

Eastern Society for Pediatric Research
18th Annual Meeting

P
Program Guide

March 17-19, 2006
Hyatt Regency - Old Greenwich, CT



In cooperation with

 The Children's Hospital of Philadelphia®
A pediatric healthcare network





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Sponsorship Honor Roll

The ESPR expressed it's appreciation
to all sponsors
of the 2006 ESPR Annual Meeting

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Welcome to the 18th Annual Meeting!

Dear Colleagues:

Welcome to the 18th Annual Meeting of the Eastern Society for Pediatric Research (Eastern SPR)! We are sure that this will be an exciting meeting with excellent State-of-the-Art Plenary Talks, a Lunch with the Professor's Educational Program, featured speakers at subspecialty sessions and a large number of high-quality abstracts. The organization of this meeting would not have been possible without the help of the American Pediatric Society and the Society for Pediatric Research, especially Deborah Atwood, Information Services Director of the APS/SPR, and Debbie Anagnostelis, APS/SPR Executive Director, as well as Marathon Multimedia. We would like to acknowledge the Eastern SPR Planning Committee and the other members of the Eastern SPR Council for their help.

We are pleased that we have been able to again use the services of The Children's Hospital of Philadelphia to run our 2006 meeting and sponsor the CME program. With the growth and success of our recent meetings, the administrative burdens of organizing and running the meetings have increased significantly, and we expect that the services of the professional meeting planners at The Children's Hospital of Philadelphia will continue to enhance our meeting. This has already consisted of a secure website for membership/registration payments, timely announcements, enhanced room booking services, and, for the meeting, will include improved informatics enabling presenters to load their presentations at a central station in advance.

We would like to thank our corporate and academic sponsors who were instrumental in making this meeting possible. We are confident that this meeting continues to satisfy the mission of the Eastern SPR in providing a forum for young investigators to present their research in a structured, yet informal and relaxed atmosphere, and by offering timely educational programs that address important current clinical and basic science questions in Pediatrics. Thank you for attending!

We look forward to sharing this time with you.

Bruce D. Gelb, MD
President

Rashmin C. Savani, MB, ChB
Secretary-Treasurer

Lawrence M. Noguee, MD
Chair, Planning Committee





Meeting Services & CME Accreditation

Faculty

Steve Abman

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The Children's Hospital at Montefiore, Bronx, NY

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Michael Bye

Columbia University Medical Center, New York, NY

Alvin J. Chin

University of Pennsylvania School of Medicine,
Philadelphia, PA

David Cooke

Johns Hopkins University Hospital, Baltimore, MD

Cindy W. Christian

The Children's Hospital of Philadelphia,
Philadelphia, PA

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Winthrop University Hospital, Mineola, NY

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Albert Einstein College of Medicine,
The Children's Hospital at Montefiore, Bronx, NY

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Albert Einstein College of Medicine,
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Tulane Hospital for Children, New Orleans, LA

Registration and CME Desk Hours

Registration will be held in the Round Hill Foyer of the Hyatt Regency. Registration hours are as follows:

Friday, March 17	4:30pm – 7:00pm
Saturday, March 18	7:30am – 7:00pm
Sunday, March 19	7:30am – 1:00pm

Abstract Publication

All abstracts being presented at the 2006 Eastern SPR Annual Meeting are printed in this Program Guide, beginning on page 15.

Audio/Visual Information

All oral presentations must be made using PowerPoint. Computers and LCD projectors will be provided. Slide projectors will not be provided. Speakers will need to bring their presentations on a CD-ROM, ZIP drive, or flash memory.

Speaker Check In *Required!*

Speakers must have their presentations loaded onto a central computer during the session 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 take your CD-ROM, ZIP drive or flash memory to the Registration Area located in the Round Hill Foyer.

Business Center

The Business Center at the Hyatt Regency is located on the ground floor, near the Grand Staircase and Gift Shop.

CME Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of The Children's Hospital of Philadelphia and the Eastern Society for Pediatric Research. The Children's Hospital of Philadelphia is accredited by the ACCME to provide continuing medical education for physicians.

The Children's Hospital of Philadelphia designates this educational activity for a maximum of **11.0 Category 1 credits toward the Physician's Recognition Award of the AMA**. Each physician should claim only those hours of credit that he or she actually spent in the educational activity.

Certification Statement

The Children's Hospital of Philadelphia designates this continuing medical education activity for a maximum of 11.0 Category 1 credits toward the Physician's Recognition Award of the American Medical Association (AMA). Each physician should claim only those hours of credit that he or she actually spent in the educational activity.

Disclosure

It is the policy of The Children's Hospital of Philadelphia, Continuing Medical Education (CME) Department to insure balance, independence, objectivity, and scientific rigor in all its individually sponsored or jointly sponsored educational programs. As an accredited CME sponsor, The Children's Hospital of Philadelphia requires that its speakers comply with the ACCME Standards for Commercial Support of CME.

All faculty participating in The Children's Hospital of Philadelphia-sponsored programs are required to disclose to the program audience any real or apparent conflict(s) of interest that may have a direct bearing on the subject matter of the continuing educational program. This 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. The intent of this policy is not to prevent a speaker with a potential conflict of interest from making a presentation. It is merely intended that any potential conflict should be identified openly so that the listeners may form their own judgements about the presentation with the full disclosure of the facts. It remains for the audience to determine whether the speaker's outside interests may reflect a possible bias in either the exposition or the conclusions presented.

Procedures for CME Credit

Physicians wishing to receive CME credits will need to register for the meeting and to report to the Eastern SPR Annual Meeting Registration Desk, located in the Round Hill Foyer, and sign the sign-in sheets. Those physicians wishing CME credits for both Saturday and Sunday must sign in each day. The Poster Sessions are not designated for CME credits.

CME Certificates will be mailed from the Continuing Medical Education Department at The Children's Hospital of Philadelphia within three to four weeks after the Annual Meeting concludes.

Eastern SPR Schedule-at-a Glance

Friday, March 17

6:00pm–7:30pm

Poster Session I

–Regency ABC–

Saturday, March 18

8:15am–10:45am

**Cardiopulmonary
Development**

–Mead C–

FEATURED TALK:

T-box Genes and
Cardiovascular Development

**Endocrinology
and Obesity**

–Winthrop B–

FEATURED TALK:

Insulin Resistance, GLUT4,
and the Endoplasmic
Reticulum Stress Response

**General Pediatrics I:
Preventative
Pediatrics**

–Mead A–

FEATURED TALK:

Medical Challenges
in the Field of Child
Protection 2006

**Hematology
and Oncology**

–Winthrop A–

FEATURED TALK:

Osteosarcoma:
Identifying
Prognostic Factors
and Therapeutic Leads

**Neonatology I:
Neonatal Clinical
Studies**

–Round Hill–

FEATURED TALK:

Do Gestational Cocaine
Exposure and/or
Socioeconomic Status Have
an Association with
Neurocognitive Development?

Neurobiology

–Mead B–

FEATURED TALK:

Brain Abnormalities
in Tuberous
Sclerosis Complex

11:00am–12:00pm

Plenary Session I

–Round Hill–

A Journey Around the Urea Cycle

12:00pm–1:00pm

Lunch with the Professor

–Regency ABC–

The Ins and Outs of Submitting
a Scientific Manuscript

Eastern SPR Business Meeting

–Sheffield–

1:15pm–3:45pm

Plenary Session II

–Round Hill–

Role of Nitric Oxide in the Pathogenesis and Treatment of Bronchopulmonary Dysplasia
Faculty Young Investigator Finalists, Trainee Award Finalists

4:00pm–6:00pm

**Adolescent
Medicine**

–Winthrop B–

**Cardiology:
Clinical Studies**

–Mead C–

**Emergency
Medicine**

–Mead B–

**General Pediatrics II:
Attitudes and
Perceptions of
Caregivers and
Caretakers**

–Mead A–

**Genetics: Predictors
and Mechanisms of
Disease**

–Winthrop A–

**Neonatology II:
Animal Models and
Translational
Studies**

–Round Hill–

6:00pm–7:30pm

Poster Session II

–Regency ABC–

Sunday, March 19

8:30am–9:30am

Plenary Session III

–Round Hill–

Inherited Eye Movement Disorders Highlight Genes Essential to Human Brainstem Development

9:45am–12:15pm

Developmental Biology

–Winthrop A/B–

FEATURED TALK:

New Light on BPD:
The Pulmonary Microvasculature
Is Growing, But How?

**General Pediatrics III:
Medical Education**

–Mead C–

FEATURED TALK:

Teaching Evidence-Based Medicine
in a Busy Residency Program, Can
It Be Done Effectively?

**Infectious
Diseases**

–Mead B–

FEATURED TALK:

Cryptococcus neoformans:
A Fungal Co-factor
in Urban Asthma?

**Neonatology III:
Basic Science Studies**

–Round Hill–

FEATURED TALK:

Pulmonary Hypertension:
Basic Mechanisms and
New Therapeutic Approaches

Pulmonary

–Mead A–



Friday, March 17

Poster Session I

6:00pm-7:30pm

Regency ABC

- 1 End Tidal Carbon Dioxide as an Objective, Noninvasive Measurement of Acute Asthma Exacerbations**
Melissa L. Langhan, Mark R. Zonfrillo, Alia Bazy-Asaad, James Dziura, David M. Spiro. — *Abstract 1*
- 2 Success Rate of Endotracheal Intubations in an Urban Pediatric Emergency Department**
Susan A. Walsh, Lei Chen. — *Abstract 2*
- 3 Influenza Vaccine in the Pediatric Emergency Department for Patients with Asthma**
David A. Listman, Nathan A. Washburn, David H. Rubin. — *Abstract 3*
- 4 Influenza Vaccine Coverage Among Child Asthmatics: 2000-2005**
Jennifer R. Verani, Matilde Irigoyen, Shaofu Chen, Frank Chimkin. — *Abstract 4*
- 5 Does the Use of Metformin in Adjunct to Exogenous Insulin Induce Better Glycemic Control in Overweight Adolescents with Type I Diabetes in a Clinic Setting?**
Soukaina Adolphe, Holley F. Allen. — *Abstract 5*
- 6 Catheter Infections in Pediatric Peritoneal (PD) and Hemodialysis (HD) Patients**
Bobby J. Noghrey, Anil K. Mongia, Davoud Mohtat, Joseph N. Sleiman, Morris J. Schoeneman, Margaret R. Hammerschlag. — *Abstract 6*
- 7 Quantification of Impulse Experienced by Neonates During Routine and Intra-Hospital Transport Using an Air-Foam Mattress as Measured by Biophysical Accelerometry**
Shetal I. Shah, Martha Caprio, Praddep Mally, Karen Hendricks-Munoz. — *Abstract 7*
- 8 Impact of Ethnicity on Retinopathy of Prematurity (ROP)**
Angela M. McGovern, Shobhana Desai, Jay S. Greenspan, Jennifer F. Culhane, David Webb, Sharon Kirkby. — *Abstract 8*
- 9 Can the Length of Stay Predict Survival To Discharge in Extremely Low Birth Weight (ELBW) Infants?**
Tarek Nakhla, Sonia Imaizumi, Judy Saslow, Zubair Aghai, Nosrat Razi, Gary Stahl. — *Abstract 9*
- 10 Hypothermia and Re-Warming in Extremely Low Birth Weight Infants and the Subsequent Clinical Consequences**
Nikol Barber, Joseph D. DeCristofaro, John Chen. — *Abstract 10*
- 11 Is There an Association Between Maternal Obesity and Severity of Neonatal Illness in Very Low Birth Weight Infants?**
Christie J. Bruno, Robert Locke, Amy Mackley, David A. Paul. — *Abstract 11*
- 12 Developmental Trajectories over the First 2 Years as a Function of Gestational Age (GA), Birth Weight (BW), Intrauterine Growth Retardation (IUGR), Central Nervous System (CNS) Injury, Gender, and Maternal Education in Premature Infants**
Judith M. Gardner, Bernard Z. Karmel, Anthony Barone, Anantham Harin, Elizabeth M. Lennon, Michael J. Flory, Jiliu Xu, Alma Taganas, Simon S. Rabinowitz. — *Abstract 12*
- 13 Initiation of Nutritional Protocols in a Level III NICU Decreases Osteopenia of Prematurity**
Ibrahim S.I. Mohamed, Nancy Garrison, Ralph J. Wynn, Satyan Lakshminrusimha, Rita M. Ryan. — *Abstract 13*
- 14 Effects of Thyroid Hormone (TH) Supplementation on Vital Signs & Hospital Course in ELBW Neonates**
A. S. Nayak, I. P. Ribeiro, C. Sanchez, S. G. Golombek, E. F. LaGamma, THOP Study Group. — *Abstract 14*
- 15 Cysteine Supplementation in Parenterally Fed Neonates: Systematic Review**
Lamia M. Soghier, Luc P. Brion. — *Abstract 15*
- 16 Pasteurization Preserves the Concentration of IL-8 in Human Milk**
Marilyn V. Giorgi, Howard Heiman, Champa N. Codipilly, Debra Potak, Richard J. Schanler. — *Abstract 16*
- 17 Impact of Instrumental Dead Space on Volume Guarantee Mode of Ventilation in Extremely Low Birth Weight Infants**
Sepideh Montazami, Kabir Abubakar, Martin Keszler. — *Abstract 17*
- 18 The Unpredictability of Delivered Bubble Nasal Continuous Positive Airway Pressure: Do We Know What We're Doing?**
Doron J. Kahn, Robert H. Habib, Michael D. Weisner, Andrew M. Steele, Rachana Singh, Sherry E. Courtney. — *Abstract 18*
- 19 Use of Intra-tracheal Pressure Measurements To Minimize Air Leaks and Assess Respiratory Mechanics During High Frequency Oscillatory Ventilation (HFOV) in Infants**
Rachana Singh, Robert H. Habib, Doron J. Kahn, Sherry E. Courtney. — *Abstract 19*
- 20 Risk of an Adverse Outcome Among Prematurely Born Small for Gestational Age Infants**
Vasudha Tulsyan, Rajeev Mehta, Thomas Hegyi, Anna Petrova. — *Abstract 20*
- 21 Parenteral Nutrition-Associated Cholestasis: Increased Susceptibility of Small for Gestation Age (SGA) Infants**
Daniel T. Robinson, Richard A. Ehrenkranz. — *Abstract 21*
- 22 Effects of Early Initiation of Parenteral Nutrition in Neonatal Morbidity Among Preterm Infants**
Caroline O. Chua, Shruti Gupta, Lourdes M. Cohen. — *Abstract 22*
- 23 Postnatal Nutrition and Growth in VLBW Infants: Can *In Utero* Growth Rate Be Achieved?**
Mana Dejhalla, Nadine El-Khoury, Heather Brumberg, Boriana Parvez, Edmund F. La Gamma. — *Abstract 23*
- 24 A Caloric Intake Achieving the "Reference Fetus" Growth-Rate Is Alone Not Sufficient To Enable Later Catch-Up Growth to Birth Weight Percentile**
R. Vembenil, M. Dejhalla, M. Katzenstein, B. Parvez, E. F. LaGamma. — *Abstract 24*
- 25 Delivery of Gastroschisis Patients Before 37 Weeks Is Associated with Increased Morbidities**
J. Fisher, H. Maramreddy, M. Slim, E. LaGamma, B. Parvez. — *Abstract 25*

- 26 Population-Based Analysis of Surgery in Infants Under One Year of Age**
Jennifer K. Son, Craig Lillehei, Kimberlee Gauvreau, Kathy J. Jenkins. — *Abstract 26*
- 27 Management of Neonatal Hyperbilirubinemia: Pediatricians' Practices and Educational Needs**
Gillian B. Birchwood, Anna Petrova, Rajeev Mehta, Thomas Hegyi. — *Abstract 27*
- 28 Computerized Drug Dose Calculation To Reduce Medication Errors in the Neonatal Intensive Care Unit**
Kabir M. Abubakar, Anthonia Umeh, Jennifer Berg, Jean Rorke, Laura Folk, Martin Keszler. — *Abstract 28*
- 29 A Dedicated Lactation Consultant in the NICU Increases the Percentage of Outborn Versus Inborn Neonates Receiving Human Milk**
Marianne Augustine, Natalie Dweck, Dhruvi Pandya, Rhonda Valdes-Greene, Paul Visintainer, Heather L. Brumberg. — *Abstract 29*
- 30 Relationship Between Having a Primary Care Provider and Child Maltreatment**
Melissa S. Stockwell, Jocelyn Brown, Shaofu Chen, Frank M. Chimkin, Matilde Irigoyen. — *Abstract 30*
- 31 Are Children Referred for Child Maltreatment at Risk for Underimmunization?**
Melissa S. Stockwell, Jocelyn Brown, Shaofu Chen, Frank M. Chimkin, Matilde Irigoyen. — *Abstract 31*
- 32 Barriers to Universal Screening for Lead Poisoning; a Survey of Inner-City Pediatric Healthcare Providers**
Rachel Outterson, Nathan Graber, Maida Galvez, Vinay Aakalu, Deborah Vasquez, Ray Cornbill. — *Abstract 32*

Saturday, March 18

Cardiopulmonary Development

8:15am–10:45am

Mead C

Moderator: Alvin J. Chin, University of Pennsylvania School of Medicine, Department of Pediatrics, Division of Cardiology, Children's Hospital of Philadelphia, Philadelphia, PA

- 8:15 Sildenafil Citrate (Viagra™), a Selective Phosphodiesterase Type 5 Inhibitor Is a Powerful Pro-Angiogenic Agent**
Ramesh Vidavalur, Suresh V. Penumathsa, Lijun Zhan, Nilanjana Maulik. — *Abstract 39*
- 8:30 Colocalization of RHAMM and HA During Cardiac Morphogenesis**
Kathryn L. Maschhoff, Lindsay M. Johnson, Paul Q. Anziano, Rashmin C. Savani. — *Abstract 40*
- 8:45 Anterior Heart Field Function Is Regulated by Intracellular Calcium Signals**
George A. Porter, Ashwani K. Sharma. — *Abstract 41*
- 9:00 Regulation of H9C2 Cardiomyocyte Proliferation Involves a Crosstalk Between the β -Adrenergic Receptors (β AR) and PI3K Via a $G_{\beta\gamma}$ /Src Signaling Pathway**
Vlad D. Ianus, Naohiro Yano, Ting C. Zhao, James F. Padbury, Yi-Tang Tseng. — *Abstract 42*
- 9:15 Break**

- 9:30 ErbB Ligand-Specific Induction of Fetal Mouse Lung Type II Cell Proliferation and Differentiation**
Lucia D. Pham, Sujatha M. Ramadurai, Sandra L. Murray, Heber C. Nielsen. — *Abstract 43*
- 9:45 Hormonal Induction of DC-LAMP, a Lamellar Body Membrane Protein, in Differentiating Human Fetal Alveolar Epithelial Cells**
Venkatadri Kolla, Linda W. Gonzales, Ping Wang, Sree Angampalli, Philip L. Ballard. — *Abstract 44*
- 10:00 Increased Human Alveolar Epithelial Barrier Function Induced by Differentiation and Transdifferentiation**
Cherie D. Foster, Linda S. Varghese, Linda W. Gonzales, Susan S. Margulies, Susan H. Guttentag. — *Abstract 45*

10:15 FEATURED TALK

T-box Genes and Cardiovascular Development
Alvin J. Chin

Endocrinology and Obesity

8:15am–10:45am

Winthrop B

Moderator: David Cooke, Johns Hopkins University Hospital, Baltimore, MD

- 8:15 Hyperglycemia on Admission to the Pediatric Intensive Care Unit: Frequency and Association with Patient Outcome**
Genna W. Klein, Joanne M. Hojsak, Sharon J. Hyman, Robert Rapaport. — *Abstract 46*
- 8:30 The Prevalence of Hypertension in Obese Minority Youth**
M. Puri, M. Garcia, H. Nussbaum, J. Flynn, K. Freeman, J. DiMartino-Nardi. — *Abstract 47*
- 8:45 Effect of Metformin and Dietary/Lifestyle Therapy on Metabolic Risk Factors in Overweight Children with Dyslipidemia**
Radhika Purushothaman, Viral Gala, Meharchand Oad, Amrit Bhangoo, Sunil Sinha, Margarita Smotkin-Tangorra, Irina Kazachkova, Jessica Hileman, Deborah DeSantis, Henry Anhalt, Lisa Altshuler, Svetlana Ten. — *Abstract 48*
- 9:00 Prevalence of Vitamin D Deficiency in Obese Children and Adolescents**
Margarita Smotkin-Tangorra, Radhika Purushothaman, Ashutosh Gupta, Golali Nejati, Sunil Sinha, Henry Anhalt, Svetlana Ten. — *Abstract 49*
- 9:15 Break**
- 9:30 Prevalence of Abnormal Glucose Tolerance in Obese Minority Adolescents with Polycystic Ovary Syndrome**
Mala Puri, Mireya Garcia, Hadassa Nussbaum, Katherine Freeman, Joan DiMartino-Nardi. — *Abstract 50*
- 9:45 Patterns of Weight Gain of 3-9 Year Old Children and the Relationship of These Patterns to Obesity**
Herbert I. Goldman. — *Abstract 51*
- 10:00 Adiponectin Responses to Oral Glucose Tolerance Tests in Adolescents with Morbid Obesity**
Vatcharapan Umpaichitra, Arlene B. Mercado, Christina Juan, Jose B. Quintos, Salvador Castells. — *Abstract 52*



Saturday, March 18 continued

10:15 FEATURED TALK

Insulin Resistance, GLUT4, and the Endoplasmic Reticulum Stress Response
David Cooke

**General Pediatrics I:
Preventative Pediatrics**

8:15am–10:45am

Mead A

Moderator: Cindy W. Christian, Co-director, Safe Place: The Center for Child Protection and Health, The Children's Hospital of Philadelphia, Philadelphia, PA

8:15 Human Milk Feeding by Gestational Age and Neonatal Intensive Care Status in a Nationally Representative Population of US Infants
Cynthia R. Howard, Kathleen A. Marinelli, Peggy Auinger, Nirupama Laroia, Ruth A. Lawrence. — *Abstract 53*

8:30 Are Hospitals Too Neutral About Breastfeeding? A Qualitative Study of New Mothers' Feeding Choices for Their Infants
Daryl Wisler-Scher, Matilde Irigoyen. — *Abstract 54*

8:45 Relative Impact of Cost and Knowledge on Intake of Folate and Other Micronutrients
Ashish S. Chogle, Willeatha Taylor, Robert J. Karp. — *Abstract 55*

9:00 Improving Appropriate Therapy for Children with Asthma
Sandra F. Braganza, Iman Sharif, Philip O. Ozuah. — *Abstract 56*

9:15 Prenatal Lead Exposure in New York City Immigrant Communities
Nathan Graber, Tatyana Gabinskaya, Joel Forman, Melvin Gertner. — *Abstract 57*

9:30 Break

9:45 Pain Associated with Aspiration Prior to Intramuscular Vaccine Injection
Moshe Ipp, Anna Taddio, Jonathan Sam, Morton Goldbach, Patricia C. Parkin. — *Abstract 58*

10:00 Exposure to Community Violence in Children
Fernanda E. Kupferman-Meik, Rafael Javier, Jennifer Salhany, Phil Drucker, Maryse Roumain. — *Abstract 59*

10:15 FEATURED TALK

Medical Challenges in the Field of Child Protection
Cindy W. Christian

Hematology and Oncology

8:15am–10:30am

Winthrop A

Moderator: Richard Gorlick, Albert Einstein College of Medicine, The Children's Hospital at Montefiore, Bronx, NY

8:15 Increased Prevalence of Overweight Status in Survivors of Acute Lymphoblastic Leukemia Treated Without Cranial Radiation
Nina S. Kadan-Lottick, Linda C. Stork, Bruce C. Bostrom, Joseph P. Neglia. — *Abstract 33*

8:30 Behavioral Social Adjustment in Survivors of Childhood Acute Lymphoblastic Leukemia Treated Without Cranial Radiation
David Breiger, Thomas A. Kaleita, Nina S. Kadan-Lottick, Joseph P. Neglia, Pim Brouwers. — *Abstract 34*

8:45 Preliminary Findings of Neurobehavioral Outcomes in Survivors of Childhood Acute Lymphoblastic Leukemia (ALL) Treated Without Cranial Radiation
Nina S. Kadan-Lottick, Pim Brouwers, Thomas A. Kaleita, David Breiger, Linda C. Stork, Bruce C. Bostrom, Joseph P. Neglia. — *Abstract 35*

9:00 Break

9:15 Mechanisms of Phthalate-Induced Toxicity in Neonatal PMN
Nkiru Nwebube, Anna Vetrano, Kirin Syed, Chris Caravanos, Sowmya Murthy, Priya Palit, Nazeeh Hanna, Barry Weinberger. — *Abstract 36*

9:30 Pulmonary Health in Sickle Cell Disease
Anita Bhandari, Nathan Hagstrom, Craig Schramm. — *Abstract 37*

9:45 Efficacy of Single Donor Platelets in Neonates Is Not Affected by Platelet Yield
David W. Moser, Amy Mackley, John Hays, David A. Paul. — *Abstract 38*

10:00 FEATURED TALK

Osteosarcoma: Identifying Prognostic Factors and Therapeutic Leads
Richard Gorlick

Neonatology I: Neonatal Clinical Studies

8:15am–10:45am

Round Hill

Moderator: Hallam Hurt, Department of Pediatrics, Division of Neonatology, The Children's Hospital of Philadelphia, Philadelphia, PA

8:15 Changes in Tidal Volume Requirement with Advancing Postnatal Age in Ventilated Extremely Low Birth Weight Infants
Sepideh Montazami, Kabir Abubakar, Martin Keszler. — *Abstract 60*

8:30 Effect of Supine and Prone Sleep Positions in Apnea of Prematurity
Dharmendra J. Nimavat, Joseph D. Decristofaro, John J. Chen, Wenyang Mao, Doreen DeMeglio. — *Abstract 61*

8:45 Apnea in Preterm Infants and Tobacco Use in Pregnancy: Is There an Association?
Shama Praveen, Naveed Hussain, Cheryl Oncken. — *Abstract 62*

9:00 Volume Guarantee Accelerates Recovery from Endotracheal Tube Suctioning in Ventilated Preterm Infants
Kabir M. Abubakar, Sepideh Montazami, Martin Keszler. — *Abstract 63*

9:15 Ranitidine Use and Late-Onset Sepsis in the Neonatal Intensive Care Unit
Simona Bianconi, Madhu Gudavalli, Vesna G. Sutija, Anna L. Lopez, Lilliana Barillas-Arias, Nitin Ron. — *Abstract 64*

- 9:30 Break**
- 9:45 Is the Pro-Inflammatory Pulmonary Response of Preterm Infants Influenced by the Type of Surfactant?**
Vanessa V. Mercado, Ioana Cristea, Sonya Strassberg, Elizabeth Buescher, Jean Yang, Lance A. Parton. — *Abstract 65*
- 10:00 Special Health Care Needs of Infants at the Threshold of Viability**
Bonnie E. Stephens, Richard Tucker, Betty R. Vohr. — *Abstract 66*

10:15 FEATURED TALK

Do Gestational Cocaine Exposure and/or Socioeconomic Status Have an Association with Neurocognitive Development?
Hallam Hurt

Neurobiology

8:15am–10:45am Mead B
Moderator: Francis DiMario, Jr., Connecticut Children's Medical Center, University of Connecticut School of Medicine, Hartford, CT

- 8:15 Risk Factors for Perinatal Brachial Plexus Palsy; a 6 Year Study**
Malgorzata D. Bulanowski, Rosario R. Trifiletti, David H. Rubin, Syed A. Hosain. — *Abstract 67*
- 8:30 Using Auditory Brainstem Responses To Assess Central Nervous System Integrity in the Neonatal Intensive Care Unit**
Bernard Z. Karmel, Judith M. Gardner, Anthony Barone, Anantham Harin, Ha T.T. Phan, Brij Kapadia, Marina Korneeva, Poonam Rauniyar, Simon S. Rabinowitz. — *Abstract 68*
- 8:45 Role of Inhaled Nitric Oxide in Evolution of Brain Lesions in the Premature Infant**
Heather Kaplan, Scott A. Lorch, Xianqun Luan, Sandra Wadlinger, Sabah Servaes, Richard J. Martin, William E. Truog, Avital Cnaan, Roberta A. Ballard, the NO-CLD Trial Group. — *Abstract 69*
- 9:00 Break**
- 9:15 NF κ B Thiol Modifications Following Hypoxia-Reoxygenation in Cerebral Cortical Cells**
Noah Cook, Guang Yang, Robert Kalb, Andrew Gow. — *Abstract 70*
- 9:30 Maturation and Antenatal Corticosteroids Reduce Non-Neuronal Apoptosis and Caspase-3 Activity in the Preterm Cerebral Cortex**
Shadi N. Malaeb, Teddy Si Youn, Grazyna B. Sadowska, Virginia Hovanesian, Matthew D. Sarasin, Silvia M. Hartmann, Barbara S. Stonestreet. — *Abstract 71*
- 9:45 Gray Matter Volume Reduction in Very Low Birth Weight Infants Is related to Gram Negative Infection**
Maricor Castillo, John Van Dyke, Linda Heier, Conrad Cassie, Sarah Sarvis, J. M. Perlman. — *Abstract 72*
- 10:00 Hypoxia Down-Regulates Expression of Prostaglandin D Synthase in Mouse Brain**
Americo E. Esquibies, Reza Farahani, Gabriel G. Haddad. — *Abstract 73*

10:15 FEATURED TALK

Brain Abnormalities in Tuberous Sclerosis Complex
Francis DiMario, Jr.

