is an effective means to reduce central line utilization and CLABSI rate in preterm infants with birth weight ≤1500g. These preventive strategies can be successfully incorporated into bundles of best practices within the NICU's that are critical to continually decreasing CLABSI to a zero infection rate. Further, such approaches would not only improve short- and long-term neonatal outcomes but can also potentially decrease the overall healthcare burden and cost.

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11:45am

Fellow in Training

Effects of Wharton's Jelly Mesenchymal Stem Cells on Neonatal Neutrophil Activity

I. Khan, Z. Yuan, M. Mohammed, L. Zhang, G. Ren, F. Archer,
A. Vetrano, A. Rabson, Y. Shi, B. Weinberger.
Division of Neonatology, UMDNJ-Robert Wood Johnson Medical School,
New Brunswick, NJ; Child Health Institute of NJ, New Brunswick, NJ.

BACKGROUND: Mesenchymal stem cells (MSC) are multipotent progenitors that down-regulate immune responses to facilitate engraftment. Neutrophils (PMN) are primary mediators of innate immunity and are associated with chronic inflammation in newborns. MSC and/or their secretory products are being investigated as treatment for neonatal inflammatory diseases, and umbilical cords offer the potential for an abundant, non-invasive source of these cells. These studies are the first to define the responses of neonatal PMN to Wharton's jelly-derived MSC (WJ-MSC).

OBJECTIVE: We hypothesized that: 1) biologically active MSC can be purified from Wharton's jelly, and 2) WJ-MSC down-regulate production of inflammatory cytokines by neutrophils and increase their clearance by apoptosis.

DESIGN/METHODS: WJ-MSC were isolated by dissecting the outer membrane and vessels away from umbilical cords and allowing MSC to adhere and proliferate. MSC purity and function were tested by flow cytometry and immunocytochemistry, respectively. Neutrophils from neonates (and adults for comparison) were isolated by dextran sedimentation and gradient centrifugation. PMN suspensions were incubated with adherent MSC at different ratios in 24-well plates. Cytokine production was quantified using cytometric bead array analysis, and apoptosis by Annexin V binding.

RESULTS: WJ-MSC expressed CD105, CD73, CD29 and CD90 (not HLA-DR, CD31 and CD45) surface markers. These cells were capable of differentiation into adipocyte- and osteocyte-like cells. Contrary to expectation, co-culture with WJ-MSC increased production of pro-inflammatory cytokines (IL-1β and MIP-1β) but had no effect on production of anti-inflammatory cytokines (IL-6) by adult and neonatal PMN. In addition, WJ-MSC suppressed PMN apoptosis in a dose-dependent manner, with optimal efficacy at MSCpmN = 1:20.

CONCLUSIONS: Biologically-active MSC can be harvested from umbilical cords, but these cells exert pro-inflammatory effects on PMN. This suggests that the effects of WJ-MSC are distinct from bone marrow-derived MSC and/or that PMN responses are distinct from other leukocytes. It is possible that increased PMN activity in response to MSC plays a physiologic role in the maturation of tissue architecture and immunocompetence. More research is needed before WJ-MSC can be considered for prophylaxis or therapy of inflammatory diseases in newborns.

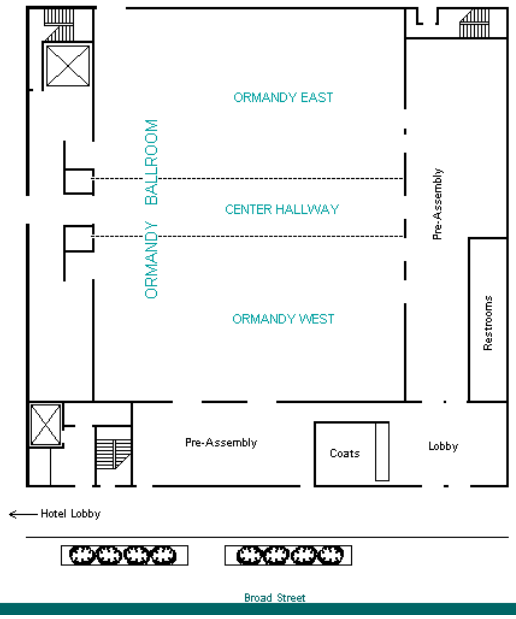
Abstract Presenter Index

Index numerals refer to the Abstract number, not the page number.
Only Presenting Abstract Authors are included in the Index.