Plenary Session I

- 11:00am–12:00pm Round Hill
- 11:00 Welcome and Announcement of the Mentor of the Year Award**
- 11:10 A Journey Around the Urea Cycle**
Mark L. Batshaw, Children's National Medical Center, Washington, DC

Lunch with the Professor's Educational Program

- 12:00pm–1:00pm Regency ABC
- 12:00 The Ins and Outs of Submitting a Scientific Manuscript**
Edward L. Lawson, Johns Hopkins University Hospital, Baltimore, MD

Eastern SPR Business Meeting

- 12:00pm–1:00pm Sheffield

Plenary Session II

- 1:15pm–3:45pm Round Hill
- 1:15 Role of Nitric Oxide in the Pathogenesis and Treatment of Bronchopulmonary Dysplasia**
Steve Abman, University of Colorado, The Children's Hospital, Denver, CO

Faculty Young Investigator Finalists

- 2:15 Caspases 3 and 7 Are Important for Cardiac Development and Are Key Mediators of Mitochondrial Events of Apoptosis**
Saqib A. Lakhani, Ali Masud, Keisuke Kuida, George A. Porter, Carmen J. Booth, Wajahat Z. Mehal, Irteza Inayat, Richard A. Flavell. — *Abstract 74*
- 2:30 Role of Ephrin-B2 in Early Renal Development**
Tanzeema Hossain, Jordan A. Kreidberg. — *Abstract 75*

Trainee Award Finalists

- 2:45 TGF β Mediates Hypoxia-Induced Inhibition of Alveolization in Newborn Mice**
Huayan Zhang, Hengjiang Zhao, Zheng Cui, Rashmin C. Savani. — *Abstract 76*
- 3:00 A Novel Anti-Inflammatory Pathway for SP-A Involving TLR2, TGF β , RHAMM and Hyaluronan (HA)**
Hengjiang Zhao, Joseph P. Foley, Stephan J. Butler, Huayan Zhang, Jo Rae Wright, Rashmin C. Savani. — *Abstract 77*
- 3:15 VEGF Blockade and the Notch Signaling Cascade in Neuroblastoma**
Eleny Romanos, Jessica Kandel, Darrell Yamashiro. — *Abstract 78*
- 3:30 Zinc Protoporphyrin IX Represses Cyclin D1 Gene Expression Through Disruption of Sp-1/Egr-1 Site in the Cyclin D1 Gene Promoter**
Zhi Wang, Andrew Gow, Guang Yang, Qing Lin, Phyllis A. Dennery. — *Abstract 79*



Saturday, March 18 continued

Adolescent Medicine

4:00pm–5:45pm

Winthrop B

Moderator: Sandra Braganza, Albert Einstein College of Medicine, The Children's Hospital at Montefiore, Bronx, NY

- 4:00 The Prevalence of Hypertension in Obese Minority Adolescents with Polycystic Ovarian Syndrome**
M. Puri, M. Garcia, H. Nussbaum, J. Flynn, K. Freeman, J. DiMartino-Nardi. — *Abstract 80*
- 4:15 Managing Childhood Overweight: Relationship Between Parent and Child Self-Efficacy**
Katherine O'Connor, Iman Sharif. — *Abstract 81*
- 4:30 Knowledge of Abortion Methods by Adolescents**
Mandy S. Coles, Laura P. Koenigs. — *Abstract 82*
- 4:45 Break**
- 5:00 Developmental and Service Needs of Teens and Young Adults with Congenitally Acquired HIV: A Follow up Study**
Katlyne Lubin, Marsha Edell, Netburn Laura. — *Abstract 83*
- 5:15 Seroprevalence of HIV-1 Infection in an Adolescent and Young Adult Population: An Anonymous Survey in a Community Hospital in the South Bronx**
Murli U. Purswani, Stefan Hagmann, Aida R. Matias, Caroline A. Nubel, Ram Kairam. — *Abstract 84*
- 5:30 Risk-Taking Behaviors and Depression in Adolescents Seeking Care in the Pediatric Emergency Department**
Maia S. Rutman, Thomas Chun, Bruce M. Becker. — *Abstract 85*

Cardiology: Clinical Studies

4:00pm–5:45pm

Mead C

Moderator: Nancy Ross-Ascuitto, Department of Pediatrics, Tulane Hospital for Children, New Orleans, LA

- 4:00 Pulmonary Hypertension in Children with Sickle Cell Disease**
Muhammad A. Khan, Erika Berman Rosenzweig, Robyn J. Barst, Margaret T. Lee, Tania Small, Mitchell S. Cairo, Sujit S. Sheth. — *Abstract 86*
- 4:15 Cardiac Risk After Craniopharyngioma Therapy: A Cross-Sectional Pilot Study**
Sandy Mong, Scott L. Pomeroy, Frank Cecchin, Mark E. Alexander. — *Abstract 87*
- 4:30 Medical Injury Diagnosis and High Resource Utilization During Congenital Heart Surgery Admissions**
Oscar J. Benavidez, Jean A. Connor, Kimberlee Gauvreau, Kathy J. Jenkins. — *Abstract 88*
- 4:45 Flow Disturbances with Small Pressure Change: Relevance to Obstructed Total Caval Pulmonary Connection (TCPC)**
Joshua Wiesman, Nancy Ross-Ascuitto, Donald Gaver, Robert Ascuitto. — *Abstract 89*
- 5:00 Break**

- 5:15 Prevalence of Congenital Cardiovascular Malformations Varies Between Whites, Blacks, and Hispanics**

Amitoz S. Manhas, Paul Visintainer, Cheryl Hunter-Grant, Heather L. Brumberg. — *Abstract 90*

- 5:30 Improvement in Mortality for Congenital Heart Surgery in Guatemala**

Luis A. Larrazabal, Kathy J. Jenkins, Kimberlee Gauvreau, Guillermo A. Gaitan, Aldo R. Castaneda. — *Abstract 91*

Emergency Medicine

4:00pm–5:45pm

Mead B

Moderator: Linda Brown, Department of Pediatrics, Yale University School of Medicine, New Haven, CT

- 4:00 Round Versus Square Head Otoscope for the Diagnosis of Acute Otitis Media**
David M. Spiro, Khoonyen E. Tay, James Dziura, Cosby G. Arnold, Eugene D. Shapiro. — *Abstract 92*
- 4:15 A Brief Screen for Adolescent Depression in the Pediatric Emergency Department**
Maia S. Rutman, Edmond Shenassa, Thomas Chun, Bruce M. Becker. — *Abstract 93*
- 4:30 Break**
- 4:45 Ultrasound Measurement of the Inferior Vena Cava Diameter in the Assessment of Children with Dehydration**
Lei Chen, Yunie Kim, Karen Santucci. — *Abstract 94*
- 5:00 Predicting Pertussis in a Pediatric Emergency Department (PED) Population**
Jennifer E. Mackey, Wojcik Susan, Boyle Margaret, Long Ray, Callahan M. James, Grant D. William. — *Abstract 95*
- 5:15 The Association of Body Mass Index and Ankle Injuries in Children**
Mark R. Zonfrillo, Jeffrey A. Seiden, Ellen M. House, Eugene D. Shapiro, Robert Dubrow, Mark D. Baker, David M. Spiro. — *Abstract 96*
- 5:30 End Tidal Carbon Dioxide Changes with Bronchodilator Therapy During Acute Asthma Exacerbations in Children**
Melissa L. Langhan, Mark R. Zonfrillo, Alia Bazzzy-Asaad, James Dziura, David M. Spiro. — *Abstract 97*

General Pediatrics II: Attitudes and Perceptions of Caregivers and Caretakers

4:00pm–6:00pm

Mead A

Moderator: John Harrington, New York Medical College, Hawthorne, NY

- 4:00 Parent Attributions for Difficulties Experienced by Children with ADHD**
Bridget Perrin, Leandra Godoy, Chris Sheldrick, Ellen C. Perrin. — *Abstract 110*
- 4:15 Parental Beliefs on Overweight and Lifestyle Changes in Latino and African-American Early School Age Children**
Shuba Kamath, Carolyn Rosen, Richard Adams, Danielle Laraque. — *Abstract 111*
- 4:30 Pediatric Healthcare Provider Beliefs Regarding Low-Level Lead Exposure and Adverse Effects in Children**
Rachel E. Outterson, Vinay K. Aakalu, Nathan Graber, Maida Galvez, Deborah Vasquez, Ray Cornbill. — *Abstract 112*

- 4:45 Bright Futures Health Supervision Guidelines Encounter Forms for Families Did Not Increase Parental Participation in Well-Child Care**
Eugene Dinkevich, Pam Sass, Anne Skamai. — *Abstract 113*
- 5:00 Break**
- 5:15 The Prevalence and Correlates of the Use of Over-the-Counter Cough and Cold (OTCC) Medicines in Asthmatic Children in South Bronx**
Maria Andrea Alano, Sameera Haroon, Delsa Compres, Ronald Bainbridge, Ayoade Adeniyi, Richard Neugebauer, Anantha Harijith. — *Abstract 114*
- 5:30 Use of Complimentary and Alternative Therapies in an Hispanic Immigrant Inner City Population**
Ranjini Chugh, Margarita Fermin, Candace Erickson. — *Abstract 115*
- 5:45 Custody Concerns: Parental Wills in an Inner-City Pediatric Clinic**
Mathew H. Baldasaro, Cheryl D. Tierney. — *Abstract 116*

Genetics: Predictors and Mechanisms of Disease

4:00pm–5:45pm Winthrop A

Moderator: Mark L. Batshaw, Children's National Medical Center, Washington, DC

- 4:00 Single Nucleotide Polymorphisms of IL8 (-781) and Autistic Spectrum Disorders**
John W. Harrington, Nora Ali, Patrick Maffucci, Ioana A. Cristea, Lance Parton. — *Abstract 105*
- 4:15 Do TNF α Polymorphisms Predict BPD?**
Sonya S. Strassberg, Ioana A. Cristea, Dajun Qian, Nora Ali, Jason A. Herrick, Lance A. Parton. — *Abstract 104*
- 4:30 Break**
- 4:45 Shared Genetic Susceptibility to Retinopathy of Prematurity (ROP) and Bronchopulmonary Dysplasia (BPD)**
Matthew J. Bizzarro, Naveed Hussain, Rui Feng, Jeffrey R. Gruen, Heping Zhang, Vineet Bhandari. — *Abstract 106*
- 5:00 Urine Proteomic Biomarkers Distinguish Steroid-Sensitive (SSNS) and Steroid-Resistant (SRNS) Idiopathic Nephrotic Syndrome (INS) of Childhood**
Robert P. Woroniecki, Ibrahim F. Shatat, Frederick J. Kaskel, Tatyana N. Orlowa, Edmond O'Riordan, Michael S. Goligorsky. — *Abstract 107*
- 5:15 Expression Profiles as Predictors of Bronchopulmonary Dysplasia in Extremely Low Gestational Age Newborns**
Jennifer N. Cohen, Yao Sun, Linda Van Marter, Alan Leviton, Elizabeth Allred, Isaac Kohane. — *Abstract 108*
- 5:30 Is Proximity to a Nuclear Power Plant Associated with Increased Rates of Congenital Malformations?**
Tania Mangones, Paul Visintainer, Cheryl Hunter-Grant, Heather L. Brumberg. — *Abstract 109*

Neonatology II: Animal Models and Translational Studies

4:00pm–5:45pm Round Hill

Moderator: Jonathan Davis, Neonatology, Winthrop University Hospital, Mineola, NY

- 4:00 Circulating Stem Cells in the Preterm Neonate**
Matthew J. Bizzarro, Vineet Bhandari, Dianne S. Krause, Brian Smith, Ian Gross. — *Abstract 98*
- 4:15 CC10 Reduces the Inflammatory Response in Piglet Meconium Aspiration Syndrome (MAS)**
Robert M. Angert, Aprile L. Pilon, Hschi-Chi Koo, Ellen M. Gurzenda, Lynda Adrouche-Armani, Davis M. Jonathan. — *Abstract 99*
- 4:30 Quantification of Nitric Oxide Metabolites in a Newborn Piglet Model of Lipopolysaccharide-Induced Sepsis**
Michael A. Padula, Ted H. Elsasser, Diane Wray-Cahen, Andrew J. Gow, Harry Ischiropoulos. — *Abstract 100*
- 4:45 Break**
- 5:00 Neonatal Resuscitation in Lambs with 100%O₂ Decreases Pulmonary Vasodilator Response to Inhaled Nitric Oxide (NO) and Acetylcholine (ACh)**
Satyan Lakshminrusimha, Frederick C. Morin III, Robin H. Steinhorn, Daniel D. Swartz, Rita M. Ryan, Sylvia F. Gugino, Bobby Mathew, Karen A. Wynn, James A. Russell. — *Abstract 101*
- 5:15 Resuscitation in 21% Versus 100% O₂—Effects on Arterial Blood Gases (ABG) and Antioxidant Enzyme (AOE) Activities in Preterm Newborn Lambs**
A. Patel, R. M. Ryan, S. Lakshminrusimha, K. A. Wynn, L. C. Nielsen, H. Wang, V. H. Kumar. — *Abstract 102*
- 5:30 MMP-2 and MMP-9 Activity in Lung Homogenates Following Resuscitation in Room Air or Oxygen in Term and Preterm Newborn Lambs**
Vasanth H. Kumar, Daniel D. Swartz, Anupama Patel, Lori C. Nielsen, Huamei Wang, Karen A. Wynn, Rita M. Ryan. — *Abstract 103*

Poster Session II

6:00pm–7:30pm Regency ABC

- 1 Transitional Medicine: How We Train Emergency Physicians To Care for Adults with Congenital Heart Disease**
Keith P. Cross, Karen A. Santucci. — *Abstract 117*
- 2 Correlation Between Carboxyhemoglobin and Fetal Hemoglobin**
Allen L. Hsiao, Karen A. Santucci, M. Douglas Baker, Carl R. Baum. — *Abstract 118*
- 3 Apnea Hypopnea Index (AHI) Is a Marker of the Sleep Disturbance in Children with Obesity**
Shalaka Indulkar, Radhika Purushothaman, Viral Gala, Amrit Bhangoo, Sunil Sinha, Margarita Smotkin, Irina Kazachkova, Henry Anhalt, Michael Marcus, Svetlana Ten. — *Abstract 119*



Saturday, March 18 continued

- 4 Lamotrigine and Phenytoin, but Not Amiodarone, Impair Peripheral Chemoreceptor Responses to Hypoxia**
E. Vincent S. Faustino, David F. Donnelly. — *Abstract 120*
- 5 Fecal ASCA Measurements in the Assessment of Pediatric Patients with Known or Suspected Crohn's Disease**
V. Tang, T. R. Walker, T. M. Saslowsky, K. Ong, K. Tygrett, J. H. Boone, P. A. Rufo. — *Abstract 121*
- 6 Expedited HIV-Testing in the Labor and Delivery Setting: The Use of Rapid HIV-Testing in a South Bronx Community Hospital**
Claudia J. Alvarado, Laura Daugialaite, Carlos Barahona, Caroline A. Nubel, Kelly Monaghan, Marilyn Crane, Stefan Hagmann, Murli U. Purswani. — *Abstract 122*
- 7 RSV Genotype and Severity of Disease in Children**
Richard A. Martinello, Issac Lazar, Carla Weibel, Eugene D. Shapiro, Jeffrey S. Kahn. — *Abstract 123*
- 8 A Computer-Based, Multivariate, Economic Analysis of Neonatal-Intensive-Care-Unit-Based Influenza Vaccine Administration to Parents in a Low-Socio-Economic, Urban Setting**
Shetal I. Shah, Martha Caprio, Pradeep V. Mally, Karen Hendricks-Munoz. — *Abstract 124*
- 9 Is Urinary Transforming Growth Factor beta-1 (TGF- β 1) a Useful Biomarker in Idiopathic Nephrotic Syndrome (INS) of Childhood?**
Ibrahim F. Shatat, Edmond O'Riordan, Frederick J. Kaskel, Robert P. Woroniecki. — *Abstract 125*
- 10 Characteristics of Pulmonary Hypertension (PH) in Infants < 37 Week Gestation (GA)**
V. H. Kumar, S. Lakshminrusimha, A. A. Hutchison, K. Keleher, R. M. Ryan. — *Abstract 126*
- 11 Comparison of Pulmonary Outcomes in a Premature Cohort: O₂ Requirement at 36 Weeks GA, Outpatient Diuretic Use, and Respiratory Readmissions**
A.M. Hibbs, S.A. Lorch, E. Alessandrini, A. Cnaan, M.C. Walsh, R.J. Martin, W.E. Truog, C.E. Coburn, R.A. Ballard, NO CLD Trial Group. — *Abstract 127*
- 12 Ventilator Associated Pneumonia in a High Risk NICU Population**
Folasade I. Kehinde, Naveed Hussain, Ted S. Rosenkrantz. — *Abstract 128*
- 13 Prophylactic Fluconazole Therapy for Very Low Birth Weight Infants Colonized with Candida**
Vaishali Jha, Monica Bajaj, Vinayak Govande, Myron Sokal, Dominique Jean-Baptiste, Nam-Young Chung, Elsa Santos-Cruz, M.Roger Kim. — *Abstract 129*
- 14 Outbreak of Parainfluenza Virus Type 3 in a Neonatal Intensive Care Unit**
Aryeh Simmonds, Barbara Clones, Jose Munoz, Marisa Montecalvo, Edmund F. LaGamma. — *Abstract 130*
- 15 Infection-Induced Placental Inflammatory Responses: Does the Type of Organism Matter?**
Mehmet Bayraktar, Morgan Peltier, John Noh, David Sorrentino, Vasudha Tulsyan, Barry Weinberger, Nazeeh Hanna. — *Abstract 131*
- 16 Placental Pathology in Asymptomatic Infants Screened for Early-Onset Sepsis**
Shirley Y. Huang, Rebecca N. Baergen, Marie Ambroise, Jeffrey M. Perlman. — *Abstract 132*
- 17 Is It Safe To Keep Umbilical Vein Catheters for Longer Than 7 Days?**
Nadine El-Khoury, Sulaiman Sannoh, Barbara Clones, Borianna Parvez. — *Abstract 133*
- 18 The Effects of Low Dose Indocin (0.1mg) Treatment on PDA Closure in VLBW Neonates**
Dalbir Singh, Pradeep Mally, Karen Hendricks-Munoz. — *Abstract 134*
- 19 Hydrolyzed Protein Formula for Gut Priming in VLBW Infants**
R. Vembenil, M. Dejhalla, M. Katzenstein, E. F. LaGamma, B. Parvez. — *Abstract 135*
- 20 Autonomic Reactivity During Car Seat Testing in Preterm Infants**
Lisa R. Eiland, Rakesh Sahni. — *Abstract 136*
- 21 A Unique Way of Decreasing Hospital Cost: The Infant Apnea Program**
Bgee E. Kunjumon, Pradeep Mally, Jessie Caprio, Anthony Peralto, Rishi Vorha, Karen Hendricks-Munoz. — *Abstract 137*
- 22 Hemangioma and Retinopathy of Prematurity: A Possible Association**
Vijayakumar Praveen, Ramesh Vidavalur, Ted S. Rosenkrantz, Naveed Hussain. — *Abstract 138*
- 23 Incidence of Periventricular Leukomalacia: Seventeen Years of Experience at a Community Hospital**
Natinder Saini, Madhavi Jasti, Khaja Raziuddin, Rica Vizarra Villonco, Vesna G. Sutija. — *Abstract 139*
- 24 Resuscitation Decisions (RD) in the Delivery Room (DR) at the Edge of Viability (EOV) and with Known Trisomy 18(TR18). Is the Gender of the Provider Important?**
Melanie P. McGraw, Jeffrey M. Perlman. — *Abstract 140*
- 25 Reliability of Immunization Records in Internationally Adopted Children**
Bindy Crouch, Paul J. Lee, Maria Alonso, Dorothy Lane, John J. Chen, Leonard R. Krilov. — *Abstract 141*
- 26 Referring Hospitals Survey for Pediatric Transport Team—Quality of Service Assessment Tool**
Michael F. Canarie, Heather A. Schmenk, Isaac Lazar. — *Abstract 142*
- 27 Sitting in the Front Seat of a Passenger Vehicle: Real-Time Usage and Possible Risk Factors at One Elementary School**
John W. Harrington. — *Abstract 143*
- 28 Hospital Admissions for Children with Autistic Spectrum Disorder in a Tertiary Care Setting: Diagnostic Etiology and Length of Stay**
John W. Harrington, Ana Garnecho. — *Abstract 144*
- 29 Prevalence of Parent Reported ADHD in 6-12 Year Old Inner City, Primary Care Patients**
Daniela I. Sima, Margarita Fermin, Candace Erickson. — *Abstract 145*

- 30 Monocanalicular Silastic Tube Intubation for the Initial Correction of Nasolacrimal Duct Obstruction: A Novel Approach**
Amy Vyas, J. Mark Engel, Barbara M. Ostfeld. — *Abstract 146*
- 31 Precepting in a Pediatric Resident Continuity Clinic**
Laura Dattner. — *Abstract 147*
- 32 Body Size and Neighborhood Characteristics: Does Food Store Availability Make a Difference?**
Maida P. Galvez, Jodi Siskind, Cherita Raines, Jessica Kobil, Kim Morland, Julie A. Britton, Barbara Brenner, James Godbold. — *Abstract 148*

Sunday, March 19

Plenary Session III

- 8:30am–9:30am Round Hill
- 8:30 Announcement of Young Investigator Awardees**
- 8:40 Inherited Eye Movement Disorders Highlight Genes Essential to Human Brainstem Development**
Elizabeth Engle, Harvard University and Boston Children's Hospital, Boston, MA

Developmental Biology

- 9:45am–12:15pm Winthrop A/B
- Moderator: Monique dePaepe, Women and Infants Hospital of Rhode Island, Providence, RI*
- 9:45 Gap Junctions in Mouse and Zebrafish Left-Right Development**
Ivy Lin, Zhaoxia Sun, Roseanne Titcombe, Martina Brueckner. — *Abstract 149*
- 10:00 Multiple Signal Transduction Pathways Interact Genetically with a Noonan Syndrome-Related *PTPN11* Gain-of-Function Mutation**
In-Kyong Kim, Kimihiko Oishi, Huiwen Ying, Fitnat Topbas, Michael Kaplan, Marek Mlodzik, Leslie Pick, Bruce D. Gelb. — *Abstract 150*
- 10:15 Transient In Utero Knockout of CFTR Results in a Disruption of Organogenesis and Intestinal Epithelial Differentiation in Sprague-Dawley Rats**
Kelly E. Moulton, J. Craig Cohen, Janet E. Larson. — *Abstract 151*
- 10:30 Valproic Acid, a Structural Homologue of Diet-Derived Butyrate, Regulates Tyrosine Hydroxylase Gene Expression (TH): A Possible Gut-Brain Link to Behavior**
Pranav Patel, Bistra Nankova, Edmund F. LaGamma. — *Abstract 152*
- 10:45 Break**
- 11:00 Macrophage-Specific Transgenic Overexpression of the Receptor for Hyaluronan-Mediated Motility (RHAMM) Increases Inflammatory Responses**
Zheng Cui, Hengjiang Zhao, Gaoyuan Cao, Horace M. DeLisser, Rashmin C. Savani. — *Abstract 153*
- 11:15 Heme Oxygenase-1 Is a Signaling Molecule That Regulate Its Own Expression**
Qing S. Lin, Sebastian Weis, Guang Yang, Phyllis A. Dennerly. — *Abstract 154*
- 11:30 Mechanical Strain Activates Rho and Induces Stress Fiber Formation in Fetal Lung Type II Epithelial Cells**
Ophira Silbert, Yulian Wang, Benjamin Maciejewski, Sunil Shaw, Juan Sanchez-Esteban. — *Abstract 155*

11:45 FEATURED TALK

New Light on BPD: The Pulmonary Microvasculature Is Growing, But How?
Monique dePaepe

General Pediatrics III: Medical Education

9:45am–12:15pm Mead C

Moderator: Eugene Dinkevich, Department of Pediatrics, SUNY Downstate Medical Center, Brooklyn, NY

- 9:45 Over the Counter and Under the Radar: Addressing Pediatric Residents' Unfamiliarity with OTC Medications**
R. Goldman, M. Schechter, A. D. Racine. — *Abstract 156*
- 10:00 Have Pediatric Resident Call Schedules Changed in Response to ACGME Work Hour Limits?**
Jodi K. Wenger, Stuart N. Karon. — *Abstract 157*
- 10:15 Differences in Factors Attendings and Residents Use To Evaluate Third Year Medical Students on Their Pediatric Clerkship Rotation**
Steve Paik, Brianna Moore, Mark Graham. — *Abstract 158*
- 10:30 Break**
- 10:45 The Incidence of Iron Deficiency Anemia in Female Residents**
Asmi F. Alam, Clarice Staves, Phillipa Sprinz. — *Abstract 159*
- 11:00 Perceptions of Expected Proficiency in Neonatal Resuscitation: A Resident Survey**
Dalbir Singh, Karen Hendricks-Munoz, Pradeep Mally. — *Abstract 160*
- 11:15 Empirical Analysis of the Third Year Pediatric Clerkship Evaluation Forms**
Steve Paik, Brianna Moore, Ting Zhang, Mark Graham. — *Abstract 161*
- 11:30 Educational Goals of Incoming Pediatric Residents**
Laura Dattner, Stephen J. Wadowski. — *Abstract 162*

11:45 FEATURED TALK

Teaching Evidence-Based Medicine in a Busy Residency Program, Can It Be Done Effectively?
Eugene Dinkevich

Infectious Diseases

9:45am–12:00pm Mead B

Moderator: David Goldman, Albert Einstein College of Medicine, The Children's Hospital at Montefiore, Bronx, NY

- 9:45 Association Between Bell's Palsy and Herpes Simplex Virus Infection in Children**
Hnin Khine, Jeffrey R. Avner, Margurite Mayers, Amy Fox, Betsy Herold, David L. Goldman. — *Abstract 163*
- 10:00 Human Bocavirus Infection in Young Children**
Deniz Kesebir, Marietta Vazquez, Eugene D. Shapiro, Carla Weibel, David Ferguson, Marie L. Landry, Jeffrey S. Kahn. — *Abstract 164*



Sunday, March 19 continued

10:15 Administration of Inactivated Trivalent Influenza Vaccine (TIV) to Parents of High-Risk Infants in the Neonatal Intensive Care Unit (NICU): Effect on Vaccination Rates

Shetal I. Shah, Martha Caprio, Pradeep Mally, Karen Hendricks-Munoz. — *Abstract 165*

10:30 Influenza Vaccine Coverage Among Children Aged 6-23 Months: 2000-2005

Jennifer R. Verani, Matilde Irigoyen, Shaofu Chen, Frank Chimkin. — *Abstract 166*

10:45 Break

11:00 Inflammatory Factors in Synovial Fluid from Patients with Acute and Chronic Lyme Arthritis

Paul T. Fawcett, Carlos D. Rose, Victoria L. Maduskuie, Jennifer J. Sanderson, AnneMarie C. Brescia, Phillip A. Stanek. — *Abstract 167*

11:15 The Contribution of Replication Capacity to Evolution of HIV Reverse Transcriptase Inhibitor Resistance

Elijah Paintsil, Asa Margolis, Jennifer A. Collins, Louis Alexander. — *Abstract 168*

11:30 FEATURED TALK

***Cryptococcus neoformans*: A Fungal Co-factor in Urban Asthma?**
David Goldman

Neonatology III: Basic Science Studies

9:45am-12:15pm Round Hill

Moderator: Stella Kourembanas, Division of Newborn Medicine, Boston Children's Hospital, Boston, MA

9:45 B-Type Natriuretic Peptide (BNP) System in an Ovine Model of Persistent Pulmonary Hypertension of the Newborn (PPHN)

Bobby Mathew, James A. Russell, Robin H. Steinhorn, Sylvia F. Gugino, Lori C. Nielsen, Rita M. Ryan, Satyan Lakshminrusimha. — *Abstract 170*

10:00 The Effects of Superoxide Dismutase (SOD) on Actin Dynamics and Endothelial Cell Structure in Response to Hyperoxia

Robert M. Angert, Yuchi Li, Robin H. Steinhorn, Svetla Harkness, Jeffrey A. Kazzaz, Jonathan M. Davis. — *Abstract 171*

10:15 Carcinoembryonic Antigen Cell Adhesion Protein: A Novel Type II Cell Marker of Infant Lung Injury?

Nicole A. Bailey, Linda K. Gonzales, Venkatadri Kolla, Roberta A. Ballard, Philip L. Ballard. — *Abstract 172*

10:30 Angiotensin II Stimulates Endothelial Superoxide Generation Via Src Kinase in Bovine Pulmonary Artery Endothelial Cells

Xinmei Li, Lance A. Parton, Susan C. Olson. — *Abstract 173*

10:45 Hyperoxia Translocates eNOS and Caveolin-1 from Endothelial Cell Surface to Cytoplasm

Antoni D'Souza, Jing Huang, Xiangmin Zhao, Susan Olsen, Lance A. Parton, Rajamma Mathew. — *Abstract 174*

11:00 Break

11:15 Hypoxia Induces Lung Heme Oxygenase-1 in Neonatal Mice

Karen A. Szczepanski, Qing Lin, Guang Yang, Phyllis A. Dennery. — *Abstract 175*

11:30 Differential Effects of Antenatal Corticosteroids and Brain Ischemia on Tight Junction Protein Expression in the Cerebral Cortex of Ovine Fetuses

Shadi N. Malaeb, Grazyna B. Sadowska, Edward G. Stopa, Halit Pinar, Barbara S. Stonestreet. — *Abstract 176*

11:45 FEATURED TALK

Pulmonary Hypertension: Basic Mechanisms and New Therapeutic Approaches
Stella Kourembanas

Pulmonary

9:45am-11:45am Mead A

Moderator: Michael Bye, Department of Pediatrics, Columbia University Medical Center, New York, NY

9:45 Childhood Asthma and Extreme Values of Body Mass Index: The Harlem Children's Zone Asthma Initiative

B. Ortiz, H. L. Kwon, K. Shoemaker, B. Jean-Louis, M. Northridge, R. Vaughan, R. Swaner, T. Marx, A. Goodman, L. Borrell, S. Nicholas. — *Abstract 177*

10:00 Asthmatic Children's Perception of Their Symptoms Is Related to Clinical Measures of Asthma Severity but Not to Pulmonary Function Testing

Jong Ho Park, Samuel Evans, Jessica Stewart, Elana Altzman, Eugene Dinkevich, Madu Rao. — *Abstract 178*

10:15 Defining Exercise Induced Bronchospasm... Asthma or a Separate Entity?

Nedda Salehi, Paul Salva. — *Abstract 179*

10:30 Break

10:45 Recurrent Wheezing in VLBW Infants Without Bronchopulmonary Dysplasia

I. D. Panthagani, T. P. Stevens, K. Lynch, K. M. Conn, J. S. Halterman. — *Abstract 180*

11:00 Effect of Short Course of Oral Steroids on Outcome of Premature Babies with Bronchopulmonary Dysplasia

Anita Bhandari, Craig Schramm, Mariann Pappagallo, Claudia Kimble, Naveed Hussain. — *Abstract 181*

11:15 Effect of Bias Flow on Work of Breathing During Bubble Nasal Continuous Positive Airway Pressure: A Pilot Study

Doron J. Kahn, Robert H. Habib, Michael D. Weisner, Andrew M. Steele, Rachana Singh, Sherry E. Courtney. — *Abstract 182*

11:30 Effect of Nitric Oxide Synthase Inhibition on Ovine Bronchial Derived Relaxing Factor: Changes with Development and Hyperoxic Ventilation

Satyan Lakshminrusimha, Frederick C. Morin III, Robin H. Steinhorn, Rita M. Ryan, Sylvia F. Gugino, Vasanth H. Kumar, James A. Russell. — *Abstract 183*

2006 Eastern SPR Abstracts

Poster Session I

Friday, March 17, 2006

6:00pm-7:30pm

1 Poster Board 1

Fellow in Training

End Tidal Carbon Dioxide as an Objective, Noninvasive Measurement of Acute Asthma Exacerbations

Melissa L. Langhan, Mark R. Zonfrillo, Alia Bazyz-Asaad, James Dziura, David M. Spiro. Department of Pediatrics, Section of Emergency Medicine, Yale-New Haven Children's Hospital, New Haven, CT; Department of Pediatrics, Yale-New Haven Children's Hospital, New Haven, CT; Department of Pediatrics, Section of Pulmonary Medicine, Yale-New Haven Children's Hospital, New Haven, CT; General Clinical Research Center, Yale-New Haven Hospital, New Haven, CT.

BACKGROUND: Clinical signs are used to classify an asthma exacerbation as mild, moderate, or severe; however these are subjective and imperfectly related to asthma severity. Capnography is a noninvasive, objective monitoring modality that closely approximates levels of arterial carbon dioxide. Several studies have noted the potential utility of capnography in asthma. However, none have compared quantitative end-tidal carbon dioxide (ETCO₂) in children during acute asthma exacerbations with healthy controls.

OBJECTIVE: 1) To determine if quantitative ETCO₂ correlates with clinical signs and symptoms in asthmatics during exacerbations compared with controls. 2) To determine if the capnograph can reliably and accurately output values among pediatric patients in the emergency department.

DESIGN/METHODS: In this ongoing study, we enrolled a sample of children from 1 to 21 years of age presenting to an urban pediatric ED with a known diagnosis of asthma during an acute asthma exacerbation (wheezing, cough, increased work of breathing). Patients in the same age group without respiratory or acid/base disturbances were enrolled as controls. Prior to medical intervention, vital signs, ETCO₂, and clinical signs were recorded.

RESULTS: We enrolled 38 asthmatics and 59 controls from 1 - 19 years old [mean age 9.7 vs 10 years respectively, (p=0.8)]. ETCO₂ was successfully obtained in 99% of enrollees. There was a statistically significant difference between asthmatics and controls for mean respiratory rate [27 bpm vs 20 bpm (p<.001)], mean heart rate [117 bpm vs 92 bpm (p=.004)] and mean oxygen saturation [97% vs 99% (p<.001)]. Mean ETCO₂ differed between asthmatics and controls [33 mmHg vs 38 mmHg (p=.001)]. This difference was statistically significant after adjusting for respiratory rate (p<.001).

CONCLUSIONS: Capnography can be successfully utilized in the pediatric ED. ETCO₂ is significantly lower in children with acute asthma compared with controls.

2 Poster Board 2

Fellow in Training

Success Rate of Endotracheal Intubations in an Urban Pediatric Emergency Department

Susan A. Walsh, Lei Chen. Department of Pediatric Emergency Medicine, Yale New Haven Children's Hospital, New Haven, CT.

BACKGROUND: Airway Management skills are essential to Pediatric Emergency Medicine (PEM) physicians. Endotracheal intubation (ETI) is an important skill to acquire during subspecialty training. No previous research has prospectively evaluated the success rates of endotracheal intubations performed in a pediatric emergency department by trainees, including PEM fellows.

OBJECTIVE: To investigate the success rates of endotracheal intubations performed in an urban pediatric emergency department by trainees.

DESIGN/METHODS: Over a 25 month period (10/2003 to 11/2005) we prospectively enrolled all patients who had intubations attempted in our Pediatric Emergency Department. We recorded the success or failure of each attempt by health care providers at various levels of training. Reasons for failure were recorded. Final diagnosis was also recorded.

RESULTS: Over the study period, 58 total patients were enrolled in the study. The subjects varied in age from 5 days to 19 years old. All subjects were successfully intubated. Sixteen patients were traumatic patients where in-line c-spine immobilization was maintained during intubation attempts. The most common traumatic diagnosis was closed head injury. Most common medical diagnoses were seizure and respiratory arrest.

Out of 58 subjects, pediatric emergency medicine (PEM) fellows attempted intubations in 33 patients. Their success rate was 91% (30/33, 95% C.I. 75%-98%). The first attempt success rate was 78% (26/33, 95% C.I. 61%-91%). Ten (30%) were trauma airways. PEM attendings had a success rate of 91% (10/11, 95% C.I. 59%-99%). Recorded reasons that may have contributed to the failure of the PEM fellows and attendings were "blood in the airway" and "oropharyngeal bleeding". Anesthesiologists and otolaryngologists performed 4 endotracheal intubations during the study period. The indications included suspected epiglottitis, trauma to airway and failed attempt by attending/fellow.

Residents in pediatrics and emergency medicine accounted for 14 attempts during the study period. Their success rate was 71% (10/14, 95% C.I. 42% - 92%). The success rate on first attempt was 57% (8/14 95% C.I. 29% - 82%).

CONCLUSIONS: Although individual skills may vary, in general PEM fellows are highly successful at performing ETI in both traumatic and non-traumatic patients in the Pediatric Emergency Department.

3 Poster Board 3

House Officer

Influenza Vaccine in the Pediatric Emergency Department for Patients with Asthma

David A. Listman, Nathan A. Washburn, David H. Rubin. Pediatrics, St Barnabas Hosp, Bronx, NY; Emerg Med, St Barnabas Hosp, Bronx, NY; Weill Med Col of Cornell Univ.

BACKGROUND: The AAP recently (2004) renewed its' policy recommending influenza vaccine in high-risk populations including children with asthma. Recent data demonstrate that only 10%

to 31% of children with asthma receive the vaccine and that inner city populations are likely to have lower vaccine rates. The Pediatric Emergency Department (PED) manages many of the more severe asthmatics in our community and may be an appropriate setting to vaccinate members of this high-risk group.

OBJECTIVE: To investigate the need for and feasibility of vaccinating patients in the PED.

DESIGN/METHODS: We surveyed a convenience sample of parent or caregiver (CG) of children seen in the PED for asthma exacerbation during the 2004-05 influenza season. Variables included vaccination status, willingness to be vaccinated in the PED if vaccine were available, and opinions about the need for and risk of flu vaccine and knowledge about the national flu vaccine shortage during the 04-05 flu season.

RESULTS: Surveys were completed on 183 CG (mean age of patients was 7.7 yrs). 45% of patients had moderate/severe asthma. 62% of the patients had received flu vaccine with 35% vaccinated during the study year. 18% of CG were contacted by their pediatrician reminding them to vaccinate their child. 85% of CG would be willing to have their child vaccinated in the PED. 88% of CG were aware of the vaccine shortage, 43% worried that their child might not be able to get vaccinated but only 14% had tried but were unable to get vaccine for their child. Patients with moderate to severe asthma were more likely to have ever been vaccinated for flu (p<.05). Maternal age or highest grade achieved by mother did not correlate with vaccine status. Children <7 years old were more likely to have been vaccinated. Children of CG who believed one could get influenza from the flu vaccine were not significantly less likely to have been vaccinated.

CONCLUSIONS: Influenza vaccine rates in one inner city PED were comparable to published reports. More severe asthmatics were more likely to have been vaccinated. Most patients would be willing to be vaccinated in the PED. CG were well aware of the flu vaccine shortage but it did not limit accessibility in most cases. Practitioners should direct further efforts at educating CG of less severe and older asthmatics about the need for flu vaccine.

4 Poster Board 4

Fellow in Training

Influenza Vaccine Coverage Among Child Asthmatics: 2000-2005

Jennifer R. Verani, Matilde Irigoyen, Shaofu Chen, Frank Chimkin. Division of General Pediatrics, Columbia University Medical Center, New York, NY.

BACKGROUND: Influenza is a significant cause of morbidity among children with asthma. Despite guidelines for vaccinating child asthmatics against influenza, studies have found low coverage, ranging 10-25% in outpatient settings. Risk factors for under-immunization require elucidation.

OBJECTIVE: (1) To assess the influenza vaccine coverage levels among child asthmatics within an inner city practice network over a five year period, (2) to identify demographics or patterns of health services utilization associated with under-immunization.

DESIGN/METHODS: We conducted a retrospective review of influenza vaccine coverage among child asthmatics for the 2000-2005 influenza seasons at a practice network in New York City serving a minority, Medicaid population. The study population included five annual cohorts of children aged 2-18 years as of 3/31 of each year with an ICD9 code for asthma or reactive airway disease and ≥1 primary care visit in the last 12 months (n=22,617). The source for immunization, demographic and visit data was the hospital immunization registry and linked billing/registration system. Coverage was defined as ≥1 influenza vaccine that season. Using chi-square we analyzed the impact of age, gender and utilization of health services within a year preceding the influenza season (primary care, subspecialty clinic, ER, ICU and hospital admission).

RESULTS: The 2000-2005 coverage was 23.5%. Coverage increased annually from 20.7% in 2000-2001 to 29.9% in 2003-2004 (29.9%), and dropped in 2004-2005 to 22.2%. Coverage decreased with age: 27.2% for 2-4 y/o, 23.7% for 5-11 y/o and 19.6% for 12+ y/o (p<0.001). Girls had lower coverage than boys (22.6% vs. 24.2% p<0.005). Increased use of health services was associated with greater coverage. We found relatively high rates among patients with ICU admissions (all: 51.0%, for asthma: 53.6%), hospitalizations (all: 37.3%, for asthma: 40.1%), visits to subspecialty clinics (all 40.7%, for asthma: 43.3%) and the ER (all: 26.3%, for asthma: 33.0%). Coverage in the primary care setting increased with visits (1 visit: 16.6%; >6 visits: 38.3%), and with any visit for asthma (32.9%).

CONCLUSIONS: Influenza vaccine coverage among child asthmatics was low and showed no significant improvement over a five year period. Adolescents and girls were less likely to be vaccinated. The utilization of health services was associated with increased coverage.

5 Poster Board 5

House Officer

Does the Use of Metformin in Adjunct to Exogenous Insulin Induce Better Glycemic Control in Overweight Adolescents with Type I Diabetes in a Clinic Setting?

Soukaina Adolphe, Holley F. Allen. Pediatrics, Baystate Children's Hospital, Springfield, MA.

BACKGROUND: Metformin is an oral anti-hyperglycemic agent commonly used in the treatment of type 2 diabetes (T2DM). Metformin increases insulin sensitivity primarily at the hepatic level. Insulin resistance is often present in adolescents with and without diabetes due at least partly to high levels of counter regulatory hormones during puberty. It is well known that both overweight and pubertal adolescents with type 1 diabetes (T1DM) have higher insulin requirements.

OBJECTIVE: The goal of the present work is to evaluate the impact of metformin in conjunction with insulin on insulin requirement, HbA1c, and BMI for adolescents with T1DM in a clinic setting.

DESIGN/METHODS: The database of the endocrine clinic was queried for all patients with a diagnosis of diabetes under age 18 who were prescribed metformin. Charts were reviewed, and each patient with T1DM who was prescribed and took metformin for at least 9 months was matched with 2 controls of comparable age, gender, duration of diabetes, HbA1c and BMI. We evaluated change in BMI, BMI SDS score, insulin dose/kg/day and HbA1c during a 9 month period after initial prescription of metformin. Results are mean±SEM.

RESULTS: We studied 39 subjects, 13 subjects were prescribed metformin - mean dose 1 g per day, aged 14.5±0.67, 6F/7M, 6W/2B/5H. At baseline the mean weight was 78.2±6.0 kgs, BMI 29.0±1.4 kg/m², BMI SDS of 1.8±0.17, HbA1c of 9.4±0.5% and insulin dose 1.4±0.2 U/kg/day. The 26 controls were all well matched for age, gender, insulin dose, HbA1c and duration of diabetes,

but were less heavy, BMI 23.5±0.8(p=.001), BMI SDS 0.89±0.16 (p=.001) After 9 months of metformin rxn, the subjects' mean increase in BMI (0.48±0.59), insulin dose (0.04±0.1 U/kg/day), and slight decrease in HbA1c (-0.66±0.5) were not significant and were not significantly different from changes seen over the same time period in the 26 controls - BMI (0.56±0.3), insulin dose (0.11±0.8), and HbA1C (+0.04±0.3).

CONCLUSIONS: During 9 months of metformin use, subjects with T1DM did not lose weight, experienced no significant reduction in insulin dose or improvement in HbA1c and had a similar clinical course to controls. Although these findings should be confirmed with a larger study, they do not suggest an advantage of addition of metformin to insulin therapy in overweight teens with T1DM.

6 Poster Board 6 Fellow in Training

Catheter Infections in Pediatric Peritoneal (PD) and Hemodialysis (HD) Patients

Bobby J. Noghrey, Anil K. Mongia, Davoud Mohtat, Joseph N. Sleiman, Morris J. Schoeneman, Margaret R. Hammerschlag, Pediatrics, SUNY-Downstate, Brooklyn, NY.

BACKGROUND: Intravascular and peritoneal catheter-related infections are major causes of morbidity and mortality in children on chronic dialysis.

OBJECTIVE: The aim of this study was to investigate the frequency, microbiology and antimicrobial therapy of catheter infections in children on chronic PD and HD at our institution. DESIGN/METHODS: We retrospectively reviewed records on all pts on chronic dialysis from 8/99-11/05.

RESULTS: 20 pts on dialysis (HD 13; PD 7), were studied, ages 1mo-21yrs. 16/20 (80%) were infected at least once during this period. 63 episodes of infection were seen in 16 (80%) pts, 43 episodes in 10 pts on HD; 20 episodes of peritonitis/catheter-related infections in 6 pts on PD. 3/13 (23%) pts on HD had one episode, 7 had ≥4 episodes (range 4-8). In HD, the first infection occurred, on average, 4.3 mos after catheter insertion, average 1 episode/4.4mos. The first infection occurred 5.4 mos after PD catheter insertion; each pt had 1 infection episode/5.8 mos. The most frequent bacteria in HD pts were coag neg Staph [S. epidermidis 8 (18.6%), S. hominis 3 (6.9%)], Staph aureus 6 (13.9%), of which all were MSSA, and Enterococcus 4 (9.3%). Gram neg orgs: Brevibacterium casei 2, (4.6%), E. coli 2, (4.6%) and one each of Serratia marcescens, Alcaligenes xylosoxidans, Acinetobacter wolffii and Bacillus. The most frequent pathogens in catheter infection/peritonitis in 20 pts on PD were Candida sp 5 (25%), followed by coagulase negative Staph 5 (25%), S aureus 2 (10%), Enterococcus 2 (10%), K pneumoniae 2 (10%) and one each of P aeruginosa and Neisseria. sicca.

CONCLUSIONS: NAPRTCS data (2004) show HD catheter infection rate was 1 episode/yr and PD catheter related infections/peritonitis was 1 episode/15 months compared to our rate of 2.7 and 2.0 episodes/yr, respectively. Our high infection rate is probably due to improper aseptic technique and should improve with more AV fistula utilization. Antibiotic recommendations for presumptive treatment of HD catheter infections are nafcillin or oxacillin, and a 3rd generation cephalosporin, and for PD catheter infection is Cefazidime, and Cefazolin or Vancomycin. These antibiotics would not have covered 27% of the infections seen in our population, including MRSA, Enterococci, and P. aeruginosa. Choice of antibiotic therapy should be tailored to local microbiological sensitivity patterns.

7 Poster Board 7 Fellow in Training

Quantification of Impulse Experienced by Neonates During Routine and Intra-Hospital Transport Using an Air-Foam Mattress as Measured by Biophysical Acclerometry

Shetal I. Shah, Martha Caprio, Praddep Mally, Karen Hendricks-Munoz, NICU, NYU School of Medicine, New York, NY.

BACKGROUND: Newborn transport incurs morbidity. Force transmitted to the neonate during transport may be implicated. Force per time (impulse) is not well characterized. Any modification of a transporter which lengthens time for a neonate to come to rest may decrease impulse.

OBJECTIVE: To quantify biophysical impulse during inter-&intra-hospital transport & determine if an air-foam mattress dampens this effect.

DESIGN/METHODS: 5 trials (length 4 miles) using an ambulance & transport isolette outfitted with an Air-foam Mattress (Tempur-Pedic Inc). 5 accelerations/second in the X(front/back), Y(side/side) & Z(up/down) planes were made using a digital accelerometer on a 1700g neonatal model. Integration of acceleration over time yielded biophysical impulse. Total impulse was calculated via vector summation. 5 trials from the delivery room to the NICU utilized 4 configurations: 1) standard neonatal isolette (Air-Shields) 2) Gel Pillow (Children's Med. Ventures), 3) Air-foam Mattress, 4) Air-foam Mattress w/Gel Pillow. Single-tailed, paired T-test, was used for analysis.

RESULTS:

281,457 data points analyzed in the Interhospital trial

	Mean Time/trial (min)	Mean X-Plane	Impulse Y-plane	+/-SD Z-plane	(m/sec ² /min) Total	P-value Comp. w/baseline
Baseline	11.1±/0.03	0.39±/0.318	0.39±/0.47	0.38±/0.14*#	1.02±/0.6	
Standard	10.91±/3.6	3.76±/2.34*	3.13±/3.47	1.0±/1.06	28.82±/4.5	<.05
Mattress	9.32±/1.2	2.2±/1.82*	2.68±/2.5	0.397±/0.3*#	26.87±/2.34	<.05

60,756 data points analyzed for the Intra-hospital

	Mean time/trial (min)	Mean X-Plane	Impulse Y-Plane	+/-SD Z-Plane	(m/sec ² /min) Total	P-Value, Comp. w/baseline
Standard	5.6±/1.1	0.3±/0.2	0.2±/0.2	0.2±/0.6	5.8±/0.2	
Standard + Gel	4.97±/1.6	0.7±/0.5	0.2±/0.2	0.06±/0.1	1.8±/0.2*	<.05
Airfoam	4.9±/1.1	0.2±/0.2	0.3±/0.2	0.4±/0.4	4.3±/0.2*	<.05
Airfoam+Gel	4.7±/0.9	0.4±/0.4	0.16±/0.1	0.18±/0.1	4.2±/0.4*	<.05

*P<.05; #P>.05

CONCLUSIONS: Neonates transported with an air-foam mattress had less impulse in the X-&Z-planes. For intrahospital transports, neonates using the air-foam mattress & gel pillow experienced less total impulse.

8 Poster Board 8 Fellow in Training

Impact of Ethnicity on Retinopathy of Prematurity (ROP)

Angela M. McGovern, Shobhana Desai, Jay S. Greenspan, Jennifer F. Culhane, David Webb, Sharon Kirkby, Neonatology, Thomas Jefferson University, Nemours Children's Clinics, Philadelphia, PA; Drexel University College of Medicine, Philadelphia, PA; ParadigmHealth, Concord, CA.

BACKGROUND: Severe ROP (Stage 3 and 4) is a primary cause of visual morbidity for very low birthweight infants. Known risk factors include gestational age, birthweight, and illness severity. While one study has shown that Black infants are less at risk than whites, this finding has not been confirmed in larger studies. More generally, little is known about the risk of ROP among different race/ethnic groups.

OBJECTIVE: To assess the relationship between infant race/ethnicity on the risk of severe ROP for a large sample of NICU infants in over 20 U.S. hospitals.

DESIGN/METHODS: ParadigmHealth database records for surviving infants born between 1/1/2001 and 12/31/2004 with a birthweight under 1250g were included in this analysis (n=1,604). Multivariate logistic regression was used to assess the association between maternal race/ethnicity and risk for severe ROP. Models were adjusted for birthweight, gestational age, Apgar score and measures of illness severity, including: days on oxygen and mechanical ventilation, sepsis, intraventricular hemorrhage, patent ductus arteriosus, necrotizing enterocolitis, and pneumothorax.

RESULTS: In the analytic data set, the distribution of maternal race was 47.2% White, 35.3% Black, 14.9% Hispanic and 3.2% Asian. Of these infants, 8.4% developed severe ROP. The rate was 6.6% for Blacks, 9.6% for Whites, 13.8% for Hispanics and 15.7% for Asians. Compared to black neonates, the unadjusted odds ratio for ROP among White infants was 1.5 (95% CI: 1.0, 2.3), for Hispanics 2.2 (95% CI: 1.4, 3.7) and for Asians 2.6 (95% CI: 1.2, 5.9). After adjustment for gestational age, birthweight and 1 minute Apgar score, the odds ratios increased to 2.0 (CI: 1.2, 3.2) for Whites, 2.7 (CI: 1.5, 4.8) for Hispanics and 5.3 (CI 1.9, 15.1) for Asians compared to Black neonates. Adjusting for additional markers of illness severity did not alter these results.

CONCLUSIONS: Results revealed lower rates of ROP among Blacks confirming findings from earlier studies. Interestingly, relatively high rates of ROP were also found among Hispanic and Asian neonates compared to Black infants. Controlling for possibly confounding morbidities and measures of illness severity did not alter these results. Further research in this area is warranted.

9 Poster Board 9

Can the Length of Stay Predict Survival To Discharge in Extremely Low Birth Weight (ELBW) Infants?

Tarek Nakhla, Sonia Imaizumi, Judy Saslow, Zubair Aghai, Nosrat Razi, Gary Stahl, Pediatrics/Neonatology, Cooper University Hospital, Camden, NJ.

BACKGROUND: Late death of ELBW infants in the neonatal intensive care unit (NICU) is often not the focus of outcome reports.

OBJECTIVE: Improve our understanding of the time to death in ELBW infants cared for in the NICU. Enhance our prenatal consultations and family education during the infant's hospital stay. DESIGN/METHODS: Retrospective review of the outcome of infants with birth weight 500-1000 g over 10 years in our regional perinatal center. The distribution of infants according to outcome: died, discharged, or in-hospital in relation to time from birth was evaluated. Percent survival to discharge based on day of life was calculated.

RESULTS: In the period 1995-2004, the overall survival to discharge rate among 320 ELBW infants was 67% (range 50-74 %). Survival among 500-749g infants was 49% while among 750-1000 g infants was 85%.

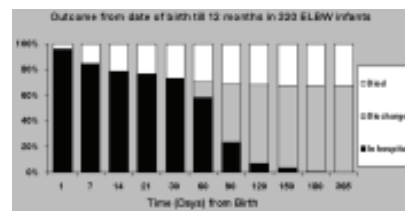


Figure 1. The distribution of infants according to outcome (Died/Discharged/In hospital) in relation to time from birth as a percentage of the whole group of 320.

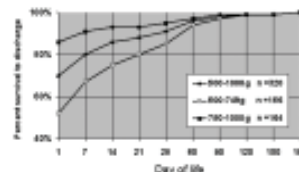


Figure 2. Percent survival to discharge on a given day of life.

CONCLUSIONS: Two-thirds of the deaths among ELBW infants occurred in the first 2 weeks of life. Although survival improved by time, 9% of the deaths occurred after 60 days. Studies are needed to evaluate risk factors for late death in ELBW infants.

10 Poster Board 10

Hypothermia and Re-Warming in Extremely Low Birth Weight Infants and the Subsequent Clinical Consequences

Nikol Barber, Joseph D. DeCristofaro, John Chen, Commonwealth Neonatology, Richmond, VA; Pediatrics, SUNYSB, Stony Brook, NY; Preventive Medicine, SUNYSB, Stony Brook, NY.

BACKGROUND: Thermoregulation and temperature homeostasis are an important in the care of ELBW infants. Severe hypothermia on admission (<35°C) has been associated with increased mortality and prolonged oxygen use.

OBJECTIVE: To determine whether mild hypothermia on admission, specifically temperatures between 35 and 36°C, is associated with poor outcomes and whether rapid rewarming portends a worse prognosis.

DESIGN/METHODS: Retrospective chart review of all inborn ELBW infants admitted to NICU over a 3 yr period. A total of 129 ELBW infants were eligible; after exclusions, 86 patients remained. Data collection included patient demographics, vital signs, respiratory support, admission temperature, time of first temperature $\geq 36.5^\circ\text{C}$, Aa gradient, use of inotropes and early pulmonary complications (pneumothorax, pulmonary hemorrhage), as well as mortality or presence of major morbidity. Patients were separated into two groups according to outcome. "Good" outcome was defined as survival to discharge with no major morbidity. "Bad" outcome was defined as having any one of the following outcomes (NEC, PVL, IVH, BPD, ROP) or death. In order to have this study be powered to 90% to detect a true difference in admission temperatures we determined that 21 patients would be needed in each of the two groups (good v bad outcome). These data were analyzed using a two-tailed test, chi-square test, Pearson's parametric correlation and Spearman non-parametric correlation, and multivariate logistic regression where appropriate.

RESULTS: Of the 86 patients evaluated, 59 (68.6%) were found to have a poor outcome. Mean admission temperature for poor outcome group was $35.3 \pm 36.1^\circ\text{C}$ for the good outcome group ($p < 0.001$). 68 of the 86 required re-warming for hypothermia. The rate of re-warming ranged from 0.1 to 4.8°C per hour. Re-warming rate in the good outcome group was no different than the poor outcome group (1.12 v 0.99). The mean re-warming rate in patients that required no inotropes was 1.24, one inotrope 0.92, two inotropes 0.64.

CONCLUSIONS: Admission temperatures less than 36°C were associated with increased morbidity and mortality. We speculate that focus on thermoregulation from the moment of delivery through initial stabilization in the NICU will improve outcome in ELBW infants.

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Poster Board 11

House Officer

Is There an Association Between Maternal Obesity and Severity of Neonatal Illness in Very Low Birth Weight Infants?

Christie J. Bruno, Robert Locke, Amy Mackley, David A. Paul. Neonatology, Christiana Care Health Services, Newark, DE; Pediatrics, Thomas Jefferson University Hospital, Philadelphia, PA.

BACKGROUND: Over the last several decades, obesity has increased to involve one-third of the adult population. Obesity is associated with an altered inflammatory response, but the effect of maternal weight on neonatal disease severity is unknown. Our hypothesis was that maternal body mass index (BMI) would be associated with severity of neonatal illness.

OBJECTIVE: To determine the effect of maternal BMI and pregnancy weight gain on the severity of neonatal illness at birth.

DESIGN/METHODS: Cohort study of infants with birth weight less than 1500 grams at a level 3 neonatal intensive care unit from 7/03-7/05, n=272. Pregnancy BMI was determined based on mother's height and weight on the day of delivery. Obesity was classified by a pregnancy BMI >30 or pre-pregnancy BMI >26 . Weight gain during pregnancy was normalized per week of gestation. Neonatal severity of illness was determined using the the Score for Neonatal Acute Physiology (SNAP) based on data from the 1st 24 hours of life. Statistical analysis included Pearson correlation, ANOVA, and multivariable linear regression.

RESULTS: In the study population, 49% of mothers were classified as obese during pregnancy and pre-pregnancy. There was no correlation between maternal pregnancy BMI and SNAP ($R=0.28$, $p=.64$) or pre-pregnancy BMI and SNAP ($R=.12$, $p=.15$). There was a negative correlation between total maternal weight gain during pregnancy and SNAP ($R=-.22$, $p=.001$) as well as weight gain per week and SNAP ($R=-.19$, $p=.01$). White mothers had a lower pre-pregnancy BMI (25.7 ± 5.7 vs. 28.6 ± 8.0 kg/m², $p<.01$), but had a greater weight gain/week ($.44 \pm .25$ vs. $.34 \pm .22$ kg/wk, $p=.01$) compared to black mothers. After controlling for potential confounding variables including race, neither maternal pregnancy BMI, pre-pregnancy BMI, or weight gain were associated with SNAP (model $r^2=.55$, $p<.01$).

CONCLUSIONS: In our population of very low birth weight infants, maternal obesity was prevalent but not associated with neonatal illness severity. Although not associated with neonatal illness, black mothers delivering very low birth weight infants had higher pre-pregnancy BMI and less weight gain compared to white mothers. The clinical significance of racial differences in maternal weight gain and BMI needs further exploration.

12

Poster Board 12

Developmental Trajectories over the First 2 Years as a Function of Gestational Age (GA), Birth Weight (BW), Intrauterine Growth Retardation (IUGR), Central Nervous System (CNS) Injury, Gender, and Maternal Education in Premature Infants

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BACKGROUND: Major advances in reproductive and neonatal medicine have produced a growing number of surviving infants with shorter GA, lower BW, and CNS injury. However, the impact of these variables on long-term outcome is not well defined.

OBJECTIVE: To correlate neurodevelopmental outcomes over the first two years of life with a set of defined perinatal clinical variables.

DESIGN/METHODS: The study cohort was 583 premature infants (GA ≤ 34 wks; BW ≤ 2100) that was part of a larger developmental follow-up study. 12.5% were ≤ 26 weeks, 10% were ≤ 750 g, 20% had no CNS injury and 14% had severe CNS injury. Bayley Scales of Infant Development were administered every 3 months from 4-25 months (M # tests/infant=5.6). Basic analytic approach used Generalized Estimating Equations (GEE). Mental Development Index (MDI) and Psychomotor Development Index (PDI) were regressed on time and their interactions with GA, BW, IUGR (normalized BW for GA), gender, CNS injury, and maternal education.

RESULTS: All variables correlated with MDI and PDI, but different patterns were noted. CNS injury lowered PDI more than MDI. The most profound CNS injury yielded the greatest effect. Girls and non-IUGR infants had statistically higher scores. IUGR and severe CNS injury had a greater affect on boys than girls. Higher maternal education attenuated the impact of mild to moderate CNS injury but had no influence when CNS injury was severe. The decrease in PDI seen after CNS injury was less in infants with lower educated mothers.

CONCLUSIONS: Serial developmental exams revealed that infants with severe CNS injury, IUGR and/or male gender had worse outcomes. Secondary variables such as maternal education did not uniformly influence the impact of perinatal events. The interplay of factors affecting neurobehavioral development is not straightforward and is deserving of carefully constructed longitudinal investigation.

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Poster Board 13

Fellow in Training

Initiation of Nutritional Protocols in a Level III NICU Decreases Osteopenia of Prematurity

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BACKGROUND: With improved survival rates of extremely premature infants, osteopenia of prematurity (OP) remains a significant clinical problem.

OBJECTIVE: To describe the change in incidence and severity of OP after instituting a nutritional protocol intervention.

DESIGN/METHODS: After a number of infants with osteopenia-related fractures were identified in 2001, we reviewed our NICU nutritional practices and then implemented necessary changes in January 2002. Although calcium (Ca) was measured regularly, additional routine measurement of serum Phosphorus (P) and Alkaline Phosphatase (AP) was instituted. A previous policy prohibiting Ca in peripheral intravenous fluids was changed and an osmolality limit instituted instead. Fortification of breast milk and increased concentration of preterm formula were instituted at lower cc/kg/day of total feedings. P and Ca intake was monitored and supplemented as needed, including as oral Na phosphate or Ca carbonate. We reviewed electronic charts of all babies < 1000 gm admitted to the NICU between January 2001 and December 2003 to identify changes in the incidence and severity of OP in relation to these changes. We documented the lowest serum P, the peak A P and the prevalence of osteopenia-related fractures (either multiple fractures, or a single fracture associated with an AP > 500).

RESULTS: The number of ELBW babies who survived for at least 14 days was 61 in 2001 and 112 in 2002-3. There were significant improvements after the change in protocol in having P measured at least once, the lowest P < 3, a peak A P > 900 or 1000, and osteopenia-related fractures.

Effect of Implementation of Nutrition Lab Monitoring and Protocols

	2001 (61)	2002-2003 (112)	P value
Phos measured at least once	77%	99%	0.0001
Lowest Phos <4	51%	37%	NS
Lowest Phos <3	34%	14%	0.003
Peak Alk Phos >500	44%	50%	NS
Peak Alk Phos >700	22%	13%	NS
Peak Alk Phos >900	13%	3%	0.015
Peak Alk Phos >1000	9%	1%	0.015
Osteopenia-related Fractures	16%	3%	0.002

CONCLUSIONS: Initiation of a protocol for measuring bone-related factors and supplementing bone minerals can result in a significant decrease in the incidence of fractures, hypophosphatemia and severe osteopenia of prematurity.

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Poster Board 14

Fellow in Training

Effects of Thyroid Hormone (TH) Supplementation on Vital Signs & Hospital Course in ELBW Neonates

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BACKGROUND: Thyroid hormone (TH) is essential for brain development & low levels vary inversely with the severity of illness in ELBW neonates. We are conducting a multicenter trial to establish dosing needed to achieve optimal TH levels in the 1st 6 postnatal weeks. Our goal is to prevent transient hypothyroxinemia without increasing morbidity/mortality.

OBJECTIVE: To compare the effects of TH supplementation in ELBW neonates's on changes in vital signs (see Abstr - Ribeiro, PAS'06) & its influence on other co-morbidities as an interim safety analysis.

DESIGN/METHODS: ELBW neonates 24-28 wks GA (4/05 to 11/05) were randomized at birth to receive either placebo, KI 30 mcg/kg/d, continuous or bolus daily infusions of either 4 or 8 mcg/kg/d of T₄ x 42d; T₄ groups also received T₃ at 1 mcg/kg/d continuous infusion x 14d. We recorded the highest daily HR, sBP, daily weights & total caloric intake through discharge. Demographic factors were noted.

RESULTS: Out of 29 subjects, the highest & lowest 25% ile for HR (n=14) with related BP & clinical course were compared to the remaining 15 subjects. No significant differences were noted in BW & GA (entire group: 783 ± 30 and 26 ± 0.3 wks). 71% of high HR grp had PDA compared to 57 & 47% in the low & middle grp. No significant difference was noted in any grp for: culture+ sepsis/NEC, anemia or caffeine intake. None of the 3 grps had increased clustering of any single TH study grp. No differences noted in total caloric intake or weight change over time between groups or comparing the highest to the lowest cohort. Mortality was 43, 29, 20% for the high, low & middle groups. Events on the day of the highest HR for either the highest or lowest 25% ile are shown (table 1).

	Associated Findings on ± 1 Day of Peak Effect				
	Postnatal Day	PDA	Sepsis or NEC	Vent/CPAP	Cont/w/Bolus Rx Group
Day of Peak HR in Highest 25% ile HR (n=7)	9	43%	43%	71/28%	43/57%
Day of Lowest HR in Lowest 25% ile (n=7)	12	43%	28%	57/43%	71/29%
Day of Peak HR in Lowest 25% ile (n=7)	16	14%	57%	43/57%	71/29%

CONCLUSIONS: Patients with the highest HR could not be distinguished based on study grp or clinical course & had no adverse effects attributed to this condition; TH Rx appears to be a safe protocol. Ongoing studies using a larger sample size will determine the effects of TH on overall & longterm neurodevelopmental outcomes. Supported: NINDS #45109

Cysteine Supplementation in Parenterally Fed Neonates: Systematic Review

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BACKGROUND: Several lines of evidence suggest that cysteine supplementation of neonatal parenteral nutrition (PN) may improve growth and nitrogen retention, reduce oxidation injury, improve bone mineralization (by enhancing solubility of calcium and phosphate in PN solutions), and limit liver toxicity (by reducing the amount of methionine, precursor of cysteine, in the PN solution), but may induce metabolic acidosis for at least 2 weeks.

OBJECTIVE: To determine the effects of supplementing parenteral nutrition with cyst(e)ine or its precursor N-acetylcysteine on neonatal outcomes.

DESIGN/METHODS: The standard search method of the Cochrane Neonatal Review Group was used. MEDLINE (1966-2005), EMBASE (1974-2005), the Cochrane Central Register of Controlled Trials (CENTRAL) and recent abstracts from APS-SPR and JPEN were searched. All randomized (RCTs) and quasi-randomized trials that examined the effects of cysteine or N-acetylcysteine supplementation of neonatal PN were reviewed. Predetermined outcome variables included growth, mortality, morbidity secondary to oxidation injury, bone accretion, acidosis, liver disease, nitrogen retention and cysteine levels.

RESULTS: Five trials fulfilled entry criteria. One RCT involving 391 very low birth weight (VLBW) infants showed that a 6-day N-acetylcysteine supplementation of cysteine-containing PN did not significantly affect the risks of death by 36 gestational weeks, bronchopulmonary dysplasia (BPD), death or BPD, retinopathy of prematurity (ROP), severe ROP, necrotizing enterocolitis requiring surgery, periventricular leukomalacia, intraventricular hemorrhage (IVH), or severe IVH. Short-term cysteine supplementation of cysteine-free PN was assessed in 4 small trials (2 RCTs and 2 quasi-randomized; 2 in abstract form only); summary statistics showed no significant change in growth (weight, length or head circumference) (n=36) or nitrogen retention (n=95), despite doubling of plasma levels of total cysteine (n=20) and free cysteine (n=40). No data were available on bone accretion, acidosis, or liver disease.

CONCLUSIONS: Short-term N-acetylcysteine supplementation of cysteine-containing PN appears to have no benefit in VLBW infants. A large RCT is required to assess whether routine cysteine supplementation of cysteine-free TPN improves short- and long-term neonatal outcomes.

Pasteurization Preserves the Concentration of IL-8 in Human Milk

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BACKGROUND: Pasteurized donor human milk is an alternative feeding when mothers' milk is not available for preterm infants. Human milk not only provides nutrition, it enhances the immature immunologic system of the neonate through a complex immunomodulating system that includes cytokines, such as IL-8, which triggers a systemic inflammatory response. Pasteurization may alter the IL-8 concentration available to the infant.

OBJECTIVE: To compare concentrations of IL-8 in milk samples obtained from mothers of infants <36 weeks gestation before and after pasteurization.

DESIGN/METHODS: Milk was obtained by electric breastpump from 15 mothers of infants <36 weeks gestation and stored at -70C. Thawed samples were divided into two aliquots, the first aliquot was stored at -70C and the second aliquot was pasteurized at 62.5C for 30 minutes. Subsequently, all samples were stored at -70C until analyzed for concentrations of IL-8 by flow cytometry (BD Cytometric Bead Array Analysis, San Diego, CA). Statistical evaluation was by 1 sample sign test.

RESULTS: The milk was collected at 4 to 54 days postpartum from mothers delivering at 28 ± 4 (mean ± SD) weeks gestation and stored at -70C for 21 to 155 d. There were no relationships between gestational age, postnatal age milk collected, or duration of milk storage and the concentrations of IL-8 in milk. The concentrations of IL-8 increased after pasteurization, $p = 0.007$ (Table).

Human Milk IL-8 Concentration Before and After Pasteurization

IL-8 (pg/mL)	BEFORE	AFTER	DIFFERENCE
Mean	276	395	119
Median	193	213	21
SEM	68	152	100
25th percentile	120	142	16
75th percentile	270	302	57

CONCLUSIONS: There is a small but significant increase in human milk IL-8 concentration after pasteurization at 62.5C for 30 minutes. The small increase in IL-8 after pasteurization suggests that the cytokine may have been liberated from its compartment. The maintenance of IL-8 in human milk after pasteurization suggests that this cytokine's proinflammatory activity might potentiate the immature infant's host response.

Impact of Instrumental Dead Space on Volume Guarantee Mode of Ventilation in Extremely Low Birth Weight Infants

Sepeidh Montazami, Kabir Abubakar, Martin Keszler, Department of Pediatrics, Division of Neonatology, Georgetown University, Washington, DC.

BACKGROUND: Volume guarantee (VG) may reduce volutrauma and inadvertent hyperventilation, a goal most critical in extremely low birth-weight (ELBW) infants. However, concerns about the added deadspace (DS) of the flow sensor needed for VG cause some clinicians to forego VG in these fragile infants. Based on empirical observation of effective alveolar ventilation with tidal volumes (V_T) at or below estimated anatomical/instrumental DS we hypothesized that, much like with high-frequency ventilation, at the high ventilator rates and small V_T seen in ELBW infants, the traditional DS concept does not apply.

OBJECTIVE: To quantify the effect of instrumental DS (IDS) on ventilation in ELBW infants on assist control or pressure support and VG.

DESIGN/METHODS: Demographics, set and measured V_T , respiratory rate (RR) and arterial blood gas values (ABG) were extracted from charts of 47 babies <800 g born Jan 2003-Aug 2005, who were ventilated with VG. Data were collected at each ABG during 1st 48h. Minute ventilation (MV) was calculated as $V_T \times RR$. IDS was measured by filling with water, a 2.5 mm ET tube cut to 10 cm with attached hub of the inline suction catheter and flow sensor. We added 0.5 ml/kg to this value to account for distal trachea/mainstem bronchi DS. Descriptive statistics and linear regression were used for analysis.

RESULTS: The measured IDS was 2.7 ml, matching closely the value derived by adding reported DS of the components. Mean combined DS (instrumental + anatomical) was 3.01 ml. There were 451 paired observations of V_T and ABG in 47 infants (mean wt 627 g, range 400-790g). The mean pH (\pm SD) was 7.32 (0.09), PaCO₂ 42.4 (10.9) torr. The mean set and measured V_T was 3.12 ± 0.76 ml and 3.13 ± 0.66 ml, respectively. Despite normocapnia, 48% of V_T s were < estimated DS. Mean calculated alveolar MV was only 5.8 ml/kg/min. The V_T /kg needed for normocapnia was inversely related to weight ($r = -0.56$, $p < 0.01$), indicating an effect of the fixed IDS. Mean V_T /kg of infants ≤ 500 g = 5.7 ± 0.36 v. 4.7 ± 0.39 ml for those ≥ 700 g ($p < 0.001$).

CONCLUSIONS: Impact of IDS is greatly overestimated. Effective alveolar ventilation occurs with V_T at or below DS, suggesting that a spike of fresh gas penetrates through the DS gas. IDS does have a greater impact in the tiniest infants. There is no need to forego synchronized and VG ventilation due to DS concerns.