Notes

Notes

DOUBLETREE HOTEL PHILADELPHIA - LOBBY LEVEL



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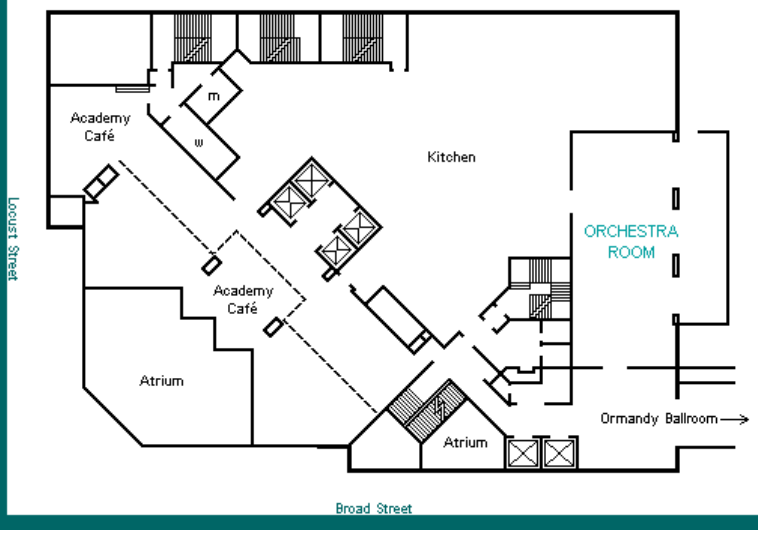

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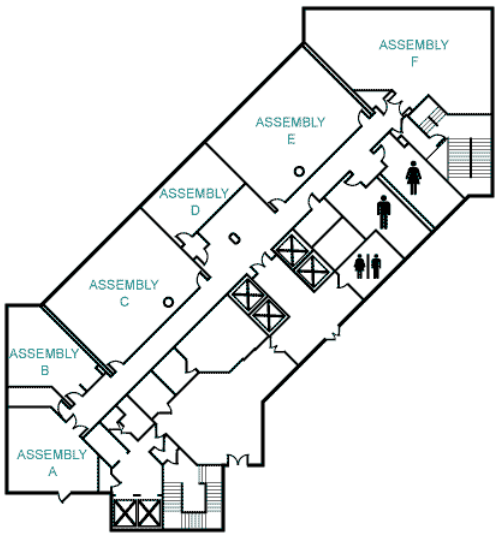

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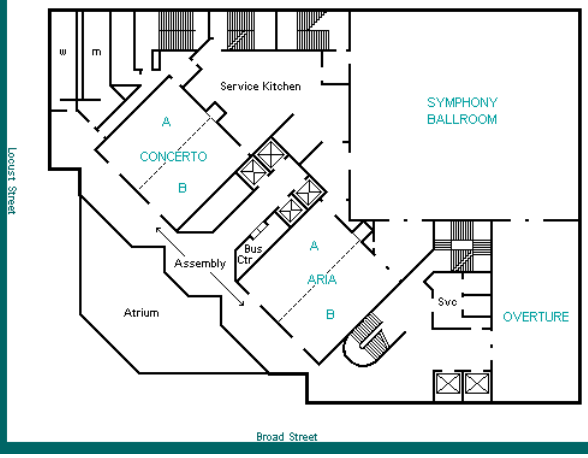

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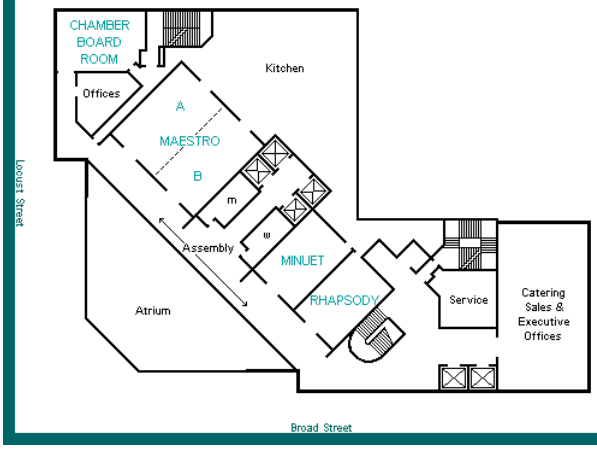

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