The Unpredictability of Delivered Bubble Nasal Continuous Positive Airway Pressure (BNCPAP): Do We Know What We're Doing?

Doron J. Kahn, Robert H. Habib, Michael D. Weisner, Andrew M. Steele, Rachana Singh, Sherry E. Courtney, Neonatal-Perinatal Medicine, Schneider Children's Hospital, NSLIJHS, New Hyde Park, NY; Pediatrics, Mercy Children's Hospital, Medical University of Ohio, Toledo, OH; Equilibrated Biosystems Inc., Smithtown, NY.

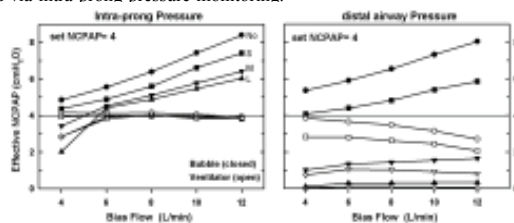
BACKGROUND: BNCPAP is an increasingly popular form of respiratory support for preterm infants. However, delivered intra-prong pressures may vary widely due to bubbling associated with BNCPAP. How this impacts effective NCPAP delivery is poorly understood.

OBJECTIVE: To compare effective *intra-prong* and *distal* airway pressures during BNCPAP vs ventilator-generated NCPAP (VNCAP) as a function of air flow magnitude, with and without leak.

DESIGN/METHODS: In a test-lung, using BNCPAP and VNCAP, we measured intra-prong and distal pressures (at NCPAP 4, 6, 8cmH₂O); flow was increased from 4-12 L/min. Air leak at the nose-prong interface was simulated via a nose model - "prong/nares" area ratios 1:1, 1:1.25, 1:1.5, and 1:2 for No, small (S), medium (M) and large (L) leak, respectively. Delivered NCPAP was calculated as mean pressure.

RESULTS: Irrespective of leak, for BNCPAP, intra-prong NCPAP was substantially and increasingly greater as flow magnitude increased (Figure, left). For VNCAP, intra-prong NCPAP closely approximated the desired values. Distally, for small, relative to no leak, the BNCPAP overshoot was attenuated, while VNCAP could be 25-50% less than the desired NCPAP (Figure, right). For medium and large leaks, distal NCPAP was increasingly less than desired and exhibited limited flow dependence.

CONCLUSIONS: Our data demonstrate the need to minimize leaks for consistent NCPAP delivery, irrespective of device. Critically, at high flows, BNCPAP can be substantially greater (>100%) than the desired NCPAP. Optimal NCPAP is facilitated by minimizing leaks and should be confirmed via intra-prong pressure monitoring.

**Use of Intra-tracheal Pressure Measurements To Minimize Air Leaks and Assess Respiratory Mechanics During High Frequency Oscillatory Ventilation (HFOV) in Infants**

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BACKGROUND: Lung mechanics assessed via airway opening measurements in infants on HFOV are: 1) dominated by the endotracheal tube (ETT) mechanical properties and 2) highly dependent on leaks around the ETT.

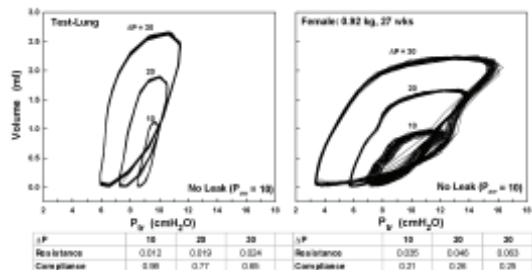
OBJECTIVE: To determine whether direct tracheal pressure (Ptr) measurements can be used as a guide to help minimize leaks around the ETT and to accurately assess the underlying lung mechanics.

DESIGN/METHODS: In a test-lung, under leak and no-leak conditions, we measured airway opening pressure (Pao) and flow (in-line pneumotachography) in addition to Ptr during HFOV at oscillation amplitudes (AP) of 10, 20, 30cmH₂O at mean airway pressures (Paw = mean Pao) of 10 and 20cmH₂O. Ptr was accessed via an ETT with distal-end pressure port. Corresponding no-to-minimal leak measurements confirmed from Paw and mean Ptr comparisons were obtained in two pre-term infants with RDS on HFOV.

RESULTS: The delivered mean Ptr was essentially identical to Paw under no-leak conditions and decreased systematically as the air leak magnitude was increased. For no leak, the test-lung resistance (R) and compliance (C) derived from Ptr and flow/volume (Figure) were similar - *irrespective of Paw and AP* - to the R and C measured directly without the ETT. Corresponding infant data exhibited similar Ptr-volume characteristics as illustrated in the Figure.

CONCLUSIONS: Ptr measurements during HFOV provide an objective means to assess and

consequently minimize leaks around the ETT. When leaks are minimized, patient care is more reliable via the provision of consistent Paw and ΔP support. Moreover, Ptr combined with airway opening flow may then be used to accurately assess the underlying lung mechanics.



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Risk of an Adverse Outcome Among Prematurely Born Small for Gestational Age Infants

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BACKGROUND: There is limited knowledge regarding risk factors and impact of growth restriction on the outcome of preterm infants.

OBJECTIVE: To identify the maternal/placental risk factors and neonatal outcome of small for gestational age (SGA) infants (GA <34 weeks).

DESIGN/METHODS: We designed a matched case-control study of 50 SGA infants (birth weight for GA < 10th percentile). Fifty AGA infants (birth weights for GA <34 weeks between 10th and 90th percentiles) were assembled as the controls. Maternal and placental risk factors and neonatal outcome variables that included mortality, bronchopulmonary dysplasia (BPD), intraventricular hemorrhage (IVH), sepsis, thrombocytopenia, and necrotizing enterocolitis (NEC) were analyzed in relationship to the neonatal growth status.

RESULTS: There were no differences in GA, parity, mode of delivery, maternal smoking and drug/alcohol, neonatal gender, Apgar score, and ventilatory support after birth between SGA and AGA infants. Mothers delivering SGA infants were more likely to be of Asian or Hispanic origin (33.7% vs. 12.4%, P<0.01), diagnosed with pregnancy induced hypertension (38% vs. 16%, P<0.01) or preeclampsia (16% vs. 2%, P<0.01) and fetal distress (22% vs. 8%, P<0.05), and were less likely to have clinical or histological chorioamnionitis. Chorionic plate thrombi and placental infarctions were diagnosed more frequently among SGA than in AGA infants (19.5% vs. 4.3%, P<0.02, and 29.3% vs. 13%, P=0.06, respectively). A greater proportion of the SGA infants developed thrombocytopenia (82% vs. 68%, P<0.05) and were transfused with platelets (64.0% vs. 40.0%, P<0.01). As shown below (Table), the neonatal morbidity among the cases and controls was comparable but the mortality rate was strongly associated with the infant's small for GA birth weight.

CONCLUSIONS: Maternal/placental hypoxic morbidity associated growth restriction has a significant impact on the mortality rate among very prematurely born neonates.

Table. Neonatal mortality and morbidity in association with growth restriction

Morbidity/ Mortality	SGA (n=50)	AGA (n=50)	OR (95% CI)*
IVH	20 (40%)	22 (44%)	0.85 (0.38-1.87)
BPD	17 (34%)	16 (32%)	1.09 (0.47-2.52)
NEC	6 (12%)	8 (16%)	0.72 (0.23-2.23)
Sepsis	22 (44%)	26 (52%)	0.72 (0.32- 1.59)
Mortality	22 (44%)	11 (22%)	2.79 (1.16-6.66)

* Odds Ratio and 95% Confidence Interval

21 Poster Board 21 Fellow in Training

Parenteral Nutrition-Associated Cholestasis: Increased Susceptibility of Small for Gestation Age (SGA) Infants

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BACKGROUND: Cholestasis is a significant complication of parenteral nutrition (PN) in neonates. An autopsy study performed at Yale-New Haven Children's Hospital (YNHCH) revealed an association between SGA infants and PN-associated cholestasis [Zambrano, Ped Dev Path, 2004]. OBJECTIVE: To determine if SGA is an independent risk factor for the development of PN-associated cholestasis.

DESIGN/METHODS: In a retrospective case-control study, medical records of preterm infants treated in the YNHCH NICU from 1994-2003 were reviewed. All study infants had a gestational age (GA) <34 wks and exposure to PN ≥7 days. Cases had PN-associated cholestasis (direct bilirubin ≥2mg/dL). Controls, matched by GA and birth date, did not have cholestasis. Although two controls were sought for each case, at this time, a second control has been identified for only 35 infants. The primary outcome was the incidence of SGA infants. Secondary outcomes included duration of PN, age at achieving full enteral nutrition (FEN), and incidence of late-onset sepsis (LOS), necrotizing enterocolitis (NEC) and bronchopulmonary dysplasia (BPD). Sub-group analyses of cholestatic and SGA infants were performed. Analysis was by Student's t-test and chi-square; p<0.05 was considered significant.

RESULTS: Cases (n=81) and controls (n=116) did not differ significantly in birth weight or GA [972 ± 471g v. 1074 ± 454g; 27.3 ± 2.8wks v. 27.5 ± 2.7wks; (M±SD)]. Cholestatic infants achieved FEN later (43 ± 25d v. 23 ± 12d, p<0.01), and had higher rates of LOS (80.3% v. 38.8%, p<0.01), NEC (50.6% v. 8.6%, p<0.01) and BPD (61.7% v. 25%, p<0.01). Significantly more infants in the cholestasis group were SGA as compared to the control group (28.4% v. 13.8%, p=0.011). Of cholestatic infants, SGA infants were exposed to fewer days of TPN than appropriate for GA (AGA) infants (49.4 ± 24.3 v. 67.9 ± 35.1, p=0.023). Of SGA infants, those with cholestasis received more days of TPN than those without (49.4 ± 24.3 v. 24.2 ± 14, p<0.01).

CONCLUSIONS: Infants with cholestasis achieved FEN later and had higher rates of LOS, NEC

or BPD. Compared to AGA infants, SGA infants have a greater risk of developing cholestasis when exposed to PN. Furthermore, these data suggest that SGA infants are more susceptible to PN-associated cholestasis, requiring less PN exposure to develop that condition.

22 Poster Board 22 House Officer

Effects of Early Initiation of Parenteral Nutrition in Neonatal Morbidity Among Preterm Infants

Caroline O. Chua, Shruti Gupta, Lourdes M. Cohen, Pediatrics, Flushing Hospital Medical Center, Flushing, NY.

BACKGROUND: A major factor in the care of low birth weight infants (LBWIs) is the ability to provide aggressive total parenteral nutrition (TPN). While there are known infectious, metabolic and other risks associated with TPN, it also positively influences long-term well-being in LBWIs.

OBJECTIVE: To determine whether early administration of TPN to LBWIs led to changes in neonatal growth, duration of TPN administration, length of hospitalization, and changes in incidence of chronic lung disease (CLD), infections, metabolic derangements or other complications.

DESIGN/METHODS: A descriptive correlation study was performed by reviewing charts of 80 infants ≤ 32 weeks gestation and birth weight (BW) ≤ 1500 grams admitted to a tertiary care NICU from Jan 1999 to Oct 2005. Demographic data were extracted, including gestational age, sex, BW, APGAR score, receipt of prenatal steroid or surfactant, presence of central lines, clinical risk index for babies (CRIB) score, and oxygen index. Babies were divided into 2 groups. Group 1 received TPN within the first 24 hrs of life, and Group 2 received TPN after 24 hrs of life. Comparisons were made between groups for: time to recover BW, length of time on TPN and of hospitalization, and the incidence of CLD, sepsis, necrotizing enterocolitis (NEC), cholestasis, and metabolic complications. Groups were compared using student's t-test, chi-square, correlation, and ANOVA.

RESULTS: The 2 groups were comparable at baseline. TPN was started at a mean age of 17 hrs in Group 1 and 54 hrs in Group 2. Infants in Group 1 regained BW at 9.8 vs.14.2 days in Group 2 (p < .001), and had a lower incidence of sepsis (p < .01). There was a trend toward a lower incidence of CLD in Group 1 vs. Group 2, which reached statistical significance (p < .05) when infants with BW ≤ 1250 grams were compared. Babies in Group 1 had fewer days on TPN (23.7 vs. 27.9) and decreased hospital stays (57.1 vs. 63.5 days). The incidence of cholestasis, metabolic derangements, and NEC were similar in both groups.

CONCLUSIONS: Early administration of TPN in preterm infants with BW ≤ 1500 grams was safe and did not increase the risk of adverse clinical or metabolic sequelae. Aggressive nutritional intake resulted in better neonatal growth, decreased incidence of CLD, and a lower propensity to infection.

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Postnatal Nutrition and Growth in VLBW Infants: Can In Utero Growth Rate Be Achieved?

Mana Dejhalla, Nadine El-Khoury, Heather Brumberg, Boriana Parvez, Edmund F. La Gamma, Newborn Medicine, Maria Fareri Children's Hosp, NYMC, Valhalla, NY.

BACKGROUND: Postnatal growth retardation is a major morbidity in VLBW infants; 99% of ELBW infants have weight <10th percentile at 36wks corrected age. Growth rate varies among NICU's, mainly due to variations in nutritional practice. We hypothesize that adequate early nutrition is important to prevent postnatal growth retardation & to optimize long-term growth and development in preterm infants.

OBJECTIVE: To determine the nutritional status and growth of VLBW infants during the first 9 wks of postnatal life.

DESIGN/METHODS: This is an observational survey of nutritional practices of preterm infants (GA ≤ 30wks & BW ≤ 1250g) who were alive on postnatal day 35. All infants were provided nutrition according to our protocol (Peds Ann 32:9, 2003). Pertinent data were collected from the medical records. Nutrient intake and weight were followed daily for 35d and thereafter weekly until 63d or discharge. After the BW was regained, actual weight was compared with calculated weight for a given day. We adopted the *reference fetus* concept for growth as optimal (≥ 15g/kg/day).

RESULTS: We surveyed 25 AGA and 2 SGA neonates (GA 26 ± 0.4wks, BW 861 ± 40g; x ± sem); 22 were <1000g. The maximum weight loss was 8% ± 0.9 at 5d and BW was regained by day 9 ± 1. Subsequently, the rate of weight gain was 18 ± 0.6 g/kg/d through 35d (81% ≥ 15g/kg/day). A protein intake of 3 g/kg/d was achieved by 4d and 80 kcal/kg/d by 6d. Enteral nutrition provided ≥ 50% of total calories by 9d. Nutrient intake: Table 1. Targeted weight gain was achieved within the first month of life and through 63d. 96% (18/20) of infants at discharge were >10th percentile for weight and head circumference for corrected age.

CONCLUSIONS: Our VLBW infants regained birth weight earlier and grew faster than in the published literature (Ehrenkranz, Peds, 1999). *In utero* growth rate was achieved although caloric intake never reached 120 kcal/kg/d suggesting less energy loss to the environment. We speculate that an adequate protein intake (esp. during the first 2 postnatal wks) was crucial in establishing a reference fetus weight gain. Early protein may reprogram hormonal release (Insulin, IGF) and promote growth. Long-term growth & neurodevelopmental outcome studies are in progress.

Average Daily Nutrient Intake per Week

	1-7d	8-14d	15-21d	22-28d	29-35d
Protein g/kg/d	2.3	3	3.1	3.1	3.2
Kcal/kg/d	62	92	104	103	108

24 Poster Board 24 Fellow in Training

A Caloric Intake Achieving the "Reference Fetus" Growth-Rate Is Alone Not Sufficient To Enable Later Catch-Up Growth to Birth Weight Percentile

R. Vembani, M. Dejhalla, M. Katzenstein, B. Parvez, E. F. LaGamma, Newborn Medicine, Maria Fareri Children's Hospital, NYMC, Valhalla, NY; NICU, OLMCC, Bronx, NY.

BACKGROUND: Adequate nutrition is essential for optimizing the growth and outcome of preterm neonates. Although many NICUs have established feeding protocols, the actual caloric intake is dependent on the clinical condition of the infant and the preference of the attending neonatologist.

OBJECTIVE: 1. To determine whether the *actual* nutrient support of VLBW infants at community level III NICU is in compliance with AAP recommendation of 120 kcal/kg/d. 2. To compare somatic growth of VLBW infants with previous publications (Peds 104:280, 1999).

DESIGN/METHODS: All VLBW neonates born Nov '03-Oct '05 were reviewed retrospectively. Exclusion criteria were: death or transfer <7d, SGA & perforated NEC. Maternal and neonatal demographic, growth, outcome, parenteral and enteral nutrition data were recorded for first 5 postnatal wks and at discharge.

RESULTS: 63 VLBW infants were identified. 30 were excluded as per criteria (8 expired, 17 transferred, 3 NEC with perforation, 2 SGA) and 3 had secured medical records with 30 neonates meeting criteria for review. GA was 28 ± 2 weeks and BW was 950 ± 200 g. ($x \pm sd$) at 40th %ile, decreasing to 20th %ile by 5 wks and until discharge. The maximum weight loss of 9 ± 6 % occurred at 4d ± 1 and was regained at 11d ± 6 vs. 6d and 14d ± 10 , respectively (NICHD). Neonates achieved >80, >90 and >100 kcal/kg/d on average by day 5, 19 and 35 respectively due to early removal of TPN. It took 4 wks for 80% of neonates to exceed a PO intake ≥ 100 kcal/kg/d (avg 100 ± 18 kcal/kg/d). Weight gain in the 2nd wk was 10 ± 7 & 15 ± 6 g/kg/d in wk 4. The rate of increase in head circumference (0.4 cm/wk in 1st wk & 0.7 cm/wk afterwards) was adequate and consistent with the NICHD data.

CONCLUSIONS: Our neonates had a BW nadir earlier, regained it sooner than NICHD standards & then achieved the accretion rate of the "reference fetus" despite never attaining an intake of 120 kcal/kg/d. Although both NICHD and our patients had similar rates of weight gain, the initial drop from an age-appropriate %ile never recovered in either cohort. We speculate that catch-up growth may require lowering metabolic demands, altering hormonal programming or simply increasing the total caloric intake (higher caloric density, continuing TPN longer).

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Poster Board 25

Fellow in Training

Delivery of Gastroschisis Patients Before 37 Weeks Is Associated with Increased Morbidities

J. Fisher, H. Maramreddy, M. Slim, E. LaGamma, B. Parvez, Neonatology, Maria Fareri Children's Hospital, Valhalla, NY.

BACKGROUND: Gastroschisis poses significant management challenges and is associated with a myriad of morbidities. Preterm delivery is often advocated to minimize damage to the extruded intestines. However, premature delivery may worsen outcome by adding the morbidities associated with prematurity.

OBJECTIVE: To determine if delivery at <37 weeks gestation is associated with increased complications in infants with gastroschisis.

DESIGN/METHODS: We conducted a retrospective chart review of patients with gastroschisis born from 1987 to 2005. Data on GA, BW, discharge weight, culture positive sepsis, GI obstruction, perforation, NEC, TPN cholestasis, duration of TPN, time to reach full enteral feeds and associated anomalies was collected. Healthy preterm infants with GA 26-36 weeks were used as controls. **RESULTS:** 30 records out of 49 patients with gastroschisis were available for review. Table 1 shows the demographic data

Table 1: Demographics

	<37 weeks (N=19)	Healthy preterm infants (N=11)	Healthy preterm infants (N=233)
GA	33±2(26-36)	38±1(37-40)	32±3(26-36)
BW	2079±592 (830-2075)	2717±377(2125-3345)*	1973±688(665-3913)**
Length of stay	47±39(12-103)	19±6(11-32)*	23±22(0-131)**

mean±SD;range; *p<0.05 preterm vs term gastroschisis; **p<0.05 preterm gastroschisis vs healthy preterm

Though 21% of preterm gastroschisis infants were SGA at birth, 58% were SGA at discharge. Preterm neonates with gastroschisis had significantly more morbidities as compared to term infants with gastroschisis or preterm healthy neonates.

Table 2: Comorbidities

	<37 weeks (N=19)	37weeks (N=11)	Healthy preterm infants (N=233)
Culture Å sepsis	6/19 (32%)	0/11(0%)*	0/233 (0%)**
Full enteral feeds(days)	25±16(7-56)	15±6(9-26)*	
TPN(days)	30±22(7-68)	14±5(8-25)*	16±17(0-85)*

*mean ±SD;range; *p<0.05 preterm vs term gastroschisis; **p<0.05 preterm gastroschisis vs healthy preterm

In the 9 patients who had a renal ultrasound, 15% had vesicoureteral reflux.

CONCLUSIONS: When compared to term infants with gastroschisis and healthy preterm infants, the preterm infants with gastroschisis had longer hospitalizations and higher rate of sepsis and other complications. Attempts should be made to avoid preterm delivery, and meticulous attention should be given to the nutritional needs of patients with gastroschisis to prevent growth failure. We found an association of gastroschisis with VUR and recommend screening.

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Poster Board 26

Medical Student

Population-Based Analysis of Surgery in Infants Under One Year of Age

Jennifer K. Son, Craig Lillehei, Kimberlee Gauvreau, Kathy J. Jenkins, Harvard Medical School, Boston, MA; Surgery, Children's Hospital, Boston, Boston, MA; Cardiology, Children's Hospital, Boston, Boston, MA.

BACKGROUND: Little descriptive information exists about non-cardiac surgical procedures in infants.

OBJECTIVE: To describe demographic, procedural and institutional characteristics for infants <1 year undergoing non-cardiac surgery.

DESIGN/METHODS: Surgical cases in infants <1 year were identified using ICD-9-CM codes in the Healthcare Cost and Utilization Project Kids' Inpatient Database (KID) 2000, which includes pediatric discharges from 27 states. Endoscopic and closed procedures, catheterizations, cardiac procedures, circumcisions, and sutures of superficial lacerations were excluded. Cases were stratified following ICD-9-CM body system classification. Single procedures involving 2 systems and procedural complications requiring additional surgery were classified according to the index procedure. Demographic, procedural and institutional characteristics were described.

RESULTS: Of 36,163 cases, 64% were male. A large proportion were newborns ≤ 28 days (40%); 14% were premature. Nearly half of infants (42%) received Medicaid. The median length of stay was 4 days, and median total hospital charges were \$12,966. Overall mortality was 2.5%. In most infants, surgery involved a single system (93%), with most cases occurring on the digestive (54%),

nervous (14%), and ear/nose/mouth/pharynx (12%) systems. Pyloromyotomy (15%), inguinal hernia repair (9%), and ventricular-peritoneal shunt (5%) were the most frequently coded procedures. Among 1338 hospitals, volumes ranged from 1 to 1029 cases; 70% of institutions performed <1 case/month while <2% performed ≥ 1 /day. Only a small percentage of institutions were freestanding children's hospitals (2%) or children's units in a general hospital (6%), while 32% were teaching institutions. However, care was centralized at these institutions: 62% of infants had surgery at a children's facility and 83% at a teaching hospital.

CONCLUSIONS: While non-cardiac surgical care for infants is centralized at teaching and children's facilities, most hospitals did very few cases. Surgery was more frequent in males and commonly involved the digestive system. Further study is needed to determine how patient, procedural and hospital characteristics are related to outcomes of complication and mortality.

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Poster Board 27

Fellow in Training

Management of Neonatal Hyperbilirubinemia: Pediatricians' Practices and Educational Needs

Gillian B. Birchwood, Anna Petrova, Rajeev Mehta, Thomas Hegyi, Division of Neonatology, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ.

BACKGROUND: Successful prevention of neurological complications in infants exposed to neonatal hyperbilirubinemia is significantly related to the pediatricians' compliance with nationally produced clinical practice guidelines. No previous studies investigated the pediatricians' preferences regarding management of neonatal hyperbilirubinemia before and after hospital discharge and assessed the pediatricians' beliefs regarding the risk factors for severe neonatal hyperbilirubinemia. **OBJECTIVE:** To evaluate the practices and beliefs of New Jersey Pediatricians regarding the management of hyperbilirubinemia in term infants.

DESIGN/METHODS: A survey questionnaire addressing aspects of neonatal hyperbilirubinemia management was sent to a random sample of 800 New Jersey pediatricians.

RESULTS: The adjusted response rate of 49.1% (n=356) was calculated from the 725 eligible respondents. The practicing pediatricians reported high utilization (77.9%) of the cephalocaudal progression of jaundice and low utilization (16.1%) of transcutaneous bilirubinometry for the quantification of the severity of jaundice. Most of the respondents (87.4%) identified jaundice as an indicator for serum bilirubin (TSB) testing prior to the neonate's discharge from hospital, whereas post-discharge, only 57.7% felt that a TSB was indicated (P<0.01). If the neonate's age was under 72 hours, less than one-third of the respondents reported initiation of phototherapy at TSB levels lower than the treatment parameters recommended by the AAP in 1994, whereas if the infant was more than 72 hours old, almost 60% were initiating phototherapy at TSB lower than the 1994 AAP guidelines. Most respondents did not regard neonatal jaundice noted after discharge and gestational ages 37-38 weeks as being significant in the development of severe hyperbilirubinemia. However, the majority did recognize the importance of jaundice presenting within the first 24 hours and Rh/ABO

CONCLUSIONS: The pediatricians' practices regarding the low utilization of laboratory diagnosis for the quantification of jaundice after discharge and underestimation of risk factors that contribute to the development of severe hyperbilirubinemia are associated with initiation of phototherapy at lower than AAP recommended treatment parameters and recognition of neonatal hyperbilirubinemia as an important public health concern.

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Poster Board 28

Computerized Drug Dose Calculation To Reduce Medication Errors in the Neonatal Intensive Care Unit

Kabir M. Abubakar, Anthonia Umeh, Jennifer Berg, Jean Rorke, Laura Folk, Martin Keszler, Neonatology, Georgetown University Hospital, Washington, DC; Pharmacy Department, Georgetown University Hospital, Washington, DC; Department of Nursing, Georgetown University Hospital, Washington, DC.

BACKGROUND: Medication errors(MEs) are a significant cause of morbidity in hospitalized patients. Infants in the Neonatal Intensive Care Unit (NICU) are particularly at risk because the dose is dependent on weight and age, which change over time. Most MEs in the NICU occur during drug dose calculation where a decimal point error can result in a 10-fold dose difference. The Neofax® drug database (Acorn Publishing) has become universally accepted in NICU's as a reliable source of drug dose information. This database combined with a drug-dose calculator is now available for use on a personal digital assistant (PDA).

OBJECTIVE: To evaluate the effect of a computerized drug dose calculator using the Neofax® for PDA on the number of drug prescription errors in the NICU.

DESIGN/METHODS: All Residents, Fellows, Nurse Practitioners, Nurses and dispensing Pharmacists in our university level 3 NICU were provided with and trained to use the PDA based Neofax®. All drug dose calculations were made using the PDA. The accuracy of all drug dose calculations was checked by the pharmacist and bedside nurse. The frequency (expressed as errors/100 orders) and types of all MEs were recorded over a 12-month period (period 2) and compared to the 12 months before intervention (period 1). Data were analyzed using Chi-square.

RESULTS: The baseline prescription error rate was 1/100 orders in period 1 and decreased by 70% in period 2 to a rate of 0.3/100 orders (p<0.0001). Though there were substantially more orders due to higher census and acuity in period 2, there were no other changes in our patient population or staffing patterns during this time.

	Period 1	Period 2
Total # of Orders	13577	31680
Total Error rate/100 orders (prescribing, dispensing, etc)	1.77	0.66 #
Total # of Prescription Errors	126	106
Prescription Error rate/100 orders	1.0	0.3*

* p<0.0001 compared to period 1 # The national benchmark for all MEs is 5.5/100 orders.

CONCLUSIONS: Using the Neofax® for PDA drug dose calculator significantly reduced the frequency of drug dose calculation errors. It is possible that increased awareness of medication errors in the NICU also contributed to this effect.

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Poster Board 29

Medical Student

A Dedicated Lactation Consultant in the NICU Increases the Percentage of Outborn Versus Inborn Neonates Receiving Human Milk

Marianne Augustine, Natalie Dweck, Dhruvi Pandya, Rhonda Valdes-Greene, Paul Visintainer, Heather L. Brumberg, Neonatology, Westchester Medical Center, Valhalla, NY; New York Medical College, Valhalla, NY.

BACKGROUND: Human milk (HM) is correlated with positive neonatal outcomes. Lactation consultants provide the framework to facilitate increased rates of hospitalized neonates receiving HM. The impact of a dedicated lactation consultant (LC) on inborn (IB) versus outborn (OB) infants receiving HM while in the NICU is unclear.

OBJECTIVE: Determine if the addition of a dedicated LC affects the rates of inborn vs. outborn neonates receiving HM in the NICU over time.

DESIGN/METHODS: Retrospective chart review (1/03-9/03) of 406 neonates (149 OB, 257 IB) at a Level 4 NICU during 3 time intervals of 3 months each: T1 (before LC, n=56 OB, 77 IB), T2 (after LC's arrival, n=51 OB, 79 IB), T3 (subsequent period after T2, n=42 OB, 101 IB). Data consisted of neonatal and maternal characteristics, demographic factors, and infant feeding practices.

RESULTS: The percentage of infants receiving HM vs. formula only during the hospital stay increased significantly over time after hiring LC (T1 55%, T2 62%, T3 69%, p=0.049). When diet was analyzed by IB or OB cohorts separately, only OB rates of HM increased significantly (T1 46%, T2 61%, T3 74%, p=0.023). Multivariate analyses showed a significant increase across time periods in the odds of receiving HM for OB infants, adjusting for birth weight, infection, days on oxygen and length of stay (p=0.003), but not for IB infants (p=0.54).

CONCLUSIONS: The addition of a full time LC to the NICU environment increases the percentage of neonates receiving HM, specifically in the OB population. The proportion of HM-fed IB infants likely showed little change over the time periods because of current high levels of breastfeeding in this facility. Understanding where the LC has the greatest impact will allow better resource utilization by a targeted approach.

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Poster Board 30

Fellow in Training

Relationship Between Having a Primary Care Provider and Child Maltreatment

Melissa S. Stockwell, Jocelyn Brown, Shaofu Chen, Frank M. Chimkin, Matilde Irigoyen, Division of General Pediatrics, Columbia University, New York, NY.

BACKGROUND: It has been hypothesized that having a medical home may help prevent child maltreatment, but research is lacking to substantiate this hypothesis. An essential component of a medical home is a relationship with a regular primary care provider. Little is known about the relationship between having a primary provider and child maltreatment.

OBJECTIVE: To test the hypothesis that children with confirmed abuse are less likely to have a primary care provider than those who are not confirmed.

DESIGN/METHODS: We performed a cross sectional retrospective analysis for 1,671 children ≤ 19 years old presenting for physical or sexual abuse to a child abuse program/child advocacy center at an academic medical center in New York City from 2000-05. At the time of the visit, basic demographic data and the name of the child's primary care provider were collected. Children were classified by abuse type (physical vs. sexual abuse) and abuse confirmation (confirmed vs. ruled-out based on disclosure and/or physical findings). We used chi-square testing and multivariate logistic regression to assess the relationship between having a primary care provider and child abuse confirmation. Variables used in the multivariate regression included age, maternal education, ethnicity and insurance status.

RESULTS: The mean age was 8 years, 91% were Black or Latino, 32% male, and 74% had Medicaid. Seventy-four percent were referred for sexual abuse and 26% for physical abuse. Overall, abuse was confirmed in 32% of cases, suspected in 30% and ruled out in 38%. The majority of children presenting for either type of abuse had a primary care provider (78.3%). However, for children presenting for physical abuse, those without a primary care provider were almost twice as likely to have confirmed abuse than children with a regular provider (OR 1.9, CI 1.1-3.3, p=.018). There was no association for children referred for sexual abuse. In multivariate analysis of physical abuse confirmation, older age was the only significant factor and lacking a primary care doctor was no longer significant.

CONCLUSIONS: Although an association seems to exist between confirmation of physical abuse and lacking a primary care provider, other factors seem to have a greater influence. The relationship between child maltreatment and having a regular primary care provider, as part of a medical home, deserves further study.

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Poster Board 31

Fellow in Training

Are Children Referred for Child Maltreatment at Risk for Underimmunization?

Melissa S. Stockwell, Jocelyn Brown, Shaofu Chen, Frank M. Chimkin, Matilde Irigoyen, General Pediatrics, Columbia University, New York, NY.

BACKGROUND: Underimmunization is a known marker for poor primary care and may be an important factor for follow-up. Little is known about immunization status in children being evaluated for maltreatment.

OBJECTIVE: To assess the immunization status of children being evaluated for child maltreatment in comparison to a birth cohort.

DESIGN/METHODS: Using a city-wide immunization registry, we compared coverage rates between children assessed for child maltreatment and a birth cohort. The maltreatment evaluation group comprised children 3-48 months living in Northern Manhattan referred to a child abuse program/child advocacy center at an academic medical center from 2000-05. The comparison group comprised children born at the medical center from 1999-2003 residing in the same zipcodes with the same insurance. Immunization records for 92% of the maltreatment assessment group and 91% of the comparison group were available from the New York Citywide Immunization Registry (CIR). To aid in reliability of data, only children with records in CIR whose DTaP1 was given at < 1 year of age were included (n=158 maltreatment evaluation group, n=4532 comparison group). Outcomes measured were up-to-date immunizations at 3, 7 and 19 months of age (4:3:1:3:3 series), and timeliness of DTaP1 (6 weeks to < 3 months) and MMR1 (12-15 months). Analysis included t tests with samples paired in the aggregate by zipcode.

RESULTS: Children assessed for maltreatment were 92% Black or Latino and 89% had Medicaid; comparison children did not differ significantly. Immunization rates at 3 months of age were not significantly different among the groups (76% vs. 84%, p=.29). However, by 7 months of age, children assessed for maltreatment had significantly lower rates than the birth cohort (38% vs. 48%, p=0.002) and even lower rates at 19 months (27% vs. 32%, p=0.01). The average delay for DTaP1 in the maltreatment assessment group was greater than the birth cohort (73 vs. 55 days). The average delay for MMR1 was also greater (168 vs. 100 days). The majority of both groups of children with delayed DTaP1 or MMR1 were concentrated in one half of the zipcodes.

CONCLUSIONS: Children evaluated for child maltreatment were at high risk for underimmunization. Immunization follow-up, as part of primary care, should be ensured for these children. Further investigation is needed to assess if underimmunization is a marker for child maltreatment risk.

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Poster Board 32

Medical Student

Barriers to Universal Screening for Lead Poisoning; a Survey of Inner-City Pediatric Healthcare Providers

Rachel Utterson, Nathan Graber, Maida Galvez, Vinay Aakalu, Deborah Vasquez, Ray Cornbill, Pediatrics and Community and Preventive Medicine, Mount Sinai School of Medicine, New York, NY; Family, Community and Preventive Medicine, Wyckoff Heights Medical Center, Brooklyn, NY.

BACKGROUND: Only 66% of NYC children have a blood lead level (BLL) measured at either 1 or 2 years. Specific barriers to screening faced by pediatric healthcare providers (HCPs) in NYC have not been identified.

OBJECTIVE: To identify barriers to universal blood lead screening as perceived by HCPs in inner-city communities.

DESIGN/METHODS: A 30-question, self-administered, anonymous survey was delivered to and collected in-person from HCPs in East Harlem and Bushwick, NY.

RESULTS: Of 99 HCPs surveyed, 49% report at least one barrier to blood Pb screening in their practice. Reported barriers include: there are other issues that are more important to review with parents (17%), low level Pb poisoning has few or no significant adverse health effects (16%), health insurance reimbursement is insufficient for BLL screening (15%), risk factor questions take too much time (11%), BLL screening is costly (9%), it is logistically difficult for my patients to get to the lab to have blood drawn (8%), prevalence of children in neighborhoods with elevated BLLs is too low to warrant universal screening (7%) and it is logistically difficult to process the blood test (2%). Perception of barriers does not vary significantly by neighborhood, gender, specialty, practice type or years in practice. HCPs who send patients to an off-site laboratory are more likely to perceive the logistical difficulty of blood drawing as a barrier to screening (p<.05). HCPs who see 51 or more patients per week are more likely to agree that risk factor questions take too much time and that this is a barrier to screening (p = .06). Having read educational information from the health department does not influence perceived barriers except that HCPs who read the bulletin are more likely to say that risk factor questions take too much time (p<.05).

CONCLUSIONS: Barriers faced by HCPs prevent universal screening of children for exposure to lead. This survey demonstrates that lead exposure is not perceived as a priority by all HCPs in high-risk neighborhoods. Recent educational campaigns for HCPs have not altered these perceptions. Appropriately targeted education and systemic change are required to surmount the identified barriers and improve BLL screening rates.

Hematology and Oncology Platform Session

Saturday, March 18, 2006

8:15am-10:30am

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8:15am

Increased Prevalence of Overweight Status in Survivors of Acute Lymphoblastic Leukemia (ALL) Treated Without Cranial Radiation

Nina S. Kadan-Lottick, Linda C. Stork, Bruce C. Bostrom, Joseph P. Neglia, Pediatric Hematology/Oncology, Yale University School of Medicine, New Haven, CT; Pediatric Hematology/Oncology/BMT, Oregon Health & Science University, Portland, OR; Pediatric Hematology/Oncology, Children's Hospitals and Clinics of Minnesota, Minneapolis, MN; Pediatrics, University of Minnesota School of Medicine, Minneapolis, MN.

BACKGROUND: Cranial radiation is an established risk factor for obesity in survivors of childhood cancer. Convincing evidence is lacking for obesity in children treated only with chemotherapy.

OBJECTIVE: (1) To describe the distribution of body mass index (BMI) in patients treated for standard risk acute lymphoblastic leukemia (ALL) without radiation, and (2) to identify potential factors associated with overweight status.

DESIGN/METHODS: Cross-sectional study of patients previously treated with systemic and intrathecal chemotherapy, without radiation, on Children's Oncology Group protocols. Standing height and weight were measured at follow-up clinic visits. BMI-for-age was calculated and overweight status was categorized as BMI-for-age ≥ 95 th percentile using 2000 CDC BMI-for-age, gender-specific growth charts. This abstract reports preliminary data of an ongoing study with an enrollment goal of 336 patients from 21 sites.

RESULTS: The initial 100 patients enrolled (46% F) had a mean age at evaluation of 12 (7-16) years, age at diagnosis of 4 (1.0-9.8) years, and interval since diagnosis of 8 (4-12) years. Overall, 28% of patients were in the overweight range, compared to 16% expected (p< 0.001), based on 2000 CDC data. Males were more likely than females to be overweight (37% vs. 17%; p=0.03). Overweight status was not significantly associated with age at diagnosis, age at evaluation, or interval since diagnosis.

CONCLUSIONS: In this preliminary analysis, a significantly elevated proportion of ALL patients treated without radiation are overweight. Contrary to previous studies in irradiated patients, males seem to be at elevated risk. These findings will be re-tested and predisposing treatment factors will be explored in future analyses with the entire study sample.

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8:30am

Behavioral Social Adjustment in Survivors of Childhood Acute Lymphoblastic Leukemia (ALL) Treated Without Cranial Radiation

David Breiger, Thomas A. Kaleita, Nina S. Kadan-Lottick, Joseph P. Neglia, Pim Brouwers, Late Effects, Psychology, and ALL Working Groups, Children's Oncology Group.

BACKGROUND: A subset of childhood acute lymphoblastic leukemia (ALL) patients experience psychosocial difficulties. An ongoing Children's Oncology Group (COG) study is assessing the effects of chemotherapy on behavior and social adjustment in childhood ALL survivors.

OBJECTIVE: To characterize patterns of behavioral adjustment and social functioning in patients treated for standard risk ALL without radiation.

DESIGN/METHODS: Cross-sectional study of patients previously treated with systemic and intrathecal chemotherapy, without radiation, on recent COG protocols. Parents completed the Child Behavior Checklist/ 6-18 (CBCL) as part of a comprehensive neurobehavioral evaluation. Enrollment goal for the entire study is 336 subjects from 21 sites.

RESULTS: The initial 102 patients (46% F) enrolled had a mean age at evaluation of 11.6 years (yrs), age at diagnosis (dx) of 3.7 yrs, and interval since dx of 7.5 yrs. The sample was evenly divided between the two CBCL age groups (6-11 and 12-16 yrs). Mean Syndrome Scale scores were in the average range except for the Somatic Complaints Scale, which exceeded the average score by one standard deviation. Boys 12-16 yrs old had a higher mean raw score (3.7 vs 1.1) on the Somatic Complaints Scale and a higher Internalizing Composite Scale mean raw score (12.0 vs 5.6) than 90% and 85% of the CBCL normative sample, respectively. Notably, more subjects than the expected 3% had scores in the borderline to clinical range on 6 of 8 Syndrome Scales and 3 of 3 Composite Scales: Withdrawn/Depressed (12.7%), Somatic Complaints (19.6%), Social Problems (6.9%), Thought Problems (5.9%), Attention Problems (7.8%), Aggressive Behavior (4.9%), Internalizing Composite (13.7%), Externalizing Composite (4.9%), Total Problems (8.8%).

CONCLUSIONS: Preliminary findings of behavioral and social adjustment in ALL survivors as assessed by the CBCL were generally in the average range for age and gender. However, heightened somatic concerns were reported overall, and particularly for boys 12-16 years of age. Greater than expected proportions of children had social/behavioral difficulties compared to the CBCL normative sample. Future multivariate analyses will identify behavioral subtypes, and determine predictors of both positive and negative psychosocial outcomes in the entire study sample.

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8:45am

Preliminary Findings of Neurobehavioral Outcomes in Survivors of Childhood Acute Lymphoblastic Leukemia (ALL) Treated Without Cranial Radiation

Nina S. Kadan-Lottick, Pim Brouwers, Thomas A. Kaleita, David Breiger, Linda C. Stork, Bruce C. Bostrom, Joseph P. Neglia, Late Effects, Psychology, and ALL Working Groups, Children's Oncology Group.

BACKGROUND: Cranial radiation can cause considerable neurobehavioral impairment. An ongoing Children's Oncology Group (COG) study is assessing the late neurocognitive effects of ALL survivors treated with chemotherapy only.

OBJECTIVE: 1) Characterize patterns of neurocognitive function in non-irradiated standard risk ALL patients, and 2) Identify factors associated with impairment.

DESIGN/METHODS: Cross-sectional study of patients previously treated with systemic and intrathecal chemotherapy, without radiation, on recent COG protocols. Evaluations for all patients included the Wechsler Intelligence Scale for Children-IV (WISC-IV), Wechsler Individual Achievement Test- 2nd Ed. Abbrev. (WIAT-II-A), Behavior Rating Inventory of Executive Function (BRIEF), FAS Fluency (FAS), Grooved Pegboard (GP), and the Beery Developmental Test of Visual Motor Integration (VMI). Enrollment goal for the entire study is 336 subjects from 21 sites.

RESULTS: The initial 102 patients (46% F) enrolled had a mean age at evaluation of 11.6 years, age at diagnosis(dx) of 3.7 years, and interval since dx of 7.5 years. Patients had an average WISC-IV Full Scale IQ (mean 101.0±12.3), with a lower Processing Speed Index (mean 94.4±11.8). WIAT-II scores were average for word reading, mathematics, and spelling, as were mean BRIEF and FAS scores for executive function. However, more than the expected 16% scored > 1 standard deviation (SD) below the normative mean on 9 of 11 indices of the BRIEF: Memory, Plan, Organize, Global Executive Composite, Shift, Emotion, Monitor, Initiate, and Metacognition. Mean scores on tests of visual-motor integration (VMI and GP) were 94.2±14.2 and 95.5±21, respectively (norm mean=100), with about 20% of patients scoring more than one SD below the mean. Factors significantly associated with less proficient abilities for certain domains included male gender, shorter interval since dx, and ≥ 5 years old at dx.

CONCLUSIONS: Preliminary analysis indicates average IQ and academic achievement in this cohort of 102 non-irradiated ALL survivors, but subsets of children have discrepancies in processing speed, executive function, and visual-motor integration. Future analysis will re-test these findings and explore predisposing factors using the entire study sample.

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9:15am

Fellow in Training

Mechanisms of Phthalate-Induced Toxicity in NeonatalpmN

Nkiru Nwebebe, Anna Vetrano, Kirin Syed, Chris Caravanos, Sowmya Murthy, Priya Palit, Nazeem Hanna, Barry Weinberger, Pediatrics/Neonatology, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ.

BACKGROUND: NICU and PICU patients are exposed to numerous polyvinyl chloride (PVC)-rich medical devices that contain the plasticizer di-(ethylhexyl) phthalate (DEHP). We have previously shown that metabolites of DEHP, including the active compound mono-(2-ethylhexyl) phthalate (MEHP), are elevated in the urine of premature infants. It has recently been suggested that MEHP exerts biologic effects by blocking eicosanoid-mediated anti-inflammatory signaling pathways, such as the nuclear transcription factor PPAR-γ.

OBJECTIVE: We hypothesize that MEHP alters pmN inflammatory responses - respiratory burst, chemotaxis and apoptosis - and that this is related to effects on eicosanoid signaling. MEHP may affect eicosanoid responses by inducing expression or activity of PPAR-γ or of cyclooxygenase-2 (COX2), which catalyzes the synthesis of anti-inflammatory eicosanoids. In addition, we compared the effects of MEHP on pmN from adults and neonates, who exhibit impaired anti-inflammatory eicosanoid responses.

DESIGN/METHODS: pmN were isolated from cord and adult blood by density gradient centrifugation. Cells were treated with MEHP (500 μM) or medium control. Phorbol 12-myristate 13-acetate (PMA)-induced intracellular H₂O₂ production was quantified by flow cytometry using the fluorescent marker, DCF-DA. Chemotaxis was measured using the modified Boyden chamber. Apoptosis was quantified by Annexin V binding and flow cytometry, and RNA expression for COX-2 and PPAR-γ by quantitative PCR.

RESULTS: MEHP significantly increased PMA-induced production of H₂O₂ in pmN. MEHP also increased chemotaxis and apoptosis in adult neutrophils. In contrast, chemotaxis and apoptosis were markedly reduced in neonatal cells. MEHP induced PPAR-γ and COX-2 expression, but this response was diminished in neonatal pmN.

CONCLUSIONS: MEHP induces respiratory burst activity. In neonatal pmN, reduced apoptosis and chemotaxis after exposure to MEHP are consistent with prolonged inflammation and delayed clearance of activated cells. This may be related to impaired induction of PPAR-γ and COX-2 in neonatal pmN. Thus, neonates may be more sensitive to the inflammatory effects of MEHP than adults. Prolonged exposure to PVC-containing equipment in the ICU may predispose already susceptible newborns to inflammatory diseases and oxidant tissue injury.

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9:30am

Pulmonary Health in Sickle Cell Disease

Anita Bhandari, Nathan Hagstrom, Craig Schramm, Pediatrics, Division of Pediatric Pulmonology, Connecticut Children's Medical Center, Hartford, CT; Pediatrics, Division of Hematology and Oncology, Connecticut Children's Medical Center, Hartford, CT.

BACKGROUND: Sickle Cell Disease (SCD) is the most common inherited disease in the African American population. Pulmonary complications are a frequent cause of hospital admissions and are a leading cause of morbidity and mortality in children with SCD. Despite the frequency and severity of pulmonary complications, pulmonologists do not play a major role in the management of these children.

OBJECTIVE: To evaluate the utilization of pulmonary subspecialty services across National Sickle Cell Centers.

DESIGN/METHODS: We conducted a survey of US centers using a questionnaire regarding utilization of pulmonary services. A questionnaire was mailed to 89 SCD Centers across the US. **RESULTS:** Of the 89 Centers, 23 responded. Most SCD Centers do not have a pulmonologist as part of the multidisciplinary team (21/23); 2 out of the 23 centers reported having a pulmonologist as part of their team, while 20 out of 23 centers used pulmonary service as a consultative service. One of the 23 centers had no pulmonologist available for consultation. The centers that had pulmonologists available showed a trend towards greater utilization of objective measures of pulmonary health such as pulmonary function tests. Of the centers responding to the survey, 33% of patients had spirometry done routinely as part of pulmonary function testing, 29% also had a post bronchodilator study, with 31% having plethysmography. Diffusing capacity was assessed in only 28% of the patients with SCD. More complex tests such as sleep studies (<25%) and exercise test (5%) were rarely obtained.

CONCLUSIONS: The centers that had pulmonologists available showed a trend towards greater utilization of objective measures of pulmonary health such as pulmonary function tests, which may detect early chronic lung disease and co-morbid conditions such as asthma; allowing for early intervention that might improve health outcomes. This underscores the importance of the multidisciplinary approach in taking care of these patients.

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9:45am

House Officer

Efficacy of Single Donor Platelets in Neonates Is Not Affected by Platelet Yield

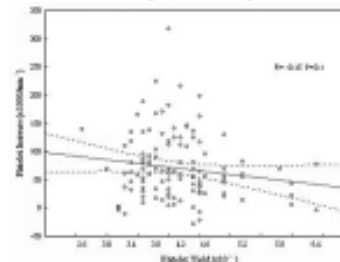
David W. Moser, Amy Mackley, John Hays, David A. Paul, Pediatrics, Thomas Jefferson University/duPont Childrens Hospital, Wilmington, DE; Neonatology, Christiana Care Health Services, Wilmington, DE; Blood Bank, Christiana Care Health Services, Wilmington, DE.

BACKGROUND: Although variable in platelet (plt) yield, single donor plts (SDP) are often used for transfusion of the neonate because of a decreased risk of bacterial contamination.

OBJECTIVE: To determine if the rise in plt count following transfusion is associated with plt yield of the SDP unit.

DESIGN/METHODS: Cohort study of infants in a level 3 NICU from 3/04-8/05 that received SDP, n=123. Neonatal and maternal causes for thrombocytopenia were identified. The main outcome variable studied was the rise in plt count post-transfusion. The plt rise in infants with plt underproduction was compared to infants with plt destruction. Statistical analysis included ANOVA, Pearson correlation and multivariable linear regression.

RESULTS: The mean gestational age (GA) of the study sample was 28 ± 4.5 wks with a birth weight (BW) of 1079 ± 842 g. The plt yield was 4.2 ± 0.7 (x10¹¹) and resultant plt rise was 71 ± 58.6 x1000/mm³. There was no correlation between the plt yield and plt rise, see figure.



Infants with plt underproduction (n=30) had a greater rise in plt compared to infants with plt destruction (n=51) following transfusion (95.3 ± 58 vs 59.6 ± 57.5 x1000/mm³, p=0.01). There were no differences in volume/kg transfused between groups. After controlling for GA, BW, volume and etiology, plt yield was not associated with post-transfusion rise in plts but plt underproduction remained associated with an increased plt rise.

CONCLUSIONS: In our population, there was no association between plt yield of SDP and plt rise following transfusion. Infants with thrombocytopenia related to plt underproduction had a greater rise in plts following transfusion compared to those with plt destruction, independent of yield or volume of SDP transfused.

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Cardiopulmonary Development Platform Session

Saturday, March 18, 2006

8:15am–10:45am

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8:15am

Fellow in Training

Sildenafil Citrate (Viagra™), a Selective Phosphodiesterase Type 5 Inhibitor Is a Powerful Pro-Angiogenic Agent

Ramesh Vidavalur, Suresh V. Penumathsa, Lijun Zhan, Nilanjana Maulik, Division of Neonatology, University of Connecticut Health Center, Farmington, CT; Molecular Cardiology Laboratory, University of Connecticut Health Center, Farmington, CT.

BACKGROUND: Myocardial ischemia is a major risk for infants undergoing early surgical interventions for congenital heart disease resulting in shock and low flow states. Recent studies in animal models has shown that sildenafil, a potent phosphodiesterase 5 (PDE 5) inhibitor, protects myocardium from ischemia/reperfusion(I/R) injury.

OBJECTIVE: To test the hypothesis that sildenafil induces cardio protective effect through nitric oxide(NO)/cyclicGMP pathway by upregulating angiogenic factors like vascular endothelial growth factor(VEGF) and it's receptor KDR activity, heme oxygenase 1(HO-1), thioredoxin(TrX), angiopoietin-1(Ang-1) and it's receptor Tie-2.

DESIGN/METHODS: We examined the effect of sildenafil using *ex-vivo* isolated rat heart model as well as using *in vitro* human coronary arteriolar endothelial cells (HCAEC) in culture. Rats were pretreated with sildenafil at a dose of 0.7mg/kg body weight intraperitoneally. After 60 min, isolated hearts were subjected to ischemia for 30 minutes followed by 2hr of reperfusion. HCAEC's were pretreated with two doses at 10 μ M and 20 μ M of sildenafil and subjected to 8hrs of hypoxia followed by 24 hrs of normoxia. Untreated controls were used for both models. Matrigel assay and western blot analyses were performed

RESULTS: Sildenafil treated animals showed statistically significant up regulation of TrX-1 (11 KDa)(1.9 fold) along with HO-1 (32 KDa)(3 fold) expression. *In vitro* study with HCAEC's showed significantly increased tubrogenesis along with increased angiogenic factors like Ang-1 (60 KDa)(1.5 fold), Tie-2 (5-fold), along with VEGF (40 KDa)(2-Fold) and it's receptor KDR (4.5 fold) expression. Sildenafil along with HO-1 inhibitor, SnPP (10 μ M) inhibited the expression of VEGF to 1 fold, TrX-1 to 0.8 fold and Ang-1 to 0.7 fold as well as reduction in tubrogenesis. **CONCLUSIONS:** The results demonstrated that sildenafil in therapeutic doses could protect the heart from I/R injury probably through upregulation of TrX/HO-1/VEGF pathway along with NO-cGMP. Further studies are needed to understand the molecular mechanism(s) of sildenafil - induced cardioprotective effect, which would help in expanding the utility of this drug for pediatric cardiovascular diseases.

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8:30am

Colocalization of RHAMM and HA During Cardiac Morphogenesis

Kathryn L. Maschhoff, Lindsay M. Johnson, Paul Q. Anziano, Rashmin C. Savani, Neonatology, Children's Hospital of Philadelphia, Philadelphia, PA; Pediatrics, University of Pennsylvania School of Medicine, Philadelphia, PA.

BACKGROUND: Defects in septation and valve formation are the most common birth defects in humans. Many of these defects arise from abnormal development of the endocardial cushions, which begins when some endocardial cells in the AV junction and outflow regions of the developing heart undergo an epithelial-mesenchymal transformation (EMT) and invade the underlying cardiac jelly. Members of the TGF β family are key regulators of this process. The glycosaminoglycan hyaluronic acid (HA) has also been shown to be crucial for EMT. In addition to its structural role, HA appears to play a role in controlling signaling events in the endocardial cushions.

OBJECTIVE: Delineate the expression pattern of hyaluronan and RHAMM (receptor for hyaluronan mediated motility) during endocardial cushion development and correlate this expression with TGF β signaling.

DESIGN/METHODS: The spatiotemporal expression pattern of RHAMM was determined by RT-PCR, Western blot analysis, and immunofluorescence. HA was localized in the developing heart using biotinylated HA binding protein.

RESULTS: During endocardial cushion formation (ED 9.5-10.5), RHAMM is expressed in both the myocardium and the endocardium. Double staining for RHAMM and HA revealed that HA is concentrated around RHAMM-expressing cells. Later in gestation (ED 12.5-13.5) RHAMM is predominately expressed in the myocardium. During EMT, the 70 kD isoform of RHAMM, which is located on the cell surface, predominates. Later in gestation, the 95 kD, intracellular form is seen. RT-PCR has revealed the presence of a single, full length RHAMM transcript during the periods of EMT and valvulogenesis; we have found no evidence of alternatively spliced transcripts or of alternative transcriptional start sites.

CONCLUSIONS: RHAMM colocalizes with HA during endocardial cushion formation in the developing heart, and may therefore mediate HA-induced transformation and migration of endocardial cells. During EMT, the cell surface isoform of RHAMM predominates. Expression of this isoform coincides with regions of TGF β signaling. As cardiac development proceeds, a transition to the intracellular form of RHAMM is seen. These alternate isoforms of RHAMM appear to arise from a single transcript and may result from alternate translation start sites or from protein processing.

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8:45am

Anterior Heart Field Function Is Regulated by Intracellular Calcium Signals

George A. Porter, Ashwani K. Sharma, Pediatrics, Yale University School of Medicine, New Haven, CT.

BACKGROUND: We previously demonstrated that altered intracellular calcium signaling causes abnormal development of the cardiac outflow tract (OFT). Conversely, others have shown that hearts of embryos with abnormal OFT development also have abnormal intracellular calcium signaling. The OFT of the heart is derived from the anterior heart field (AHF), which lies within the pharyngeal arches, and disruption of the AHF leads to right ventricular and OFT defects.

OBJECTIVE: We hypothesize that intracellular calcium signaling regulates the generation of myocytes from the AHF. Our objective was to determine the effects of altered calcium signals on the differentiation and migration of myocytes from the AHF into the cardiac OFT.

DESIGN/METHODS: We performed organ culture of intact mouse E9.5 AHFs and OFT placed on collagen plugs. We also studied primary cultures of dissociated AHFs and OFTs. Specimens were treated to disrupt calcium signaling and analyzed for differentiation and migration using various antibodies to cardiac myocytes proteins. Quantitative RT-PCR was performed to compare the expression levels of genes expressed in differentiating cardiac myocytes. Calcium imaging was performed to analyze the effects of treatments on intracellular calcium levels.

RESULTS: The calcium channel antagonist, nifedipine, decreased intracellular calcium levels in these specimens. Nifedipine also inhibited the differentiation and migration of AHF cells toward the cardiac OFT in a concentration dependent manner. In contrast, the calcium channel agonist, BayK8644, or increasing extracellular calcium in the media dramatically increased the number and migration of differentiated cardiac myocytes. Agents that affect intracellular stores of calcium did not inhibit growth and differentiation as well as nifedipine, suggesting that calcium from the sarcoplasmic reticulum is not as important as that from the extracellular fluid. Gene expression analysis demonstrated that decreased intracellular calcium levels selectively altered the expression of genes important for early cardiac development.

CONCLUSIONS: Altering intracellular calcium signals derived from the extracellular fluid via L-type calcium channels affects the development of the cardiac OFT by decreasing the differentiation and migration of cells from the AHF. These results suggest that intracellular calcium signals are an important modulator of cardiac OFT development.

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9:00am

Fellow in Training

Regulation of H9C2 Cardiomyocyte Proliferation Involves a Crosstalk Between the β -Adrenergic Receptors (bAR) and PI3K Via a $G_{\beta\gamma}$ /Src Signaling Pathway

Vlad D. Ianus, Naohiro Yano, Ting C. Zhao, James F. Padbury, Yi-Tang Tseng, Department of Pediatrics, Women and Infants' Hospital, Providence, RI.

BACKGROUND: We have shown that blockade of the β -adrenergic receptors (β AR) *in vivo* is associated with reduced neonatal cardiomyocyte proliferation with a reduced cardiac p70S6K1 activity. There is a globally high expression and activity of each protein in the cardiac PI3K/p70S6K signaling pathway during late gestation and in early postnatal stages of development. These results suggest that β AR regulate cardiomyocyte proliferation via the PI3K/p70S6K signaling pathway.

OBJECTIVE: To examine the mechanism(s) for β AR activation of PI3K signaling.

DESIGN/METHODS: H9c2 cells, a rat fetal cardiomyocyte cell line, were maintained in serum-free condition overnight and treated for 6 hr with isoproterenol (ISO, 10 nM) alone or in combination with wortmannin (0.2 mM) or LY 294002 (5 mM). Cells were lysed and proliferation was determined based on cellular nucleic acid binding to a green fluorescent dye, CyQUANT GR, using a microplate reader at an excitation of 480 nm and an emission of 530 nm. Cells were also treated with ISO for 2 min with or without other antagonists before PI3K activity was determined with *in vitro* lipid kinase assay. To inhibit $G_{\beta\gamma}$ the cells were stably transfected with an empty vector or a vector expressing a $G_{\beta\gamma}$ sequesterant peptide derived from the C-terminus of β AR kinase 1 (β ARKct).

RESULTS: ISO induced a significant increase in cell proliferation which was abrogated by co-treatment with either wortmannin or LY294002. The increase in cell proliferation was confirmed with immunofluorescent staining for Ki-67. ISO induced an increase in PI3K activity which was abolished by co-treatment with CGP 20712 but not by ICI 118,551, suggesting a β_2 AR-mediated effect. The increase in PI3K activity was also blocked by co-treatment by PP2, a Src inhibitor, but not by inhibitors for PKC, PKA and Ras. Overexpression of β ARKct completely abolished ISO-induced increase in PI3K activity.

CONCLUSIONS: These data suggest a novel mechanism that regulates cardiomyocyte proliferation *in vitro* which involves crosstalk between the β_2 AR and PI3K signaling pathways via the involvement of $G_{\beta\gamma}$ /Src. (Supported by NIH 1 P20 RR018728)

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9:30am

ErbB Ligand-Specific Induction of Fetal Mouse Lung Type II Cell Proliferation and Differentiation

Lucia D. Pham, Sujatha M. Ramadurai, Sandra L. Murray, Heber C. Nielsen, Pediatrics, Floating Hospital for Children, Tufts-New England Med Ctr, Boston, MA.

BACKGROUND: ErbB receptors (ErbB1, ErbB2, ErbB3, ErbB4) are important for development of several organs including lung. The ErbB1 ligands epidermal growth factor (EGF) and transforming growth factor α (TGF α), and the ErbB4 ligand neuregulin (NRG) are crucial in the control of lung development. In developing systems, cell proliferation and cell differentiation are often in tension, a phenomenon we have reported in lung development. The relative effects of EGF, TGF α , and NRG on fetal lung type II cell proliferation and differentiation during development are unknown. **OBJECTIVE:** We hypothesized that EGF, TGF α , and NRG induce differential effects on fetal lung type II cell proliferation and differentiation, and that stimulation of one effect correlates to inhibition of the other.

DESIGN/METHODS: Primary cultures of fetal mouse lung type II cells were prepared on d16, d17, and d18 of gestation (term=d19). Cells were grown in DMEM+20% stripped fetal calf serum to 80% confluence, serum starved for 3 hrs, then treated with EGF (10ng/ml), TGF α (10ng/ml), or NRG (33nM) for 24 hrs. Controls received DMEM only. During the 24hr treatment cells were also exposed to either 3 H-choline (to measure synthesis of surfactant DSPC) or 3 H-thymidine (to measure proliferation).

RESULTS: The different ErbB ligands had gestation- and ligand-dependent effects on type II cell proliferation and DSPC synthesis (ANOVA P<0.05). Thymidine incorporation was strongly stimulated by EGF on d17 (P<0.05). No significant changes in proliferation were observed in d16 (range 85% to 116%) or in d18 (range 109% to 117%) cells. No treatment inhibited thymidine incorporation. EGF had minimal effect on DSPC synthesis except on d18. Both NRG and TGF α strongly stimulated DSPC synthesis on d17 and d18 (stimulation range 260%-285%; P<0.05 for each treatment). No treatments significantly affected d16 DSPC synthesis.

CONCLUSIONS: EGF, TGF α , and NRG did exhibit ligand-specific effects on proliferation and differentiation which were gestational age dependent. There was however no observable tension between cell proliferation and cell differentiation. We speculate that ErbB ligands strongly affect type II cell differentiation, while other factors may simultaneously reduce proliferative effects.

Hormonal Induction of DC-LAMP, a Lamellar Body Membrane Protein, in Differentiating Human Fetal Alveolar Epithelial Cells

Venkataadri Kolla, Linda W. Gonzales, Ping Wang, Sree Angampalli, Philip L. Ballard, Pediatrics/Neonatology, Childrens Hospital & Univ of PA, Phila, PA.

BACKGROUND: Type II cell maturation is characterized by induction of surfactant components and formation of lamellar bodies (LB), which are derived from multivesicular bodies via the lysosomal-vesicular pathway. Except for ABCA3, which is required for LB formation, the membrane proteins that are unique to and specifically identify LB are largely unidentified.

OBJECTIVE: We identified and characterized DC-LAMP, a second unique protein of LB, in differentiating human fetal lung epithelial cells.

DESIGN/METHODS: Epithelial cells were isolated from human fetal lungs (16-21 wk gestation) and cultured alone (control) or with dexamethasone (D, 10 nM), or 8-Br-cAMP (C, 0.1 mM) + isobutylmethylxanthine (I, 0.1 mM) or both (DCI) for 1-5 days. Some cells were either transfected with AdTTF-1 (1-6 pfu/cell) (over-expression), or transfected with TTF-1 siRNA oligonucleotides (inhibition). Expression of DC-LAMP was analyzed by cDNA microarray, real time PCR, Western blot, and immunofluorescent staining.

RESULTS: Control epithelial cells after 5 d culture showed minimal staining for DC-LAMP. With DCI treatment, DC-LAMP staining was intense and co-localized with SP-B in LB. Dexamethasone or cAMP alone induced minimal DC-LAMP staining. In contrast, staining of LAMP-1, a lysosomal marker, was similarly intense and vesicular in both control and DCI-treated cells. In time-course studies of DCI induction, DC-LAMP mRNA and protein were detectable at 24 h, increasing in a linear fashion to day 5, similar to the time course for induction of SP-B. Overexpression of thyroid transcription factor-1 (TTF-1) by adenovirus transduction in the absence of DCI induced DC-LAMP mRNA to a high level (>10-fold), and knock-down of endogenous TTF-1 by siRNA in the presence of DCI inhibited DC-LAMP expression (10-39%, n=2), suggesting that TTF-1 is a sufficient and required transcription factor for DC-LAMP expression. In DCI-treated cells, knock-down of DC-LAMP by siRNA reduced DC-LAMP mRNA and protein expression >50% (n=2) with no effect on SP-B mRNA or protein (8 kD) or GAPDH expression.

CONCLUSIONS: DC-LAMP is a hormonally regulated, TTF-1-dependent membrane protein, segregated to lamellar bodies during type II cell differentiation. We speculate that it plays a unique, but as yet unidentified, role in LB formation or function.

Increased Human Alveolar Epithelial Barrier Function Induced by Differentiation and Transdifferentiation

Cherie D. Foster, Linda S. Varghese, Linda W. Gonzales, Susan S. Margulies, Susan H. Guttentag, Pediatrics, Division of Neonatology, University of Pennsylvania School of Medicine/CHOP, Philadelphia, PA.

BACKGROUND: The alveolar epithelium provides a resistant barrier to water flux and solute transport from the lung interstitium to the alveolar space. However, comparative profiles of developing human type II (T2) and type I (T1) cell barrier properties have not been well characterized.

OBJECTIVE: To describe the changes in alveolar epithelial barrier function in an established in vitro model of human T2 cell differentiation and T1 cell transdifferentiation.

DESIGN/METHODS: Epithelial cells from 2nd trimester human fetal lung were cultured for 7d on Transwell permeable membrane supports in one of 3 conditions: Waymouth's alone (Way), 10nM dexamethasone + 0.1 mM each 8-Br-cAMP and IBMX (DCI) to establish the T2 cell phenotype, or 4d of DCI followed by 3d of Waymouth's to promote T1 transdifferentiation (DCI/Way). Cell barrier function was assessed after 7d in culture by measurement of transepithelial resistance (TER) and by measuring the diffusion of the fluorescent dyes carboxyfluorescein and Texas Red Dextran across the cell monolayer. Results are expressed as mean ± SE for 3-4 experiments and were analyzed by ANOVA.

RESULTS: TER increased from 111.7±13.2 Ohms*cm² in Way to 362±28.4 in DCI (p<0.01). Transdifferentiation resulted in a further increase in TER to 430±35 Ohms*cm² (p<0.001 vs. Way). In the fluorescent dye studies, carboxyfluorescein concentration in the collecting chamber decreased from 64.6±4.3µg/mL (Way) to 57±1.9(DCI) and 45.0±4.0 (DCI/Way) (p<0.01 vs. Way). Dextran permeability decreased in a similar manner: 573±42.0 µg/mL (Way) to 304.0±29.6 (DCI)(p<0.001) and 123±22.0 (DCI/ Way) (p<0.001 vs. Way, p<0.01 vs. DCI). Both DCI and DCI/Way treatment resulted in increased epithelial barrier function, with transdifferentiated cells (DCI/Way) demonstrating the highest alveolar epithelial barrier function.

CONCLUSIONS: Differentiation towards a T2 cell phenotype and transdifferentiation towards a T1 cell phenotype resulted in changed alveolar epithelial barrier properties, with increased TER and decreased permeability when compared to untreated human fetal cells. Increased TER and decreased permeability may serve as a functional marker to distinguish Type I cells from Type II cells in further studies of the developing human alveolar epithelium.

Supported by NIH K08 HL077266-01A1

Endocrinology and Obesity Platform Session

Saturday, March 18, 2006

8:15am-10:45am

Hyperglycemia on Admission to the Pediatric Intensive Care Unit: Frequency and Association with Patient Outcome

Genna W. Klein, Joanne M. Hojsak, Sharon J. Hyman, Robert Rapaport, Department of Pediatrics, Mount Sinai School of Medicine, New York, NY.

BACKGROUND: Studies in critically ill adults have demonstrated an association of hyperglycemia with poor outcome. Rigorous glycemic control decreases morbidity and mortality.

OBJECTIVE: To determine the frequency of hyperglycemia within the first 24 hours of admission to the Pediatric Intensive Care Unit (PICU) and its effect on morbidity and mortality.

DESIGN/METHODS: Data were collected retrospectively from PICU and laboratory databases on 1368 consecutive PICU admissions from 1/1/01 through 12/31/04. Patients without serum glucose testing and patients with known diabetes were excluded. Patients were stratified by maximum serum glucose level in the first 24 hours of PICU admission into <200 mg/dL (normoglycemic NG) vs. 200 mg/dL (hyperglycemic HG) groups. Baseline characteristics included age, gender and PRISM (pediatric risk of mortality) score. Outcome measures were PICU mechanical ventilation days (MVD), length of stay (LOS), and mortality. Data were analyzed by the Mann-Whitney Rank Sum test and the Fisher Exact Chi-Square test.

RESULTS: Of 1301 patients analyzed, HG occurred in 16%, (43.3% male). Of the NG group, 52.4% were male.

	Glucose < 200 mg/dl N = 1096	Glucose > mg/dl N = 205	P value
Age, months *	49.84 (12.32-157.29)	49.63 (12.54-160.12)	NS
PRISM*	2.00 (0.00-6.00)	9.00 (5.00-14.50)	< 0.001
MVD*	0.00 (0.00-2.00)	2.00 (0.00-4.00)	< 0.001
LOS (days)*	4.00 (2.00-8.00)	5.00 (3.00-10.00)	< 0.001
survival (%)	95.8	85.4	< 0.001
Data expressed as median (25%-75%)			

CONCLUSIONS: Admission hyperglycemia occurs in 16% of critically ill children and is associated with an increase in PRISM score, PICU mechanical ventilation time, length of stay and mortality. Further analyses are required to determine the contribution of hyperglycemia to acuity of illness and outcome. Prospective evaluations of the effects of glycemic control in pediatric intensive care patients will also help elucidate the role of hyperglycemia in such patients.

The Prevalence of Hypertension in Obese Minority Youth

M. Puri, M. Garcia, H. Nussbaum, J. Flynn, K. Freeman, J. DiMartino-Nardi, Pediatric Endocrinology, Montefiore Medical Center, Bronx, NY; Pediatric Nephrology, Montefiore Medical Center, Bronx, NY.

BACKGROUND: Primary hypertension (htn), once considered rare among children, is becoming increasingly more common especially in obese children.

OBJECTIVE: To study the prevalence of htn in minority {African-American (AA) and Caribbean Hispanic (CH)} youth referred for evaluation of obesity.

DESIGN/METHODS: 167 subjects (45 AA,122 CH);(92 females (F),75 males (M)) mean age of 14±2.3 years, BMI 38±7.5 kg/m², and BMI z-score 5.3±2.2 were studied. 31 control non-obese youth were recruited (7 AA, 24 CH);(17 F,14 M) mean age of 14.6±2.1 years, BMI 20±2.8 kg/m², and BMI z-score -0.21±0.7. Weight, height and BP were measured in each child. Htn was defined as resting systolic and or diastolic BP values equal to or exceeding the 95th percentile for gender, age and height. All subjects underwent oral glucose tolerance testing.

RESULTS: The prevalence of office htn in the obese minority patients was observed to be 31% as compared to 3% in the non-obese controls. The prevalence of elevated BP was similar in early (T 2-3) and late pubertal (T 4-5) subjects. Subjects with htn had higher BMIs, BMI z-scores, and HbA1Cs than those obese subjects without htn. No significant differences were observed with respect to age, birth weight, gestational age, waist-hip ratio, HOMA, lipids, or rates of impaired glucose tolerance.

	Early pubertal youth with htn	Early pubertal youth without htn	Late pubertal youth with htn	Late pubertal youth without htn	Control patients
n	15	32	37	83	30
Age (yrs)	11±1.6	12±1.7	15±1.7	15±1.9	15±2.2
Systolic BP (SBP)	130±12.4	111±10.7	134±7.0	116±8.6	104±9.3
Diastolic BP (DBP)	70±10	63±9.9	69±10.4	65±9.7	65±7.1
SBP Index	1.06±0.08	0.90±0.08	1.04±0.05	0.91±0.06	0.83±0.08
DBP Index	0.87±0.11	0.78±0.11	0.83±0.12	0.78±0.11	0.80±0.09
BMI kg/m ²	36±7.7	35±6.4	42±7.2	38±7.5	20±2.9
BMI z-score	5.61±2.6	4.78±1.9	6.05±2.3	5.06±2.2	-0.2±0.7

*mean±SD

CONCLUSIONS: In this study, we report a 10 fold increase in prevalence of htn among obese pubertal minority youth when compared to lean controls. This underscores the need for careful evaluation and followup of these children to confirm the presence of htn and detect other cardiovascular risk factors such as hyperlipidemia and insulin resistance.

Effect of Metformin and Dietary/Lifestyle Therapy on Metabolic Risk Factors in Overweight Children with Dyslipidemia

Radhika Purushothaman, Viral Gala, Meharchand Oad, Amrit Bhargoo, Sunil Sinha, Margarita Smotkin-Tangorra, Irina Kazachkova, Jessica Hileman, Deborah DeSantis, Henry Anhalt, Lisa Altshuler, Svetlana Ten, Pediatrics, Infants and Children's Hospital of Brooklyn, Brooklyn, NY; Pediatric Endocrinology, Infants and Children's Hospital of Brooklyn, Brooklyn, NY; Kids Weight Down Program, Infants and Children's Hospital of Brooklyn, Brooklyn, NY; Pediatric Endocrinology, Saint Barnabas Medical Center, West Orange, NJ.

BACKGROUND: Diet/lifestyle therapy provides < 5 kg weight loss in 2-4 y but pharmacological therapy provides 5-10 kg weight loss in 1-2 y. Weight loss of ≥ 5 % is associated with improvements in cardiovascular risk factors>

OBJECTIVE: Compare the effect of Diet/lifestyle therapy +/- metformin on BMI, lipid profile, BP & insulin sensitivity in children<

DESIGN/METHODS: We reviewed charts of 51 obese children, who underwent 12 weeks of diet/lifestyle therapy & 15 with elevated triglycerides, BP & insulin at baseline received metformin 100 mg BID for 6 months. Clinical & biochemical parameters were compared.

RESULTS: BMI didn't decrease significantly in any of the group. Triglycerides and ALKP decreased significantly in both groups (p < 0.01). HDL significantly increased in metformin treated group (p< 0.01).

CONCLUSIONS: Combination of Diet/lifestyle therapy with metformin improved cardiovascular risk factors in spite of not significant change in BMI

Comparison between groups at baseline & after intervention

Parameter	Diet, Exercise & Metformin [Mean(SD)]	Diet & Exercise [Mean(SD)]
BMI at baseline	36.1(7.2)*	30.7(7.1)
BMI after intervention	35.04(7.3)*	29.12(9.08)
Diastolic pressure at baseline	70.3(10.7)*	63.6(9.3)
HDL at baseline	36.8(6.6)*	41.2(8.9)
Triglyceride at baseline	208.2(79.9)*	147.3(98.6)
Triglyceride after intervention	143.78(73.2)*#	100.7(55.6)@
ALKP at baseline	191.5(96.7)*	274.6(89.4)
ALKP after intervention	141.4(64.6)*#	237.7(87.6)@
Fasting glucose at baseline	95.6(11.3)*	81.9(9.3)
Fasting glucose after intervention	91.2(15.6)*	83.5(7.2)
Fasting Insulin at baseline	35.3(25.4)*	20.72(17)
Fasting Insulin after intervention	28.1(22.7)*	14.8(9.04)@

*- p<0.05 when comparing the 2 groups, #- p<0.05 when comparing the diet, exercise & metformin group before & after intervention, @- p<0.05 when comparing the diet & exercise group before & after intervention

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9:00am

Fellow in Training

Prevalence of Vitamin D Deficiency in Obese Children and Adolescents

Margarita Smotkin-Tangorra, Radhika Purushothaman, Ashutosh Gupta, Golali Nejadi, Sunil Sinha, Henry Anhalt, Svetlana Ten, Pediatric Endocrinology, Infants and Childrens Hospital of Brooklyn, Brooklyn, NY; Pediatrics, Infants and Childrens Hospital of Brooklyn, Brooklyn, NY; Pediatric Endocrinology, Avera Children's Hospital, SD; Pediatric Endocrinology, Saint Barnabas Medical Center, West Orange, NJ.

BACKGROUND: Current understanding of the role of vitamin D has broadened. It regulates calcium homeostasis, glucose metabolism, autoimmunity and carcinogenesis. Data regarding vitamin D status of obese pediatric subjects is not available.

OBJECTIVE: We sought to determine the prevalence of 25-hydroxyvitamin D deficiency and its correlation to various metabolic indices in the obese pediatric population

DESIGN/METHODS: We reviewed the charts of 217 obese (BMI 32.2±6.4 kg/m²) children (110 boys, 100 girls). Vitamin D 25-OHD, total cholesterol, LDL, HDL, triglycerides, ALT, AST, TSH, total T4, fasting insulin and glucose were measured after an overnight fast. QUICKI was calculated and used as the index of insulin sensitivity. Apnea-Hypopnea Index (AHI) was evaluated in 35 children by nocturnal polysomnography. Patients were divided into 2 groups with vitamin D 25-OHD < 20 ng/mL (n=120, 13.6 ± 3.2 yrs) and vitamin D 25-OHD ≥ 20 ng/mL (n=97, 11.8 ± 3.6 yrs). **RESULTS:** Overall 55.2 % patients (n=120; 59 boys) were vitamin D 25-OHD deficient (<20 ng/mL) of whom 12.9 % (n=28; 16 boys) were severely deficient (<10 ng/mL). There was no difference in vitamin D 25-OHD levels on the basis of gender. Age, body mass index (BMI), and systolic blood pressure (SBP) were significantly elevated, albeit HDL and alkaline phosphatase (ALKP) were lower in the group with vitamin D 25-OHD < 20 ng/dL (p< 0.05). QUICKI was borderline lower in the vitamin D 25-OHD deficient group (p=0.058). The vitamin D 25-OHD levels negatively correlated with BMI (r=0.22, P=0.001) and AHI (r=0.42, P=0.01) and positively correlated with HDL (r=0.14, p=0.03) and ALKP (r=0.19, p=0.009).

CONCLUSIONS: We found that more than half of the obese children were vitamin D 25-OHD deficient with equal gender distribution. Vitamin D deficiency was associated with increased age, BMI, SBP and decreased HDL and ALKP

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9:30am

Fellow in Training

Prevalence of Abnormal Glucose Tolerance in Obese Minority Adolescents with Polycystic Ovary Syndrome

Mala Puri, Mireya Garcia, Hadassa Nussbaum, Katherine Freeman, Joan DiMartino-Nardi, Pediatric Endocrinology, Montefiore Medical Center, Bronx, NY; Biostatistics, Montefiore Medical Center, Bronx, NY.

BACKGROUND: Impaired glucose tolerance (IGT) and diabetes mellitus (DM) is present in approximately 30-40% of women with polycystic ovarian syndrome (PCOS). Recent data suggest that insulin resistance is present in the early stages of PCOS.

OBJECTIVE: To characterize the incidence of IGT in obese minority adolescent girls with PCOS and to compare it to the incidence of IGT in obese minority girls without PCOS.

DESIGN/METHODS: 31 girls {4 African American (AA), 27 Caribbean Hispanic (CH) with a mean age of 15±1.8 years, BMI 39±7.5 kg/m², BMI z-score 5.2±2.3 with the diagnosis of PCOS (defined by chronic anovulation and clinical and biochemical signs of hyperandrogenism) referred for evaluation of PCOS and obesity were enrolled in the study. 61 girls without PCOS (20 AA, 41 CH) with a mean age of 13±2.5 years, BMI 36±7.6 kg/m², BMI z-score 4.6±1.9 who were referred for evaluation of obesity were also recruited. Weight, height and blood pressure was obtained on each subject. All girls underwent a standard 2 hour glucose tolerance test.

RESULTS: The prevalence of IGT was 19% in those subjects with PCOS compared to 6.6% in the obese girls without PCOS. In our cohort, fasting plasma blood glucose (FBS) measurements alone were not an accurate predictor of IGT as only 2 of the 10 patients with IGT had an abnormal (FBS). The girls with PCOS were older, however no significant differences were observed with respect to birth weight, gestational age, waist-hip ratio, HOMA, or lipids.

Parameter	Obese girls with PCOS	Obese girls without PCOS
n	31	61
age (yrs)	15±1.8	13±2.5
BMI (kg/m ²)	39±7.5	36±7.6
BMI z-score	5.2±2.3	4.6±1.9
Waist hip ratio	0.83±0.23	0.82±0.23
HOMA	5.81±3.96	6.13±6.3
Cholesterol	161±28.8	167±32.2
HDL	52±13.8	49±9.9
LDL	88±26.9	97±25.7
TG	108±59	108±43.5
HbA1C	5.48±0.49	5.44±0.46
IGT	6	4

*Values reflect mean±SD

CONCLUSIONS: As in adult patients, our obese minority adolescent girls who carry the diagnosis of PCOS have a greater incidence of IGT, despite no differences in HOMA, lipids, and HbA1C. This emphasizes the importance of screening these youth with a glucose tolerance test to identify IGT.

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9:45am

Patterns of Weight Gain of 3-9 Year Old Children and the Relationship of These Patterns to ObesityHerbert I. Goldman

BACKGROUND: The growth curve in some slender children falls almost exactly on one of the percentile lines or is parallel to it. The Figure is a copy of the growth chart of one of these children who are called PARALLEL GROWERS (PG). Others cross percentile lines and are called NON PARALLEL GROWERS (NPG).

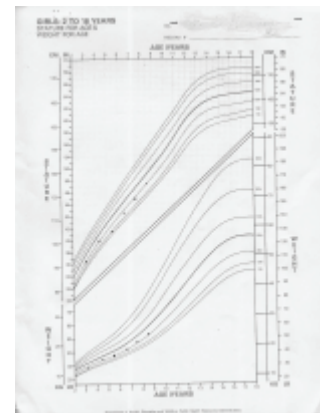
OBJECTIVE: To determine differences in weight gain and in feeding methods and feeding behavior between PG and NPG.

DESIGN/METHODS: SETTING A solo suburban Pediatric practice. **PARTICIPANTS** 45 children 9-13 years of age. **DESIGN** Retrospective review of growth charts, and administration of a questionnaire regarding feeding methods and feeding behavior. Questionnaires are returned for 40 children, 20 male, 20 female; 38 Caucasian, 2 Asian. **MAIN OUTCOME MEASURES** 1. Whether the child is PG or NPG according to predetermined criteria. 2. BMI at 3 and 9 years. 3. Differences in feeding methods and feeding behavior between PG and NPG.

RESULTS: 21 children are PG, 19 NPG. The birth weights of the 2 groups are similar. The NPG gain more weight during the first year but the differences are not significant. At 3 years the mean BODY MASS INDICES (BMI's) are 15.5 (PG) and 18.2 (NPG), p =.002. Mean 9 year old BMIs are 15.7 (PG) & 22.2 (NPG), p<.00001. At 9 years 9 NPG's are obese, compared to 0 PG (p<.02.)

PG infants are more often demand fed, 18 of 21 PG vs. 10 of 19 NPG, p = .06 and start self-feeding earlier in infancy, mean age 11.2 months PG, vs. 15.0 months NPG, p<.05 (i.e. PG are given greater control of their infant feedings.) As children, PG more often can not eat when full, 18 of 21 PG vs. 9 of 19 NPG, p<.025 and more often do not always finish all the food on the plate, 17 of 21 PG vs. 6 of 19 NPG, p<.005 (i.e. PG children have stronger satiety signals.)

CONCLUSIONS: The findings suggest that PG children are slender because they have strong satiety signals. These strong signals are possibly related to the greater control by the PG of their feedings during infancy.

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10:00am

Adiponectin Responses to Oral Glucose Tolerance Tests in Adolescents with Morbid Obesity

Vatcharapan Umpaichitra, Arlene B. Mercado, Christina Juan, Jose B. Quintos, Salvador Castells, Pediatrics, The Brookdale Univ Hosp & Med Ctr, Brooklyn, NY; Pediatrics, Mount Sinai School of Medicine, New York, NY; Pediatrics, SUNY Downstate Med Ctr, Brooklyn, NY.

BACKGROUND: Adiponectin levels are decreased and negatively associated with adiposity in adults and children with obesity and type 2 diabetes. In patients with morbid obesity, therefore, the degree of decreased adiponectin levels should be substantiated. Data in "morbidly" obese subjects, especially children and adolescents, are scanty. With a continuing increase in obesity, treating children with morbid obesity and its co-morbidities is becoming a challenge. Related data are needed.

OBJECTIVE: To examine adiponectin levels during standard oral glucose tolerance test (OGTT) in adolescents with morbid obesity.

DESIGN/METHODS: We studied 21 morbidly obese [BMI 48.6±7.3 (mean±SD) kg/m²] and 8 nonobese (BMI 21.8±4.3 kg/m²) adolescents. Morbid obesity was defined as BMI ≥ 40 kg/m². Mean ages were similar (14.7±2.1 and 13.3±1.7 y, respectively). All had standard OGTT (75 g of glucose). Plasma glucose and serum adiponectin levels were measured at 0, ½, 1, 1½, and 2 h.

RESULTS: All had normal glucose at 0 and 2 h according to ADA criteria. Adolescents with morbid obesity had significant higher glucose levels at 1 and 2 h when compared to nonobese adolescents (119.4±25.9 vs. 95.3±20.3 mg/dl; p < 0.02 and 106.0±18.7 vs. 86.3±20.0 mg/dl; p < 0.03, respectively). These higher glucose levels, however, were not clinically significant. Unexpectedly, adiponectin levels at all time points were not significantly different between the 2 groups. The adiponectin levels in the adolescents with morbid obesity were 10.5±4.0, 10.2±4.1, 9.6±4.5, 9.2±3.9, and 10.0±4.3 mcg/ml at 0, ½, 1, 1½, and 2 h, respectively. Those in the nonobese adolescents were 12.2±5.4, 11.7±5.8, 11.2±4.6, 11.7±5.5, and 11.4±5.0 mcg/ml at 0, ½, 1, 1½, and 2 h, respectively.

CONCLUSIONS: Our preliminary data suggest that in morbid obesity, unlike in mild-moderate obesity, there may be a loss of normal regulatory endocrine loops or significant effects of glucose loads on adiponectin responses may become apparent after 2 h.

General Pediatrics I: Preventative Pediatrics Platform Session

Saturday, March 18, 2006

8:15am-10:45am

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8:15am

Human Milk Feeding by Gestational Age and Neonatal Intensive Care Status in a Nationally Representative Population of US Infants

Cynthia R. Howard, Kathleen A. Marinelli, Peggy Auinger, Nirupama Laroia, Ruth A. Lawrence. Pediatrics and Neonatology, University of Rochester, Rochester, NY; Neonatology, University of Connecticut, Hartford, CT.

OBJECTIVE: To describe initiation and duration of human milk (HM) feeding in a US birth cohort by gestational age (GA) and neonatal intensive care (NICU) and to evaluate associated sociodemographic factors.

DESIGN/METHODS: Data were from the Early Childhood Longitudinal Study Birth Cohort. Analyses used SPSS and SUDAAN software, chi-square for bivariate and logistic regression for multivariate analyses.

RESULTS: NICU infants were less likely than well infants (WI) to ever be fed HM (60.5% vs. 67.4%, $p=0.01$). HM feeding in the NICU did not differ by GA; in WI it increased with greater GA, and only differed between NICU (55.8%) and WI (68.3%) at >37 wks ($p=0.02$). In multivariate analyses HM feeding in the NICU was not associated with GA, mom's smoking, parity, age, region of US, race, WIC, poverty or plurality but varied significantly with mom's education. In contrast, mom's smoking, marital status, parity, education, region, race, and WIC status all were independently associated with HM feeding in WI.

NICU compared to WI were less likely to be fed HM at 3 and 6 mo, overall and if >37 wks (all $p<.05$), but not in infants 31-34 wks or 35-37 wks. Duration increased in WI with advancing GA at 3 and 6 mo, but did not vary with GA to 6 mo in NICU babies. HM feeding to 6 mo in NICU infants was independently associated with mom's race, marital status, education and length of NICU stay.

CONCLUSIONS: HM feeding is less common in NICU than well infants, but is unaffected by many of the usual sociodemographic predictors of HM feeding in the US. HM feeding increases with GA in well infants, but does not vary in the NICU, suggesting that NICUs support HM feeding even in the tiniest babies.

Duration NICU Infants by Gestational Age (n=1,817)

HM Feeding	Overall (n=221)	<27 (n=535)	27-30 (n=557)	31-34 (n=301)	35-37 (n=203)	>37	p value
Ever	60.5	61.1	56.5	62.5	65.5	55.8	0.25
3 months	35.1	37.6	31.2	32.8	39.6	33.7	0.58
6 months	19.8	13.0	15.0	17.2	23.0	20.8	0.14

Well Infants by Gestational Age (n=7,029)

	% HM	—	—	%HM (n=153)	%HM (n=1,402)	%HM (n=5,474)	p value
Ever	67.4	—	—	53.9	61.6	68.3	<.0001
3 months	43.9	—	—	32.4	37.1	45.0	<.0001
6 months	29.9	—	—	18.6	24.0	30.9	<.0001

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8:30am

Fellow in Training

Are Hospitals Too Neutral About Breastfeeding? A Qualitative Study of New Mothers' Feeding Choices for Their Infants

Daryl Wisler-Scher, Matilde Irigoyen. General Pediatrics, Columbia Presbyterian Medical Center, New York, NY.

BACKGROUND: Many laboring mothers express the intent to breastfeed, yet proportionately fewer are exclusively breastfeeding upon hospital discharge. Studies that evaluate the factors influencing breastfeeding fail to evaluate the postpartum hospitalization period, despite the fact that breastfeeding is most successful when initiated prior to discharge. The role the postpartum hospitalization plays in feeding decisions must be better understood to enhance breastfeeding success.

OBJECTIVE: To evaluate the impact of the postpartum hospital environment on a mothers' feeding choice for her newborn.

DESIGN/METHODS: We interviewed women over 18 years old who delivered a healthy, term infant at an urban, academic medical center. Open-ended, structured interviews were taped, transcribed, and reviewed. Variables included demographics, strength of conviction of feeding choice, and maternal perception of: availability of lactation services, beliefs among providers, modeling behaviors in the newborn nursery, and hospital support of feeding choice. Transcripts were reviewed. Themes were identified and placed into a coding structure, which was revised as new themes emerged from ongoing interviews. Recruitment continued until the point of theoretical saturation was reached.

RESULTS: Eleven women participated (ages 21 to 40, 30% Hispanic, 55% Black, 88% high school graduates, 33% primiparous, 22% with income $< \$20,000$ per year). Review of the transcripts revealed: 1) Most women knew the hospital prefers breastfeeding, yet perceived the hospital environment as purposely neutral. 2) Breastfeeding mothers had a stronger strength of conviction about their decision. Formula feeding mothers were more ambivalent. Many women reported being open to trying breastfeeding again if they were approached about it in the future. 3) All mothers cited breast milk as the healthiest choice. Those women who chose to formula feed did this despite this knowledge. 4) Providers were perceived as reluctant to discuss/encourage breastfeeding once mothers started to give formula.

CONCLUSIONS: Postpartum mothers are ambivalent about their feeding choices. They are aware of the benefits of breastfeeding, but this alone is not always enough to convince them to breastfeed. Visible promotion of breastfeeding by the hospital and repeated discussions of feeding choices with mothers may influence them to breastfeed.

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8:45am

House Officer

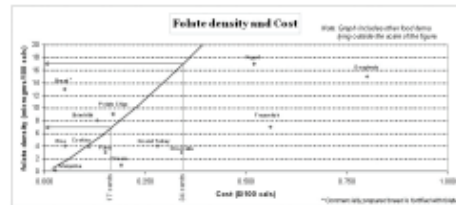
Relative Impact of Cost and Knowledge on Intake of Folate and Other Micronutrients

Ashish S. Chogle, Willeatha Taylor, Robert J. Karp. Pediatrics, SUNY Downstate Medical Center, Brooklyn, NY.

BACKGROUND: Parents and children from poorer families are less likely than the affluent to achieve adequate intake of folate, and deficient women are at greater risk of giving birth to premature, growth retarded or infants with neural tube defects.

OBJECTIVE: We sought to determine the relative impact of food cost and nutrition education on folate content of foods consumed at the cost of the USDA Thrifty Food Plan, with and without guidance from USDA Thrifty Food Plan sample menu, when compared to folate intake achieved at the cost of the USDA Liberal Plan.

DESIGN/METHODS: Food items drawn from the USDA Thrifty and Liberal Plans were used to establish a best-fit curve showing the relation between folate content/100 calories and cost/100 calories of food. Folate content in one day's Thrifty Plan sample menu ("guided") was calculated for a family of 4 and compared with the folate content of "unguided" intakes at the cost of the Thrifty (17¢/100cal) and Liberal (34¢/100cal) Plans.



RESULTS: Food costs are highly correlated with folate density ($r^2 = 0.78$; $p<0.0001$). Spending 17¢/100cal obtains 45% of RDA when unguided, 75% following the Thrifty Plan, and 100% spending 34¢/100cal as allowed by the Liberal Plan.

CONCLUSIONS: These data verify the profound impact of income on likelihood of reaching RDA for folate for low-income families. Guidance improves folate intake at low income but does not achieve the RDA. Combinations of higher income, supplementation, and food support are required to achieve micronutrient adequacy for poor families.

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9:00am

Improving Appropriate Therapy for Children with Asthma

Sandra F. Braganza, Iman Sharif, Philip O. Ozuah. Pediatrics, Children's Hospital at Montefiore/AECOM, Bronx, NY.

BACKGROUND: The National Asthma Education and Prevention Program (NAEPP) recommends that physicians classify severity for patients with asthma. However, it is unclear whether correct asthma severity classification (ASC) increases appropriate asthma therapy.

OBJECTIVE: To test whether a simple intervention can improve appropriate therapy for children with asthma.

DESIGN/METHODS: Randomized controlled trial at an academic health center. We developed a 2 x 3" sticker listing the NAEPP criteria for ASC & highlighting criteria for inhaled steroids.

During 12/04-1/05, we reviewed charts of scheduled patients to identify children with asthma. Using alternate week randomization, we placed stickers on clinic visit forms during "intervention" periods, but not during "control" periods.

After each physician encounter, a blinded research assistant used a standardized questionnaire to interview parents about their child's asthma symptoms and medication use. An investigator reviewed the charts of all patients treated for asthma and abstracted data about physician documentation and ASC.

Using the interview classification as the gold standard, we defined two dichotomous variables, one to code whether the physician-documented ASC was correct, and one to code whether the subject's medication use was appropriate. Appropriate therapy=use of inhaled steroids for persistent asthma.

Multivariate regression adjusted for confounders (level of training, visit type, ASC, asthma action plan in chart) and clustering by physician.

RESULTS: We reviewed 443 charts (211 intervention; 232 control). Intervention subjects were more likely to have physician documentation of ASC (99% vs. 75%, $p<.001$). We interviewed 313 subjects (138 intervention, 175 control). The groups were as likely to have persistent asthma (81% vs 86%, $p=.219$). Of these, 135 (98%) intervention and 128 (73%) control subjects had physician-documented ASC. Intervention subjects were more likely to have a correct physician-documented ASC (46% vs. 28%, $p=.003$) and more likely to report using appropriate therapy (64% vs 50%, $p=.017$).

Overall, the intervention significantly increased the odds of correct ASC (AOR=2.58, CI:1.45, 4.67) and appropriate therapy (AOR=1.77, CI: 1.21, 2.60).

CONCLUSIONS: The use of an asthma sticker on visit forms resulted in increased documentation and more accurate ASC. The intervention also increased the use of appropriate asthma therapy by children with asthma.

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9:15am

Fellow in Training

Prenatal Lead Exposure in New York City Immigrant Communities

Nathan Graber, Tatyana Gabinskaya, Joel Forman, Melvin Gertner. Pediatrics and Community and Preventive Medicine, Mount Sinai School of Medicine, New York, NY; Pediatrics, Elmhurst Hospital Medical Center, Queens, NY.

BACKGROUND: Prenatal lead exposure has been associated with neurodevelopmental deficits in children. Lead crosses the placenta freely. Sources of lead for pregnant women include imported goods, cultural practices, occupational hazards, pica and bone lead stores from distant exposures. Immigrants are thought to be of particularly high-risk.

OBJECTIVE: To describe the distribution of blood lead levels (BLLs) among pregnant women and examine determinants that influence those levels.

Neonatology I: Neonatal Clinical Studies Platform Session

Saturday, March 18, 2006

8:15am-10:45am

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8:15am

Fellow in Training

Changes in Tidal Volume Requirement with Advancing Postnatal Age in Ventilated Extremely Low Birth Weight (ELBW) Infants

Sepideh Montazami, Kabir Abubakar, Martin Keszler, Pediatrics, Division of Neonatology, Georgetown University, Washington, DC.

BACKGROUND: Volume targeted ventilation is increasingly used in neonatal ventilation in the hope of reducing volutrauma and hypocapnia. However, normative data for appropriate tidal volume (V_T) settings are lacking, especially in ELBW infants in whom the added deadspace of the flow sensor may be important. Additionally, there are no data to guide adjustments over time as the disease process evolves.

OBJECTIVE: To obtain normative data for initial V_T associated with normocapnia in ELBW infants ventilated with volume guarantee (VG) combined with assist control (AC) or pressure support ventilation (PSV) and to test the hypothesis that progressive distention of the large airways (acquired tracheomegaly) due to prolonged exposure to cyclic distending pressure, and more heterogeneous lung aeration result in increasing anatomical and physiological deadspace in ELBW infants with evolving chronic lung disease, leading to requirement for a larger V_T .

DESIGN/METHODS: Demographics, set and measured V_T and arterial or capillary blood gas values were extracted from charts of 47 babies <800 g born Jan 2003-Aug 2005, who were ventilated with VG+AC or +PSV. Data were collected with each blood gas measurement on days 1-2, 5-7 and 14-21. Birth wt. was used for day 1-7, current wt. for days 14-21. Capillary and arterial CO_2 values did not differ from each other and were thus combined for analysis. Descriptive statistics were used. ANOVA for repeated measures was used to compare mean V_T /kg for each infant for each of the 3 study periods.

RESULTS: Thirty infants (birth weight 631 ± 110 g) remained intubated beyond 14 days and had complete data available. Total of 1033 paired blood gas and V_T sets were available: d 1-2=330, d 5-7= 233 d 14-21= 460. The data are presented as mean \pm SD. (*= $p < 0.001$ v. Day 1-2)

	Day 1-2	Day 5-7	Day 14-21
VT(ml/kg)	5.01 \pm 0.64	5.07 \pm 0.77	5.73 \pm 0.90*
PCO2 (torr)	43.4 \pm 8.6	48.3 \pm 7.0*	53.9 \pm 8.1*

CONCLUSIONS: Even in infants <800g, an initial V_T of 5ml/kg achieved normocapnia when using AC or PSV. Despite permissive hypercapnia in the latter periods, progressively higher V_T /kg was required to maintain adequate ventilation, supporting the hypothesis that anatomical and/or physiological deadspace is increasing. These are the first normative data that can guide V_T adjustments in infants with evolving chronic lung disease.

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8:30am

Effect of Supine and Prone Sleep Positions in Apnea of Prematurity

Dharmendra J. Nimavat, Joseph D. Decristofaro, John J. Chen, Wenyang Mao, Doreen DeMeglio, Pediatrics/Division of Neonatology, Southern Illinois University, Springfield, IL; Pediatrics, SUNYSB, Stony Brook, NY; Preventive Medicine, SUNYSB, Stony Brook, NY.

BACKGROUND: Optimal sleep position for the preterm infant not ready for discharge from the NICU with symptomatic Apnea of Prematurity (AOP) is unknown. After discharge, supine is the preferred sleep position for both term and preterm infants to decrease SIDS risk. However, several studies suggest that prone positions has beneficial effects in preterm infants including improved in arterial oxygen tension, lung compliance, increased tidal volume, and lower energy expenditure.

OBJECTIVE: To determine whether sleep position affects AOP in symptomatic preterms.

DESIGN/METHODS: This was a prospective randomized crossover trial of sleep position and frequency of AOP. Twenty-nine preterms with AOP were randomized to either supine or prone sleep positions for a 12-hour period and then turned to the other sleep positions for the next 12 hours. Apnea, bradycardia and desaturation were continuously recorded and data analyzed after monitor download. Categorical variables such as gender and race were summarized as percentages and frequencies. Continuous variable were calculated for means, standard deviations, minimum and maximum values. Paired t-tests and Wilcoxon non-parametric tests were used to compare number of events with different sleep position. The association between sleep position and number of events were further evaluated using mixed-effects models, taking into consideration the crossover design, while adjusting for important covariates. SAS 9.1 was used for all statistical analysis; $p < 0.05$ was considered significant.

RESULTS: Prone position was associated with less desaturation episodes compared to supine ($p = 0.03$) as well as a decreased number of desaturations associated with apnea and bradycardia ($p = 0.03$). There was no difference in the frequency of central apnea with sleep position. Moreover, there were less total cumulative events of apnea with bradycardia and desaturation ($p = 0.04$) in prone sleep position.

CONCLUSIONS: Prone sleep position is beneficial for some hospitalized preterm infants with symptomatic AOP. Decreasing the frequency of desaturation episodes by placing infants with symptomatic AOP prone may affect other aspects of their care or outcome including maternal perception of well-being, weight gain, development, or morbidity.

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8:45am

Fellow in Training

Apnea in Preterm Infants and Tobacco Use in Pregnancy: Is There an Association?

Shama Praveen, Naveed Hussain, Cheryl Oncken, Neonatal-Perinatal Medicine, University of Connecticut Health Center, Farmington, CT.

BACKGROUND: Prenatal tobacco exposure (TS) is associated with an increased risk of sudden infant death syndrome. Its effects on arousal patterns in term infants has been studied but the effect on apnea of prematurity (AOP) is unknown.

OBJECTIVE: To determine if TS is a risk factor for the incidence of AOP in infants.

DESIGN/METHODS: A retrospective study was done of infants at John Dempsey Hospital from

DESIGN/METHODS: Retrospective record review of pregnant women seeking prenatal care at an inner-city women's health center from January 2003 – June 2005. Data were analyzed using χ^2 , ANOVA or linear regression.

RESULTS: Mean BLL of the 4814 pregnant women aged 13 to 52 years (mean age = 27.8) was 2.3 μ g/dL (range: 0 to 31; SD = 2.3). 1.1% had a BLL ≥ 10 μ g/dL and 10.6% had a BLL ≥ 5 μ g/dL. Women born in the United States had a mean BLL = 1.22 μ g/dL. 0.2% had a BLL ≥ 10 μ g/dL and 1.6% had a BLL ≥ 5 μ g/dL. 100 countries were represented in the sample. Women from Bangladesh, Mexico and Pakistan had the highest mean BLL and percent with BLLs ≥ 5 μ g/dL (4.4, 3.2 and 2.9 μ g/dL ($p < .001$) and 36.6%, 20.9%, 17.6% ($p < .001$)). Using WHO groupings, women from Africa Region E, Eastern Mediterranean Region D and South East Asia Region D had the highest mean BLLs and percent with BLLs ≥ 5 μ g/dL (3.0, 3.2 and 3.5 μ g/dL ($p < .001$) and 16.7%, 18.8% and 25.1% ($p < .001$)). Women from countries where leaded gasoline is in use had lower mean BLLs and percent with BLLs ≥ 5 μ g/dL (2.3 vs. 2.0 μ g/dL ($p < .05$) and 10.9% vs. 6.8% ($p < .05$)). 14%, 11.7%, 7.3% and 1.9% of women in the 2nd, 3rd, 4th and 5th decades of life had BLLs ≥ 5 μ g/dL ($p < .001$). Mean BLL decreases with age by .032 μ g/dL per year ($p < .001$). Mean BLL increased by .14 μ g/dL ($p < .05$) from 2003 to 2005 with 0.6%, 0.8% and 1.8% with BLLs ≥ 10 μ g/dL, respectively ($p = .002$). BLLs did not vary by time of year.

CONCLUSIONS: Prenatal lead exposure represents a serious public health problem that appears to disproportionately affect immigrant women from certain countries. Unlike childhood lead poisoning, pregnancy related lead exposure does not appear to be declining with time.

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9:45am

Pain Associated with Aspiration Prior to Intramuscular Vaccine Injection

Moshe Ipp, Anna Taddio, Jonathan Sam, Morton Goldbach, Patricia C. Parkin, Paediatrics, Hospital for Sick Children, Toronto, ON, Canada; Pharmacology, Hospital for Sick Children, Toronto, Ontario, Canada; Medicine, University of Toronto, Toronto, ON, Canada.

BACKGROUND: Needle aspiration is the process of pulling back on the syringe plunger prior to injection. Its purported importance is to prevent accidental entry of the needle into a blood vessel, but there is no scientific evidence to support its need. The effects of aspiration on vaccination pain have also never been studied before. The most recent American Academy of Pediatrics guidelines recommend that aspiration prior to intramuscular vaccination may not be necessary while the Canadian guidelines continue to recommend aspiration. With the increased number of injections now recommended for children it is important to minimize vaccination pain and to consider reducing the time taken to administer each vaccine.

OBJECTIVE: To compare infant pain responses to intramuscular vaccination without prior aspiration (WOASP) and with prior aspiration (WASP).

DESIGN/METHODS: This was a randomized clinical trial of healthy infants, 4 - 6 months of age, receiving their primary intramuscular DPTaP-Hib vaccination. Infants were videotaped during vaccination, WOASP or WASP. Infant crying time and visual analogue scale (VAS) scores were used to measure infant pain.

RESULTS: Of 113 infants enrolled, 57 were randomized to the WASP group and 56 to the WOASP group. There were no differences between groups for age, previous hospitalization, birth order, method of feeding and prior analgesic administration. The incidence of crying was higher in the WASP group compared to the WOASP group: 82.5% vs. 42%, $p < 0.001$. Infants in the WASP group cried for longer; median (range) 14.67 sec (0 - 59.73 sec) vs. 0 sec (0 - 58.77 sec), $p < 0.001$, and took longer to have the vaccine injected, 8.8 sec (4.73 - 13.83 sec) vs. 0.9 sec (0.5 - 2.63 sec), $p < 0.001$ compared to the WOASP group. The physician and parental VAS were also higher for the WASP group compared to the WOASP group; median (range) 2.8 (0-8) vs. 1.35 (0-6.9), $p < 0.001$ and 3.5 (0-9.8) vs 1.85 (0-9.5), $p = 0.001$, respectively.

CONCLUSIONS: This study demonstrates that aspiration prior to intramuscular injection is more painful and takes much longer to administer than not aspirating. The guidelines for recommending aspiration prior to intramuscular injection should be reconsidered.

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10:00am

Exposure to Community Violence in Children

Fernanda E. Kupferman-Meik, Rafael Javier, Jennifer Salhany, Phil Drucker, Maryse Roumain, Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Psychological Services Center, St. John's University, Queens, NY.

BACKGROUND: Community violence is a problem that crosses all geographic and socioeconomic boundaries. Violence prevention is one of the top priorities of Healthy People 2010.

OBJECTIVE: To assess the prevalence of exposure to community violence in children 8 to 16 years-old and to examine whether different types of exposure to violence are associated with gender, ethnic diversity and academic achievement

DESIGN/METHODS: This is a descriptive, cross-sectional study. The study sample consisted of children 8 to 16 years-old from the Pediatric Continuity Clinic, from December 2004 until October 2005. Acutely sick children were excluded. We utilized two instruments: 1) a demographic data questionnaire, and 2) "My Exposure to Violence (ETV)", a previously validated instrument which assessed the exposure to 18 different types of violence as witness (W) and/or as victim (V). RESULTS: Seventy-nine subjects have completed the study to date. Fifty-six percent were females. Mean age was 11.2 years (SD=2.4). Sixty-three percent were Hispanics, 16.7% Asians, 11.5% Blacks, 3.8% Whites, and 5.0% others.

Seventy-four subjects (93.7%) were exposed to community violence at least once in their life. Being punched (W) (65.7%), humiliated (V) (65.4%), chased (W) (47.4%), and threatened with a weapon (W) (33%) were the most common type of violence exposure. Sexual violence was reported in only 6.4%. Children were more likely to be exposed to violence at school (62.3%). The mean number of V items was 1.5, SD=1.18; the mean number of W items was 3.2, SD=2.5 and the mean number of exposure to violence as a W and/or a V was 4.7, SD=3.3.

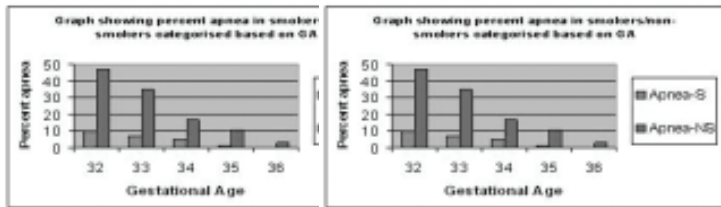
There was no significant difference in ETV by race or gender, and no significant correlation between grade point average and ETV. Older children were exposed to more violence as W (ANOVA F (2,76)= 5.77, $p < .01$) and as W and V (F (2,76)=5.28, $p < .01$).

CONCLUSIONS: Almost all children were exposed to community violence. They were more likely to be exposed at school. Punching, humiliation, chasing and threats were the most frequent types. Older children are increasingly exposed to community violence. Screening for exposure to violence should be a routine part of the pediatric medical history. Identifying the prevalence and type of violence exposure will allow us to plan appropriate preventive measures.

1/1/90 to 6/30/05 who were born at ≥ 32 to ≤ 36 wk gestational age (GA). Data were collected on maternal smoking status (TS = tobacco smokers; NTS = non-smokers) and AOP along with other risk factors including GA, birth weight, race, sex, respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), bronchopulmonary dysplasia (BPD) and clinical sepsis. Univariate and multiple regression analyses were done.

RESULTS: During the study period (15.5 yr) there were 2,862 survivors (32-36 wk GA). After exclusions, (24 anomalies, 654 unknown smoking status) 2,184 were analysed. The incidence of AOP was 29% (642/2184). AOP among infants born to TS was significantly less than those born to NTS (TS - 122/489, 25% vs NTS - 520/1695, 31%; $p = 0.014$). This relationship was significant for each GA category (Fig 1). The demographics of TS and NTS were similar for GA, race, male sex and ethnicity. Birth weight (mean TS 2104 g vs. NTS 2207 g; $p < 0.0001$) and RDS (17% TS vs. 21% NTS; $p = 0.03$) were significantly lower in the TS group. Other risk factors were not significantly related. However, on multiple logistic regression analyses using smoking status, RDS, and GA, the independent effect of TS on decreased incidence of AOP remained significant ($p < 0.05$).

CONCLUSIONS: Maternal smoking during pregnancy is associated with lower incidence of apnea in 32-36 wk infants. This may be due to an advanced maturity of respiratory control and needs further evaluation.



63 9:00am

Volume Guarantee Accelerates Recovery from Endotracheal Tube Suctioning in Ventilated Preterm Infants

Kabir M. Abubakar, Sepideh Montazami, Martin Keszler, Pediatrics/Neonatology, Georgetown University, Washington, DC.

BACKGROUND: Endotracheal tube (ET) suctioning is necessary to remove secretions and maintain a clear airway in ventilated infants. This is commonly associated with decreased oxygen saturation (SpO_2) due to loss of lung volume resulting from interruption of distending airway pressure. Volume guarantee (VG) is an option that can be combined with any synchronized ventilation mode. In VG, the ventilator automatically adjusts working pressure (PIP) in response to changing compliance and patient effort to maintain a target tidal volume (V_T).

OBJECTIVE: To test the hypothesis that VG accelerates recovery from ET suctioning and restores SpO_2 more rapidly because of its ability to transiently increase peak pressure and re-recruit lung volume.

DESIGN/METHODS: Ventilated infants requiring ET suction were studied with and without VG for up to 6 alternating periods, beginning in a random order. Infants were ventilated with Dräger Babylog ventilators (Dräger, Lübeck, Germany) in Assist/Control or Pressure Support mode with VG. During suction without VG, the peak pressure limit was set at the observed working pressure while on VG. During VG, the pressure limit was set 5 cmH_2O above working PIP. All infants had the closed-suction Ballard apparatus and were suctioned using a standardized procedure. Saline instillation was not routinely used. Inspired oxygen concentration was increased by 0.1 prior to suction. SpO_2 was continuously recorded 5 minutes prior to and 10 minutes after each suctioning using a bedside pulse oximeter (Ohmeda Biox/Trusat, GE Medical) and exported to a spreadsheet for analysis. Time for SpO_2 to return to baseline was calculated and data were analyzed by paired t-test using SPSS statistical software.

RESULTS: Forty-six suctioning events were recorded from 10 infants (23 with and 23 without VG). Mean gestational age (range) was 25wk (24-27), weight at study 1187g (1040-1610g) and age at study was 33d (23-59d). Mean time to recovery of SpO_2 to baseline on VG was 208 sec vs. 386 sec without VG ($p < 0.001$). Nadir SpO_2 values post suction were significantly lower without VG ($p < 0.001$).

CONCLUSIONS: ET suction is associated with significant oxygen desaturation. The VG mode leads to more rapid recovery of SpO_2 to baseline, presumably because it responds appropriately to decreased lung compliance by increasing working pressure to restore lung volume following ET suction.

64 9:15am

House Officer

Ranitidine Use and Late-Onset Sepsis in the Neonatal Intensive Care Unit

Simona Bianconi, Madhu Gudavalli, Vesna G. Sutija, Anna L. Lopez, Lilliana Barillas-Arias, Nitin Ron, Department of Pediatrics, New York Methodist Hospital, Brooklyn, NY; Department of Pediatrics, NY Presbyterian Weill Cornell Medical Center, New York, NY; International Vaccine Institute, SNU Research Park San 4-8 Bongcheon 7-dong, Kwanak-gu, Seoul 151-818, Korea.

BACKGROUND: Late-onset sepsis in the NICU remains a major cause of morbidity and mortality. Some risk factors such as gestational age (GA) and birth weight (BW) are widely recognized, but others still need to be determined. Histamine-2 receptor antagonists have been used in the NICU for prevention of stress ulcers. With the use of ranitidine gastric pH increases, which causes alteration of the normal gastric flora and bacterial translocation.

OBJECTIVE: The objective of the study was to examine the effect of ranitidine on the incidence of late-onset sepsis.

DESIGN/METHODS: This retrospective study was based on the information extracted from the charts of 574 infants admitted to NICU from July 2003 - July 2005. All infants admitted for 7 days or more were included. Late-onset sepsis was defined as a positive blood culture with clinical signs of sepsis after 7 days of life. Outcome measures included the use of ranitidine, type of infection and infectious agent, BW, GA, and type of care while in the NICU.

RESULTS: Of the 574 neonates admitted to the NICU from July 2003 to July 2005, 62 (10.8%) were treated with ranitidine. There were 74 episodes of late-onset sepsis. Twenty seven occurred in neonates receiving ranitidine and 47 occurred in neonates who did not receive ranitidine.

Neonates receiving ranitidine were at 7.6 times greater risk of late-onset sepsis (OR=7.6; 95% CI: 4.2 - 13.7; $p < 0.0001$). Coagulase negative organisms caused 67.5% (50/74) infections, other gram positive organisms 13.5% (10/74), gram-negative bacilli 33.8% (25/74) and 9.4% (7/74) were fungal. There were 25.7% (19/74) neonates with multiple episodes of sepsis. The birth weights and gestational ages of the neonates with sepsis receiving ranitidine and those not receiving ranitidine were comparable (BW: 1246.7 vs. 1031.5 g; $p = 0.20$; GA: 28.30 vs. 28.02 wks; $p = 0.77$).

CONCLUSIONS: The use of ranitidine in infants admitted to the NICU elevates the risk of late-onset sepsis. The pathological mechanisms need to be studied further. The wide spread use of ranitidine as an accepted and safe drug in neonates is controversial.

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9:45am

Fellow in Training

Is the Pro-Inflammatory Pulmonary Response of Preterm Infants Influenced by the Type of Surfactant?

Vanessa V. Mercado, Ioana Cristea, Sonya Strassberg, Elizabeth Buescher, Jean Yang, Lance A. Parton, Neonatology, Maria Fareri Children's Hospital at Westchester/New York Medical College, Valhalla, NY; Pediatrics, S.U.N.Y. at Stony Brook, Stony Brook, NY.

BACKGROUND: A differential pro-inflammatory response can be demonstrated as early as d1 for < 1 kg infants who progress to BPD, even when maternal chorioamnionitis and histologic evidence of placental inflammation are excluded. The etiology of this pro-inflammatory response is unknown. The delivered volume of surfactant may contribute to inflammation, while surfactant apoproteins (SP) may abrogate this inflammatory response. Survanta and Curosurf differ in volume/dose and in SP concentrations. We sought to quantitate the pulmonary inflammatory effects of these surfactant variables in preterm infants.

OBJECTIVE: We tested the hypothesis that the type of surfactant would play a role in the magnitude of the pro-inflammatory pulmonary response.

DESIGN/METHODS: Infants < 30 weeks gest. age (GA) and < 1 kg birthwt. were randomly stratified to receive either Curosurf (N=9) or Survanta (N=10) following consent. Clinical chorioamnionitis, rupture of membranes greater than 6h, neonatal sepsis, Apgars < 3 (5 min), the need for epinephrine in the DR, or multiple congenital anomalies are exclusionary criteria. Serial tracheal aspirates (TA) were collected on d1, 3, 5 and 7 of life. Interleukin (IL)-6 and IL-8 were measured in the TA with ELISA. Student's t test and ANOVA were used for comparisons between and within groups, respectively. A P value < 0.05 was considered to be statistically significant.

RESULTS: There were no significant differences in birth wt (Curosurf: 773 \pm 164; Survanta: 681 \pm 191g; mean \pm SD) or GA (Curosurf: 25.7 \pm 1.8; Survanta: 25 \pm 1.7wks). No differences were seen between or within the 2 groups when levels of TA IL-6 and IL-8 were compared.

CONCLUSIONS: This pilot data showed no differences in the pulmonary pro-inflammatory responses within the first week of life in neonates < 1 kg with RDS given either Curosurf or Survanta.

	TA IL-8			
	Day 1	Day 3	Day 5	Day 7
Curosurf®	5.9 (3.2, 154)	5.4 (1.1, 24.7)	12.2 (4.6, 24.2)	441 (13.4, 2090)
Survanta®	6.8 (1.6, 32.5)	21 (4.1, 60.7)	15.6 (7.1, 94.5)	28.4 (23.2, 63.6)
	median 25%, 75%			

	TA IL-6			
	Day 1	Day 3	Day 5	Day 7
Curosurf®	4.5 (0.7, 113)	1.6 (1.5, 2.2)	5.2 (4.1, 6.3)	5.6 (2.4, 89.5)
Survanta®	1.4 (0.7, 10)	2.3 (0.6, 4.0)	2.4 (0.8, 5.0)	5.4 (2.5, 33.6)
	median 25%, 75%			

66

10:00am

Fellow in Training

Special Health Care Needs of Infants at the Threshold of Viability

Bonnie E. Stephens, Richard Tucker, Betty R. Vohr, Pediatrics, Women and Infants Hospital, Providence, RI.

BACKGROUND: As neonatal survival at the limits of viability (22-24w EGA) has increased, so has the % of infants discharged from the NICU with special health care needs (SHCN). SHCN add complexity to the care of these infants, placing \uparrow burden on families. Few studies have reported serial rates of SHCN in these infants.

OBJECTIVE: The purpose of this study is to compare rates of survival and SHCN at discharge, 3, 7 & 18m follow-up, between infants born 22-24w and 25-27w. We hypothesized that SHCN would be sig higher in 22-24w infants.

DESIGN/METHODS: This is a retrospective cohort review of data collected in follow-up clinic on all 504 infants born 22-27w EGA from 1/1/98 to 12/31/02. Chi-square analysis compared rates of survival and outcomes between groups. SHCN was defined as need for home O2, meds, monitors, tube feeds, or rehospitalizations

RESULTS: 84 (54%) of 157 infants born 22-24w survived vs 311 (90%) of 347 infants born 25-27w ($p < 0.001$). There were no survivors at 22w. 41% of 23-24w survivors went home on O2 vs 21% of 25-27w survivors ($p < 0.001$). 27% vs 10% remained on O2 at 3m ($p < 0.001$), 15% vs 8% at 7m ($p = 0.110$), 7% vs 3% at 18m CA ($p = 0.079$). 47% vs 30% were discharged on a monitor ($p = 0.006$). 57% vs 36% went home on meds ($p = 0.005$). 26% vs 16% remained on meds at 3m. No difference was seen in med use at 7 or 18m. No difference in tube feeds or rehospitalizations was seen. All infants were referred to EI at discharge but 89% vs 74% remained in EI at 18m CA ($p = 0.010$)

Mortality and Special Needs of 22-27 week infants

	22-24 weeks	25-27 weeks	p value
n	84	311	
O2 @ D/C	41%	21%	0.001
O2 @ 3mo	27%	10%	0.001
O2 @ 7mo	15%	8%	0.110
O2 @ 18mo	7%	3%	0.079
Monitor @ D/C	47%	30%	0.006
Medications @ D/C	57%	36%	0.005
Medications @ 3mo	26%	16%	0.077
Medications @ 7mo	30%	30%	0.989
Medications @ 18mo	31%	28%	0.603
Gtube	0%	1%	0.312

² Rehospitalizations by 18m	39%	37%	0.613
Early Intervention @ 18mo	89%	74%	0.010
Death or SHCN @ D/C	78%	49%	0.001
Death or SHCN @ 3mo	73%	34%	0.001
Death or SHCN @ 7mo	71%	47%	0.001
Death or SHCN @ 18mo	68%	38%	0.001

CONCLUSIONS: SHCN (study definition) increase sig with decreasing gestation. Of 157 infants born 22-24w, 78% died or had SHCN at discharge, 73% at 3m, 71% at 7m, and 68% at 18m, indicating need for comprehensive support services for these infants.

Neurobiology Platform Session

Saturday, March 18, 2006

9:45am–10:45am

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8:15am

House Officer

Risk Factors for Perinatal Brachial Plexus Palsy; a 6 Year Study

Malgorzata D. Bulanowski, Rosario R. Trifiletti, David H. Rubin, Syed A. Hosain, Pediatrics, St. Barnabas Hospital, Bronx, NY; Neurology, University of Medicine and Dentistry, Newark, NJ; Pediatrics, Weill Medical College of Cornell University, New York, NY.

BACKGROUND: Perinatal Brachial Plexus Palsy (PBPP) is a potentially serious form of neonatal peripheral nerve injury with an incidence of 1/1000 live births. Despite improvement in obstetric techniques and identification of risk factors the incidence PBPP remains high. There are no studies of risk factors associated with PBPP in an inner city population.

OBJECTIVE: To determine the risk factors and outcome of PBPP in an inner city community hospital.

DESIGN/METHODS: The medical records of 8,917 deliveries between 1998 and 2004 at a community inner city hospital were examined. For all cases of PBPP and 60 age matched controls, we abstracted 7 neonatal variables (race, gender, presentation, Apgar score, morphometric measurements, mode of delivery, associated trauma) and 15 maternal and delivery variables (age, race, gravida, para, mode of delivery, instrumental assistance, weight before pregnancy, weight gain, final weight, duration of delivery, duration of second stage, past medical history, shoulder dystocia, OB maneuvers). Brachial plexus was modeled with a binary outcome variable (presence or absence of PBPP). Outcome of risk was analyzed using a single-factor chi-square analysis. Outcome of functional recovery was based on results of neurology consultant's examinations at one, three, and six-month intervals. A detailed analysis of factor interacts was also performed.

RESULTS: 30 cases of brachial plexus injury were identified (incidence: 3.36 /1000 births). Birthweight > 3500 grams (86%), Length > 50 cms (92%) and shoulder dystocia (87%) were found to be highly significant predictive factors ($p < 0.0001$) compared with controls. Additional risk factors of maternal weight gain and duration of second stage of labor were also predictive ($p < 0.001$). Complete recovery of function occurred in 14 (46%), partial in 7 (23%), and no recovery in 2 (7%) cases. No data was available for 7 cases (23%).

CONCLUSIONS: These data suggest a three-fold increase in incidence of PBPP in our population, which is primarily African American and Hispanic. Close attention to risk factors usually associated with pre-natal care (maternal weight gain) and other factors associated with labor (prolonged second stage) may reduce the incidence of PBPP.

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8:30am

Using Auditory Brainstem Responses (ABRs) To Assess Central Nervous System (CNS) Integrity in the Neonatal Intensive Care Unit (NICU)

Bernard Z. Karmel, Judith M. Gardner, Anthony Barone, Anantham Harin, Ha T.T. Phan, Brij Kapadia, Marina Korneeva, Poonam Rauniyar, Simon S. Rabinowitz, Infant Development, NYS Inst for Basic Research in Devel Disabilities, Staten Island, NY; Pediatrics, St. Vincent Catholic Medical Centers of NY, St. Vincent's Hospital, Staten Island, NY.

BACKGROUND: ABRs, the gold standard for assessing auditory functioning at all ages, have been employed to assess neurological integrity compromised by brain stem trauma, tumors, and hydrocephalus (HC). However, their use for neurological assessments in high-risk newborns is not well defined.

OBJECTIVE: To provide evidence-based exemplars detailing ABRs' use in assessing CNS integrity in high-risk NICU neonates.

DESIGN/METHODS: Data are reported from 1690 infants (23-42 wks GA; 369-5358 g BW; 57% boys) tested from 07/2000-10/2005; 2% were < 27 wks GA or < 750 g BW, 11% were < 1500 g, > 80% had no identified structural CNS injury. ABRs were recorded at the bedside using Intelligent Hearing Systems' SmartEP System to clicks (80, 75, & 70 dB) presented at 12.1 Hz. Testing was conducted > 24 hours after birth, starting at 32 wks postconceptional age. Waveforms consisted of 3 1024 artifact-free responses averaged for each intensity. Latencies for Waves I, III, & V and Wave I-III & III-V latency intervals were used as standard information in analyses. Abnormality was indicated by absent, delayed, or prolonged Waves or intervals. Typically > 95% of initially abnormal ABRs normalized by discharge.

RESULTS: ABRs correlated with medical variables and provided useful clinical information. Abnormal ABRs were related to recent IVH; asphyxia; length of hospital stay (GA adj); compressive HC; and HC shunt failure. Initial ABRs done ≤ 7 days of life in severely asphyxiated term or near term infants predicted weaning from ventilator, neurobehavior at discharge, and long-term outcome. Normal ABRs helped rule out CNS involvement in infants requiring assisted ventilation. ABRs followed the course of palliative effects of shunting in infants with HC. Unusually fast latencies (<10%) were associated with IUGR, especially in girls.

CONCLUSIONS: ABRs are a safe, non-invasive procedure with rapid data acquisition, which are easily performed on infants in the NICU. ABR data complement clinical features and other investigations to predict an infant's NICU course and future neurodevelopmental outcome.

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8:45am

Fellow in Training

Role of Inhaled Nitric Oxide in Evolution of Brain Lesions in the Premature Infant

Heather Kaplan, Scott A. Lorch, Xianqun Luan, Sandra Wadlinger, Sabah Servaes, Richard J. Martin, William E. Truog, Avital Cnaan, Roberta A. Ballard, the NO-CLD Trial Group, Neonatology, Radiology, & Biostatistics, Children's Hosp of Phila, Phila, PA; Neonatology, Rainbow Babies & Children's Hosp, Cleveland, OH; Neonatology, Children's Mercy Hosp, Kansas City, MO.

BACKGROUND: Extremely low birthweight infants (ELBW ≤ 1250 g) are susceptible to brain injury detected by head ultrasound (HUS). Inhaled nitric oxide (iNO) has been identified as a potential risk factor for injury.

OBJECTIVE: To evaluate the possible contribution of iNO to evolution of brain injury in a multi-center randomized controlled trial of iNO, begun between 7 and 21 days of life, to prevent chronic lung disease (NO-CLD trial NIH U01-HL62514).

DESIGN/METHODS: The Data Safety and Monitoring Board of this trial requested an analysis of risk factors (including iNO) among infants with evolution of brain injury and asked that a single radiologist review the HUSs. At that time, data were available on 393 of the 587 infants enrolled in this trial (67%). A nested, matched case-control study was performed to evaluate ELBW infants enrolled in the NO-CLD trial who had a change in their HUS from an initial normal HUS or HUS with grade I/II intraventricular hemorrhage (IVH) to a HUS with grade III/IV IVH, hydrocephalus, perencephalic cyst, or periventricular leukomalacia. Each infant was matched by birth weight group and study site to two control infants enrolled in the trial with stable HUSs. Perinatal-neonatal risk factors, including iNO, were evaluated with univariable and multivariable analyses. Representative HUSs of cases and controls were reviewed by a single radiologist.

RESULTS: 19 infants (4.8%) had evidence of evolution of HUS findings. Use of maternal tocolytics achieved borderline significance as a protective factor (OR 0.21, 95% CI 0.04-1.03), while other factors were not significantly associated with evolution. 53% of cases received iNO versus 56% of controls. In univariable analysis, iNO was not significantly associated with evolution of brain injury (OR 0.90, 95% CI 0.30-2.70). After controlling for maternal tocolytics in multivariable analysis, iNO was still not associated with evolution.

CONCLUSIONS: In this small case-control study, iNO did not increase the odds of evolution of brain lesions in these ELBW infants. Data from the entire NO-CLD trial will be available 1/06.

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9:15am

Fellow in Training

NFkB Thiol Modifications Following Hypoxia-Reoxygenation in Cerebral Cortical Cells

Noah Cook, Guang Yang, Robert Kalb, Andrew Gow, Neonatology, Neurology, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: NFkB-regulated gene activation following perinatal hypoxic-ischemic (HI) brain injury coincides with the period of reperfusion, when reactive oxygen and nitrogen species (RONS) are generated. RONS are capable of modifying protein cysteine thiols by both S-nitrosylation and sulfenylation. The presence of highly conserved cysteine residues in NFkB makes it an attractive candidate as a RONS-mediated effector of cerebral HI injury and a potential target of therapeutic intervention.

OBJECTIVE: To determine if NFkB undergoes thiol modification in perinatal cerebral cortical cells following hypoxic injury, and whether these modifications affect DNA-binding activity and cell outcome following such injury.

DESIGN/METHODS: Our model for perinatal hypoxic brain injury utilized mixed cerebral cortical cells from E18 (embryonic day 18) rats. Cells were cultured and exposed to hypoxia (1% Oxygen) for 6 hours followed by reoxygenation for 24 to 72 hours. Nuclear and cytoplasmic lysates were analyzed for total thiol balance, NFkB p50 thiol modification, and NFkB DNA-binding activity. Cells were also analyzed for patterns of cell death following hypoxia-reoxygenation (HR).

RESULTS: HR resulted in a significant increase in cell death as compared to control cells maintained in normoxia (mean dead cells per HPF 88.8 vs 50.4 at 72 hours, $p < 0.01$). In the cells exposed to HR, a greater than 300-fold increase in non-reduced thiols occurred within the nucleus following hypoxia and a slight increase (approximately 4 fold) in reduced thiol content within the cytoplasm. These changes in thiol balance persisted 24 hours beyond the hypoxic exposure. In parallel, increased nuclear NFkB (p50 subunit) sulfenylation and S-nitrosylation was observed following hypoxia and HR respectively. Treatment with the thiol reducing agent, N-acetylcysteine (NAC), increased cell death (mean dead cells per HPF 99.7 vs 30.7 at 24 hours, $p < 0.01$) and altered the DNA-binding of NFkB following HR.

CONCLUSIONS: Within cerebral cortical cells nuclear thiol redox is altered following HR and NFkB is a protein thiol target within nucleus. Alteration of thiol redox status by treatment with NAC alters NFkB DNA-binding and hastens the cell death caused by HR. The extent to which these modifications affect HI brain injury warrants further investigation.

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9:30am

Fellow in Training

Maturation and Antenatal Corticosteroids Reduce Non-Neuronal Apoptosis and Caspase-3 Activity in the Preterm Cerebral Cortex

Shadi N. Malaeb, Teddy Si Youn, Grazyna B. Sadowska, Virginia Hovanesian, Matthew D. Sarasin, Silvia M. Hartmann, Barbara S. Stonestreet, Pediatrics, Women & Infants' Hospital of Rhode Island, Providence, RI; Brown Medical School, Providence, RI; Core Research Laboratories, Rhode Island Hospital, Providence, RI.

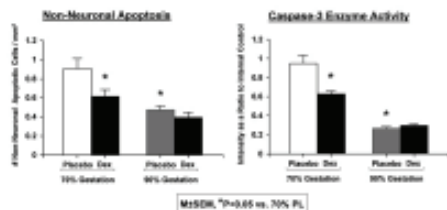
BACKGROUND: We have shown that maturation and antenatal corticosteroids reduce apoptosis (Apop) in the ovine fetal cerebral cortex (CC). The cell type and mechanisms of apoptosis have not been previously examined.

OBJECTIVE: To study the effects of maturation and antenatal corticosteroids on apoptotic cell type and caspase-3 (Csp3) enzyme activity in the fetal CC.

DESIGN/METHODS: Ovine fetuses (n=7-9 per group) at 70% and 90% of gestation (gest) were examined 18 h after four 6 mg dexamethasone (Dex) or placebo (PL) were given IM q12 h to the ewes. Frontal CC were snap frozen and Apop nuclei/mm² counted on 6-micron sections using the Apoptag TUNEL assay and double-labeling immunohistochemistry for specific neuronal nuclear antigen (NeuN). Csp3 activity was measured by a fluorometric assay in 500 μ g of CC homogenates, and normalized to an induced Jurkat cell lysate.

RESULTS: Non-neuronal cells accounted for >90% of Apop cells in CC. Fetuses of PL treated ewes had 20% lower cellular density, but 45% fewer non-neuronal Apop cells/mm², and 72% lower Csp3 activity in CC at 90% than at 70% gest. Fetuses of Dex treated ewes had 32% less non-neuronal Apop cells/mm² and 38% less Csp3 activity in CC than PL treated ewes at 70%, but not at 90% gest. The number of Apop neurons/mm² did not differ between the groups. (Fig, P<0.05 vs 70% PL)

CONCLUSIONS: The majority of apoptotic cells in the preterm ovine cerebral cortex were non-neuronal in origin. Maturation, and maternal treatment with corticosteroids at 70% but not 90% of gestation reduces non-neuronal apoptosis and caspase-3 enzyme activity in the ovine fetal cerebral cortex.



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9:45am

Gray Matter (GM) Volume (VOL) Reduction in Very Low Birth Weight (VLBW) Infants Is Related to Gram Negative (neg) Infection

Maricor Castillo, John Van Dyke, Linda Heier, Conrad Cassie, Sarah Sarvis, J. M. Perlman, Peds, Radiol, Weill Cornell Medical College, NY, NY.

BACKGROUND: Numerous studies have demonstrated smaller GM, white matter (WM) and cerebellar (Cereb) VOL in VLBW infants compared to full terms (FT). There are no data regarding VOL changes in other important regions of interest (ROI) i.e. basal ganglia (BG), thalamus (TH) and brainstem (BS).

OBJECTIVE: To determine whether global ↓ in brain VOL in sick VLBW infants extend to other regions including BG, TH, BS and to delineate any potential predisposing clinical factors

DESIGN/METHODS: Retrospective study of 16 VLBW infants with GA of 26 ± 1 wk imaged on a 1.5T GE MRI scanner at 39 ± 2wks and compared with 9 FT imaged at 1 wk after birth. CSF was removed on the T2-FLAIR images to calculate whole brain VOL. GM and WM segmentation was performed utilizing image subtraction of T1 from the T2 weighted images. Cereb, BG, thalamus (TH) and BS VOL were determined using freehand ROI's. All software was written in-house using IDL 6.1.

RESULTS: MRI findings were NL n=5, IVH n=8, PVL n=1, other=2. Relevant clinical variables included no CLD, steroids use n=2, gram neg. infection (n=7), PDA ligation (n=7), length of stay 88±26d. Total brain VOL less CSF were 275 ± 45 and 355 ± 38 cc for VLBW and FT respectively (p<0.001). There were no Bilat VOL differences for either population (p=0.7). For VLBW % GM was 50.4 ± 5% vs WM 49.5 ± 5%. All ROI VOL were ↓ in VLBW vs FT i.e. cerebellum 18 ± 3 vs 22 ± 6*, BG 7 ± 1 vs 10 ± 1*, TH 5 ± 1 vs 7 ± 1*, BS 5 ± 0.6 vs 6 ± 0.8 cc* (p<0.02). GM was > WM VOL by 8 ± 2% (n=6) and WM > GM VOL by 11 ± 3% (n=4) and comparable n=2. GM, WM and Cereb VOL were significantly related i.e. when % GM was > % WM vs when % WM > % GM, Cereb VOL was 19 ± 3.2 vs 15 ± 1.4 cc respectively (p=0.006). No relationship between other ROI and GM vs WM VOL was noted. Gram neg infection vs none was the only clinical variable associated with VOL ↓ and specifically for GM 112 ± 15 vs 142 ± 29cc (p=0.04) and cerebellum 16.4 ± 2.6 vs 18.4 ± 1.7 (p=0.07).

CONCLUSIONS: These observations confirm that VLBW infants have smaller whole brain VOL compared to FT and demonstrate that the ↓ extend to BG, thalamus and BS. There was a significant association between ↓ in GM and Cereb VOL that appears to be linked to gram neg sepsis. Potential mechanisms contributing to ↓ in all additional ROI is not apparent in this small study but critical to delineate.

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10:00am

Hypoxia Down-Regulates Expression of Prostaglandin D Synthase in Mouse Brain

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BACKGROUND: Hypoxia modifies the expression levels of genes involved in various signal transduction pathways and thereby can affect important physiological processes. Amongst these are genes involved in arachidonic acid metabolism such as prostaglandin D2 synthase (PGDS). Prostaglandins regulate many important physiological processes including sleep, body temperature, vasodilatation, bronchoconstriction, and allergic reactions.

OBJECTIVE: Since hypoxia has been shown to affect arachidonic acid metabolism, we investigated the expression of brain PGDS and asked whether hypoxia alters the expression level of brain PGDS.

DESIGN/METHODS: Northern blot:

-Animals: Post-coital (PC18), postnatal day (PND) 3, 14, 28 and 60 mice

-2-4 mouse brains were pooled to generate enough tissue.

-Northern blots were probed with PGDS probe and beta-actin as a loading control.

Western blot:

-Animals: PND 3 mice expose to hypoxia and normoxia for four weeks.

-Hypoxia paradigms:

Chronic intermittent hypoxia (CIH): Cycles of 4 minutes of 11% O₂ followed by 4 minutes of 21% O₂.

Chronic constant hypoxia (CCH): Constant 11% O₂.

-Immunoblotting: PDGS polyclonal antibody and HSC70 as a loading control.

RESULTS: We investigated the expression of brain PGDS using Northern blot analysis. PGDS message is present in the mouse brain as early as PC 18 and increases throughout development reaching a plateau at PND 28-60 (N=3 p<0.05 vs PC18). To ask whether hypoxia alters the expression level of brain PGDS, we exposed mice at PND 3 to either CCH or CIH for four weeks. Western blot analysis showed about 50% decrease in the expression of brain PGDS after CCH (N=4 p<0.05 CCH

vs normoxia) and a similar decrease in PGDS after CIH (N=4 p<0.05 CIH vs normoxia at four weeks). **CONCLUSIONS:** We conclude that PGDS is present throughout development and CIH along with CCH down-regulate PGDS protein in the mouse brain. We suggest that down-regulation of PGDS as a result of exposure to hypoxia may represent a protective mechanism since elevated levels of PGDS are associated with cell injury.

Plenary Session II - Award Presentations

Saturday, March 18, 2006

1:15pm-3:45pm

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2:15pm

Caspases 3 and 7 Are Important for Cardiac Development and Are Key Mediators of Mitochondrial Events of Apoptosis

Saqib A. Lakhani, Ali Masud, Keisuke Kuida, George A. Porter, Carmen J. Booth, Wajahat Z. Mehal, Irteza Inayat, Richard A. Flavell, Pediatrics, Yale University, New Haven, CT; Vertex Pharmaceuticals, Cambridge, MA; Comparative Medicine, Yale University, New Haven, CT; Internal Medicine, Yale University, New Haven, CT; Immunobiology and Howard Hughes Medical Institute, Yale University, New Haven, CT.

BACKGROUND: Apoptosis, or programmed cell death, is a highly regulated route to cellular demise that is critical for a variety of biologic processes, ranging from development and homeostasis to disease. The caspase family of proteases has been well described as crucial mediators of apoptosis. In our current understanding, certain death signals lead to changes in mitochondria, including the loss of mitochondrial membrane potential and the release of pro-apoptotic factors from mitochondria. This results in activation of downstream effector caspases, which in turn cleave a variety of substrates leading to cell death. So-called "death receptors" can also induce mitochondrial changes or, alternatively, can directly activate caspases.

OBJECTIVE: To further clarify the role of the two effectors, caspase 3 and caspase 7, in apoptosis.

DESIGN/METHODS: We generated mice individually deficient in caspase 3 or caspase 7, then bred them to obtain double knockout (DKO) mice. We also generated mouse embryonic fibroblasts (MEFs) from these mice, and studied apoptosis pathways by exposing these cells to a variety of death-inducing stimuli.

RESULTS: DKO mice died within the first day of life. Histologic analysis revealed a defect in cardiac development, ventricular noncompaction. DKO MEFs were highly resistant to death via the mitochondrial and death receptor-mediated pathways, the two canonical routes to apoptosis. Furthermore, in contrast to wild type cells, DKO MEFs displayed preservation of mitochondrial membrane potential and had defective nuclear translocation of Apoptosis Inducing Factor in response to UV irradiation. Surprisingly, the early apoptotic events of Bax translocation from cytosol to mitochondria and cytochrome c release from mitochondria to cytosol were also delayed.

CONCLUSIONS: Caspases 3 and 7 are important for normal cardiac development. In addition to their known importance in cleaving downstream substrates, they are also critical mediators of mitochondrial events of apoptosis.

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2:30pm

Role of Ephrin-B2 in Early Renal Development

Tanzeema Hossain, Jordan A. Kreidberg, Newborn Medicine, Children's Hospital, Boston, MA; Nephrology, Children's Hospital, Boston, MA; Harvard Medical School, Boston, MA.

BACKGROUND: Abnormal epithelial-mesenchymal interactions may cause disruption of branching morphogenesis and patterning during early renal development resulting in congenital developmental anomalies. Recently, our lab has demonstrated a novel signaling mechanism whereby the angioblast population provides inductive signals to the mesenchymal component of the early kidney. Eph receptors, the largest subfamily of receptor tyrosine kinases, have been shown to play an essential role in angiogenesis and hence could potentially contribute to such interactions. **OBJECTIVE:** To explore whether ephrin-B2 and its known receptors play key roles in epithelial-mesenchymal-angioblast interactions during development of the embryonic kidney.

DESIGN/METHODS: Total RNA extracted from E_{17.5} kidneys was subjected to RTPCR using customized primers for Ephs and ephrins. Wild-type E_{17.5} kidney explants, with their respective contralateral kidneys as controls, were cultured on filter membranes suspended on a grid over culture medium or medium supplemented with ephrin-B2/Fc, EphA4/Fc or EphB4/Fc chimeric peptides. Effects on kidney development were noted using immunofluorescence staining of fixed cultures.

RESULTS: RT-PCR demonstrates that ephrin-B2 and its receptors EphA4, EphB1, EphB2, EphB3 and EphB4 are expressed in E_{17.5} kidneys, with the strongest signals emanating from EphB4 and EphA4. β-galactosidase staining of frozen sections of ephrin-B2^{-lacZ} mice confirms ephrin-B2 expression in ureteric bud branches, glomeruli and endothelial cells. No significant differences in number and distribution of branch tips or length of primary bifurcation branches were noted in the cultures. Preliminary data suggests that addition of EphA4/Fc appears to initially delay the appearance of proximal tubules (noted by lectin staining), while EphB4/Fc results in a proportion of morphologically abnormal appearing proximal tubules with poorly demarcated boundaries between lectin-stained tubules and WT1-stained glomeruli.

CONCLUSIONS: Preliminary data suggests that ephrin-B2 and its receptors are expressed in embryonic renal tissue and may be involved in patterning of the kidney. Further studies are necessary to analyze these potential epithelial-mesenchymal-angioblast interactions in more detail with a view to unraveling some of the complex mechanisms underlying early renal development.

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2:45pm

Fellow in Training

TGFβ Mediates Hypoxia-Induced Inhibition of Alveolization in Newborn Mice

Huayan Zhang, Hengjiang Zhao, Zheng Cui, Rashmin C. Savani, Division of Neonatology, Dept. of Pediatrics, CHOP-University of Pennsylvania, Philadelphia, PA.

BACKGROUND: Alveogenesis, an essential component of normal lung development, occurs in the immediate postnatal period in rodents. Exposure to hypoxia in newborn rats results in an

inhibition of secondary septation, simplification of the distal lung architecture and increased expression of Transforming Growth Factor-Beta (TGFβ).

OBJECTIVE: To test the hypothesis that TGFβ is causally related to hypoxia-induced inhibition of alveolar development.

DESIGN/METHODS: Transgenic mice expressing a TGFβ-responsive promoter driving GFP as a reporter were placed either in room air or in 12% oxygen for 20 hours a day from birth to 15 days. Somatic growth was evaluated by measuring weights at PN 1, 5, 10 and 15. Alveolar morphology was assessed by lung histology and radial alveolar counts (RAC) at the same ages. Active TGFβ was assessed by GFP staining. In order to inhibit the effects of this growth factor, a blocking anti-TGFβ antibody was given to hypoxia-exposed mice on PN 1, 5 and 10, and effects on morphology examined.

RESULTS: Mice exposed to hypoxia showed larger distal airspaces from PN5 with significantly lower RAC that persisted to PN15 as compared to room air controls (PN5 RAC: Normoxia 6.16 ± 0.24 vs. Hypoxia 5.24 ± 0.04 , $P = 0.025$, $n = 5/\text{group}$). Alveolization was inhibited only up to PN15, the critical period for alveolar development. Somatic growth was delayed in the hypoxia group at PN5 and 10, but this difference had resolved by PN15. Immunofluorescence staining for GFP expression showed that active TGFβ was increased in both the alveolar and bronchiolar airspaces in the hypoxia group from PN5 and maximally at PN15. Treatment with anti-TGFβ antibody prevented approximately 50% of the inhibition of secondary septation seen with hypoxia (Table).

Radial Alveolar Counts (RAC) at PN 15

Normoxia	Hypoxia	Hypoxia + anti-TGFβ Ab
8.85 ± 0.18	$6.80 \pm 0.13^*$	$7.68 \pm 0.03^{**}$

CONCLUSIONS: The inhibition of alveolar development due to hypoxia is, at least in part, mediated by TGFβ. We speculate that strategies to block TGFβ may enhance alveolar septation in conditions such as Bronchopulmonary Dysplasia that are associated with episodes of hypoxia and an arrest of distal lung development.

Funded by the Physician Scientist Development Award (HD00850) to H Zhang and NIH (HL62868 and HL075930) to RCS

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3:00pm

Fellow in Training

A Novel Anti-Inflammatory Pathway for SP-A Involving TLR2, TGFβ, RHAMM and Hyaluronan (HA)

Hengjiang Zhao, Joseph P. Foley, Stephan J. Butler, Huayan Zhang, Jo Rae Wright, Rashmin C. Savani, Div. of Neonatology, Dept. of Pediatrics, CHOP-University of Pennsylvania, Philadelphia, PA; Cell Biology, Duke University, Durham, NC.

BACKGROUND: Surfactant Protein-A (SP-A) stimulates macrophage chemotaxis and binds to SIRPα, Calreticulin, TLR2 and TLR4. Hyaluronan (HA) binds to the receptors RHAMM and CD44, and also promotes macrophage chemotaxis. Using macrophages obtained from transgenic and knockout mice, we investigated the role of SP-A binding proteins and HA receptors in SP-A, TGFβ and HA-stimulated chemotaxis, as well as changes in cytoskeletal responses and TGFβ activation.

OBJECTIVE: To determine the mechanisms of SP-A-stimulated macrophage chemotaxis.

DESIGN/METHODS: Bone marrow-derived macrophages (BMDM) were obtained from Wild Type (WT), TLR2^{-/-}, and CD44^{-/-} mice. Chemotactic responses to SP-A (100μg/ml), HA (4 mM) and TGFβ (3 ng/ml) were examined in a Boyden chamber. BMDM from mice expressing a TGFβ-responsive promoter driving a GFP reporter were used to determine changes in active TGFβ. Cytoskeletal changes in BMDM from WT and knockout mice were probed using FITC-phalloidin staining. Anti-RHAMM antibody (R36, 100 μg/ml) was used to block RHAMM.

RESULTS: SP-A stimulated a 6-fold increase in chemotaxis in WT BMDM, a response that was completely blocked by anti-TLR2, anti-TGFβ and anti-RHAMM (R36) antibodies. The absence of CD44 (BMDM from CD44^{-/-} mice) had no effect on SP-A, TGFβ or HA stimulated chemotaxis. Macrophages from TLR2^{-/-} mice failed to respond to SP-A, but had normal chemotactic responses to TGFβ and HA that were also inhibited by R36. Macrophages from TGFβ-responsive GFP reporter mice showed increased fluorescence when stimulated by either SP-A, TGFβ or a TLR2 agonist. Anti-TGFβ and R36 antibodies blocked each of this increased fluorescence. Increased lamellipodial and filopodial extensions were observed in SP-A stimulated WT, but not TLR2^{-/-} macrophages. However, cytoskeletal responses in TLR2^{-/-} macrophages were similar to WT cells when exposed to TGFβ and HA, and these changes were also blocked by R36.

CONCLUSIONS: We conclude that SP-A-stimulation of macrophage chemotaxis is dependent on TLR2, TGFβ and RHAMM. Interaction of SP-A with TLR2 results in increased active TGFβ that stimulates chemotaxis in a RHAMM, but not CD44-dependent manner. These studies describe a novel anti-inflammatory pathway stimulated by SP-A in innate host defense.

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3:15pm

Medical Student

VEGF Blockade and the Notch Signaling Cascade in Neuroblastoma

Eleny Romanos, Jessica Kandel, Darrell Yamashiro, Peds. Oncology & Peds. Surgery, Columbia University College of Physicians & Surgeons, NY, NY.

BACKGROUND: Blockade of vascular endothelial growth factor (VEGF), a key mediator of angiogenesis, is a validated therapy for human cancers. However, virtually all patients treated with VEGF blocking agents eventually develop progressive disease. Recent data suggests that tumors may evade VEGF blockade by induction of alternative proangiogenic pathways. One candidate is the Notch signaling cascade, implicated in both vascular development and pathologic angiogenesis. Using a model of pediatric neuroblastoma, we tested the hypothesis that VEGF blockade would alter Notch signaling in tumor vasculature.

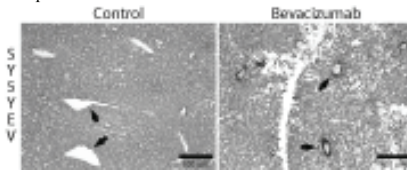
OBJECTIVE: To determine if VEGF blockade alters Notch signaling in tumor vasculature.

DESIGN/METHODS: Xenografts were induced by intrarenal injection of 10^6 cultured human neuroblastoma SY5Y cells in NCR nude mice. After 1 week, mice received IP injections of anti-human VEGF antibody bevacizumab (100 mcg; N=10) or vehicle (N=11) biweekly for 5 weeks. Tumors were harvested and analyzed by immunohistochemistry for Notch receptors (Notch1, Notch4) and ligands (Jagged1, Delta-like4 [DLL4]).

RESULTS: Jagged1 expression was strikingly increased in vascular cells of treated tumors. Whereas control tumor vasculature was erratically dilated, bevacizumab-treated tumors developed relatively uniform vessels. DLL4 was also increased, although less markedly. Notch1 was detected more

frequently in treated tumor vessels. Notch4 was minimally present.

CONCLUSIONS: VEGF blockade slows tumor growth but does not ablate vasculature in experimental neuroblastoma. In this model, bevacizumab treatment results in distinct changes in vascular architecture, concurrent with increased expression of Notch1 and its ligands Jagged1 and DLL4. These data suggest that Notch signaling in neuroblastoma vessels is influenced by VEGF blockade, and may be implicated in the survival of tumor vasculature during this therapy.



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3:30pm

Fellow in Training

Zinc Protoporphyrin IX Represses Cyclin D1 Gene Expression Through Disruption of Sp-1/Egr-1 Site in the Cyclin D1 Gene Promoter

Zhi Wang, Andrew Gow, Guang Yang, Qing Lin, Phyllis A. Dennery, Neonatology, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: We have recently shown that zinc protoporphyrin IX (ZnPP) suppresses tumor cell proliferation and decreases cyclin D1 gene expression in the HepG2 Cells. Further preliminary evidence suggests that cyclin D1 gene promoter activity is suppressed with ZnPP incubation, suggesting that this is one of the mechanisms by which ZnPP suppresses tumor growth *in vivo*. The cyclin D1 gene promoter is prone to DNA structural change in guanine rich regions such as Sp-1 binding sites. In addition, metalloproteins can result in DNA structural changes, such as G-tetraplex formation in guanine rich regions. Therefore we hypothesized that ZnPP can alter cyclin D1 DNA conformation, thereby resulting in reduced cyclin D1 gene transcription.

OBJECTIVE: To elucidate the mechanisms by which ZnPP represses cyclin D1 gene transcription.

DESIGN/METHODS: A ³²P labeled double stranded oligonucleotide probe with the consensus sequence of the Sp-1/Egr-1 (S/E) site was incubated with 12.5-200 μM ZnPP. Thereafter the ZnPP-labeled probe complex was incubated with or without Sp-1 protein and resolved on a polyacrylamide gel. The gel was dried and exposed to X-ray film and developed. In other experiments, a double stranded S/E oligonucleotide was incubated with 0-250 μM ZnPP. A circular dichroism spectrum was recorded on a π-180 spectrometer at a wavelength range of 200-700nm using a 1mm path length cell at 24°C. The scan of buffer was subtracted from the scan of each sample.

RESULTS: In the polyacrylamide gel, ZnPP incubation was associated with retardation of the S/E probe in a concentration dependent manner. Incubation with ZnPP also blocked Sp-1 protein binding to the S/E site. Spectrophotometric evaluation revealed that the double stranded S/E oligonucleotide adopts a Z-DNA conformation in its native state. Upon addition of 125-250 μM ZnPP, this conformation was disrupted.

CONCLUSIONS: These data document that ZnPP can disrupt DNA conformation in the cyclin D1 gene promoter at the S/E site. We speculate that this DNA disruption leads to suppression of cyclin D1 gene expression, resulting in arrest of cell cycle progression.

Adolescent Medicine Platform Session

Saturday, March 18, 2006

4:00pm-5:45pm

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4:00pm

Fellow in Training

The Prevalence of Hypertension in Obese Minority Adolescents with Polycystic Ovarian Syndrome

M. Puri, M. Garcia, H. Nussbaum, J. Flynn, K. Freeman, J. DiMartino-Nardi, Pediatric Endocrinology, Montefiore Medical Center, Bronx, NY; Pediatric Nephrology, Montefiore Medical Center, Bronx, NY.

BACKGROUND: Polycystic Ovarian Syndrome (PCOS) is associated with an increased incidence of the components of the metabolic syndrome (MS) such as insulin resistance (IR), and abnormal lipid profiles. However, there are few data on the incidence of hypertension (htn) in girls with PCOS.

OBJECTIVE: To compare the incidence of elevated office blood pressure (BP) in girls referred for evaluation of PCOS and obesity to those referred for evaluation of obesity alone.

DESIGN/METHODS: 31 obese minority girls {4 African American(AA), 27 Caribbean Hispanic(CH)} with a mean age of 15 ± 1.8 years, BMI 39 ± 7.5 kg/m², BMI z-score 5.2 ± 2.3 with the diagnosis of PCOS (defined by chronic anovulation and clinical and biochemical signs of hyperandrogenism) and 61 obese girls (20 AA and 41 CH) with a mean age of 13 ± 2.5 years, BMI 36 ± 7.6 kg/m², BMI z-score 4.6 ± 1.9 without PCOS were recruited. Weight, height, and BP were measured in each child. Htn was defined as resting systolic and/or diastolic BP values equal to or exceeding the 95th percentile for gender, age, and height. All subjects underwent oral glucose tolerance testing.

RESULTS: The prevalence of office htn in obese subjects with PCOS was 19% compared to 34% in obese girls without PCOS. No significant differences were observed with respect to birth weight, gestational age, waist-hip ratio, and HOMA between those girls with and without htn. The girls with PCOS were significantly older.

Parameter	Obese PCOS		Obese	
	with htn	without htn	with htn	without htn
n	6	25	21	40
Age (yrs)	15 ± 2.7	15.5 ± 1.6	13 ± 2.3	13 ± 2.6
Systolic BP (SBP)	130 ± 4.9	114 ± 9.5	129 ± 8.0	111 ± 10.2
Diastolic BP (DBP)	66 ± 5.7	67 ± 9.9	69 ± 11	64 ± 8.2
SBP Index	1.03 ± 0.3	$.90 \pm 0.08$	1.04 ± 0.06	0.90 ± 0.08
DBP Index	0.81 ± 0.07	0.81 ± 0.12	0.85 ± 0.13	0.79 ± 0.09
BMI kg/m ²	41 ± 7.1	39 ± 7.7	39 ± 7.9	35 ± 7.3
BMI z-score	5.64 ± 2.6	5.05 ± 2.3	5.25 ± 2.0	4.23 ± 1.72
HOMA	6.3 ± 1.9	5.7 ± 4.3	5.4 ± 3.5	6.5 ± 7.4

*Values reflect mean±SD

CONCLUSIONS: In this study, we demonstrate that although htn occurs frequently in obese minority adolescent girls, there is not an increased incidence in those adolescent girls that carry the diagnosis of PCOS. This suggests that hyperandrogenism in these girls with PCOS does not confer an additional risk for the development of htn.

81 4:15pm **House Officer**
Managing Childhood Overweight: Relationship Between Parent and Child Self-Efficacy

Katherine O'Connor, Iman Sharif, Pediatrics, Children's Hosp at Montefiore/AECOM, Bronx, NY. **BACKGROUND:** Self-efficacy is an important mediator of behavior change. Parental SE for supporting an overweight child's exercise is positively correlated with the child's activity. However, no studies have investigated the relationship between parental SE for managing their own exercise and eating behaviors and children's SE for managing those behaviors. Since overweight children usually have overweight parents, this relationship may be important.

OBJECTIVE: To test the hypothesis that parental SE for healthy eating and exercise behaviors predicts child SE for those behaviors.

DESIGN/METHODS: Cross-sectional survey at an inner-city health center. Pediatricians referred families of children with BMI \geq 85th percentile for enrollment in an obesity management program. Parents and children separately completed written validated questionnaires to measure SE: 19-item written "Eating Self-Efficacy Scale" (1-7), and 6-item written "Exercise Self-Efficacy Scale" (1-5). Anthropometric, 7-day exercise recall diary, and demographic data were collected. EpiInfo calculated age/sex adjusted BMI z-scores. We used linear regression to test predictors of child SE, adjusting for confounders.

RESULTS: 106 children and 78 parents participated. Mean child BMI=30, mean child BMI Z-score=2.34; Mean parental BMI=31. Parental BMI and child BMI z-score were correlated ($r=0.27$, $p=0.02$). For both parents and children, exercise activity decreased with age ($r=-0.34$, $p=0.003$; $r=-0.18$, $p=0.06$, respectively). Parents had better eating SE than did children (4.9 vs. 4.6, $p=0.04$) but worse exercise SE (2.7 vs. 3.0, $p=0.11$). Among children, exercise SE decreased with age ($r=-0.22$, $p=0.02$), while eating SE improved ($r=0.26$, $p=0.007$). Among children, exercise SE predicted exercise activity ($r=0.26$, $p=0.008$).

88 children had SE data recorded for their parents. On bivariate analyses, parental eating SE was correlated with child eating SE ($r=0.30$, $p=0.004$). The relationship held after adjustment for confounders and clustering by family (adjusted $r=0.29$, $p=0.001$).

Among parents, there was no relationship between eating or exercise SE and age, or between exercise SE and exercise activity. Parental exercise SE did not correlate with child exercise SE.

CONCLUSIONS: Child eating SE is associated with parental eating SE, implying that interventions targeting parental eating SE may be an important part of treating childhood overweight.

82 4:30pm **House Officer**
Knowledge of Abortion Methods by Adolescents

Mandy S. Coles, Laura P. Koenigs, Pediatrics, Baystate Medical Center, Springfield, MA.

BACKGROUND: A sexually active eighteen year-old female presented with a four-day history of vaginal bleeding and cramping. Urine pregnancy test was positive. After the exam she reported taking four "little white pills from a friend so she would not be pregnant," prior to onset of bleeding. Further questioning revealed that the pills were misoprostol 200 mcg. While there is a good deal of pediatric literature addressing the topic of emergency contraception (EC), there is scant research on medical abortion (MAB) in this population.

OBJECTIVE: The purpose of this study is to determine knowledge and use of MAB, as compared to EC, in adolescent females.

DESIGN/METHODS: Anonymous surveys were distributed to adolescent females in a local alternative educational center for pregnant and parenting adolescents, a local high school health clinic, and local pediatric offices. At the time of abstract submission, 12 surveys have been collected and analyzed; an additional 50 surveys are pending collection and analysis.

RESULTS: Respondents were predominantly Latina/Hispanic (83%) pregnant or parenting adolescents participating in a GED program, with a mean age of 18 (16-20) years old. Ten adolescents (83%) had heard of EC and five (42%) had personal experience: two (17%) knew someone who had used EC; three (25%) had used EC. In comparison, only four adolescents (33%) had heard of MAB: two (17%) knew someone who had a MAB; none had a MAB. Of the seven adolescents (58%) who either knew someone or themselves had used either EC or had a MAB, more than half were unsure of the differences between the two medications.

CONCLUSIONS: Awareness and knowledge of EC is more widespread when compared with MAB in our population of at risk adolescent females. It is concerning that, even among adolescents whom have personal experience with either method, there seems to be a poor understanding of the differences between medication that prevents implantation and medication that induces an abortion. Thus our data supports the need for further education of contraception and abortion methods for adolescent females.

83 5:00pm

Developmental and Service Needs of Teens and Young Adults with Congenitally Acquired HIV: A Follow up Study

Katlyne Lubin, Marsha Edell, Netburn Laura, Pediatrics, AECOM, Bronx, NY.

BACKGROUND: Children born with congenitally acquired HIV are living longer lives due to antiretroviral treatments. This has created a new group of patients who are now reaching adolescence and adulthood. This unique generation of patients is confronted with issues, such as sexual activity and reproduction, disclosure to friends and partners.

OBJECTIVE: To examine the developmental function and service needs of a cohort of 90 school age congenitally HIV infected children who were referred to a developmental clinic. This cohort was initially identified by Papola, et al. in 1994.

DESIGN/METHODS: A structured interview was performed, eliciting information about school attendance, sexual activity, substance abuse, problems with the law, compliance with antiretrovirals and mental health (MH) services. Statistical analysis includes chi-square and t test.

RESULTS: Of the 90 original subjects, we identified 44 of whom 20 were confirmed as deceased. Their ages ranged from 16 to 24, with a mean age of 19.5.

Nine of the subjects (33%) are currently attending school, 6 in some type of self-contained class, 1 in college. Of the 14 (58%) not in school, 7 dropped out, 7 have graduated. Sixty-seven percent (16) of the subjects are sexually active and of those, 56% have disclosed their status to their partner(s). Ten (62%) of the sexually active patients said they use a condom all of the time. Two of the subjects delivered full term HIV negative babies. Sixteen percent have tried drugs other than marihuana at least once. Fifteen subjects (62%) reported compliance with antiretrovirals. The non-compliant subjects were significantly older (18.5 \pm 2 vs. 21.3 \pm 2 $p=0.01$); they also had a higher school dropout rate ($p=0.01$), and were more likely to engage in risk-taking behaviors ($p=0.01$). Twenty-nine percent have had some problems with the law and 25% have spent time in prison, 49% receive MH services, 29% with at least one psychiatric hospitalization.

CONCLUSIONS: The average age of children with congenital HIV has increased. The data highlights the myriad of behavioral and psychosocial issues that need to be addressed. The focus of care needs to incorporate not just medical management, but early identification of behavioral problems and academic disabilities. This will allow for appropriate interventions to be implemented early.

84 5:15pm

Seroprevalence of HIV-1 Infection in an Adolescent and Young Adult Population: An Anonymous Survey in a Community Hospital in the South Bronx

Murli U. Purswani, Stefan Hagmann, Aida R. Matias, Caroline A. Nubel, Ram Kairam, Department of Pediatrics, Bronx-Lebanon Hospital Center, Bronx, NY.

BACKGROUND: Centers for Disease Control estimates that adolescents (Ad) and young adults (YA) represent half of all new HIV-1 infections (HIV) in the US. Ad are at risk for acquiring HIV since many engage in high-risk behaviors. Many perinatally-infected children have grown into YA because of effective treatment. These factors contribute to the growing prevalence of HIV, impacting on a community's health care needs. Previous estimates of seroprevalence (SP) of HIV in this population are obtained from national studies on Job Corps students and military applicants (0.08-0.19%), and may not accurately characterize SP of HIV within local communities.

OBJECTIVE: To describe the SP of HIV among Ad and YA 12-24 years of age attending a community hospital in the South Bronx.

DESIGN/METHODS: Unused serum samples of patients attending the hospital's adult/pediatric emergency departments and ambulatory practices were identified from 11/19/2003 to 6/24/2004. Demographic data and diagnosis at the index visit were abstracted from medical records. Samples with previous diagnosis of HIV were excluded. After removal of identifiers, samples were tested for HIV-1 antibodies anonymously using a rapid HIV-1 assay (Uni-Gold Recombigen HIV, Trinity Biotech USA). Reactive samples were retested by HIV1/2 enzyme-linked immunosorbent assay (ELISA) and confirmed by western blot (WB). The study was approved by the hospital's Institutional Review Board.

RESULTS: 511 samples were collected from patients seen for a variety of acute/chronic conditions, childbirth and preventive evaluations. The mean age for females (F) was 19.2 \pm 2.9 yrs and males (M) 17.9 \pm 3.6 yrs. 59.1% were Latino (LA), 38.6% African American (AA) and 75.7% F. The Uni-Gold was reactive for 16 samples, 5 of which had HIV confirmed by ELISA/ WB. Of these 5, 4 were F (3 AA and 1 LA). The crude SP for HIV in this population was 0.98% (95% CI 0.08-1.88%). The SP (95% CI) for F, M, AA and LA were 1.03% (0.03-2.03%), 0.81% (0-2.4%), 1.52% (0-3.4%) and 0.66% (0-1.8%) respectively. The highest SP was for the AA F (2.07%, 0-4.6%).

CONCLUSIONS: In this South Bronx population, the SP for HIV in Ad and YA may be higher than that noted in national surveys, with the highest SP in the AA F. These results supports the need for increased education, outreach and routine screening for HIV.

85 5:30pm **Fellow in Training**

Risk-Taking Behaviors and Depression in Adolescents Seeking Care in the Pediatric Emergency Department

Maia S. Rutman, Thomas Chun, Bruce M. Becker, Emergency Medicine, Brown Medical School, Providence, RI.

BACKGROUND: Adolescents who seek health care in emergency departments are more likely to report both mental health problems and substance use than those who utilize other sources of medical care.

OBJECTIVE: To examine the correlation between depression and substance use, sexual activity, and other risk-taking behaviors in adolescents seen in a Pediatric Emergency Department (PED). **DESIGN/METHODS:** Cross-sectional study of a convenience sample of adolescents 12-17 years of age presenting to an urban PED with sub-critical illness or injury between 4/05 and 11/05. Participants completed a demographic questionnaire and the Center for Epidemiologic Studies 20-question screen (CESD). Data was analyzed using SPSS® and STATA®.

RESULTS: One hundred and eighty one patients were approached, of whom 130 (72%) agreed to be screened. Forty-six participants (35%) screened positive for depression using a cutoff score of \geq 16 on the CESD. Participants who screened positive for depression were more likely to have smoked cigarettes, used alcohol or marijuana, or had sexual intercourse than those who screened negative for depression (Table 1). No significant difference in the rates of tattoos or piercings (non-earlobe) were reported. Logistic regression analysis shows that all of these behaviors are highly associated. Cigarette smoking remains the only significant variable when the other risk-taking behaviors as well as age are taken into account (p -value 0.044, OR 4.99).

Table 1: Reported behaviors among screened adolescents

	Positive CESD (N=46)	Negative CESD (N=84)	p-value	Odds Ratio
Lifetime cigarette smoking (N=125)	10 (22%)	3 (4%)	0.001*	7.98
Lifetime alcohol use (N=126)	20 (43%)	18 (21%)	0.004*	3.14
Lifetime marijuana use (N=127)	15 (33%)	14 (17%)	0.028*	2.55
History of sexual intercourse (N=126)	17 (37%)	15 (18%)	0.012*	2.81
Tattoos and/or piercing(s) (N=128)	11 (24%)	11 (13%)	0.069	2.45

*p-value < 0.05

CONCLUSIONS: There is a significant correlation between screening positive for depression and cigarette smoking, alcohol and marijuana use, and sexual intercourse in adolescents seeking medical care in the PED. These risk-taking behaviors are all highly associated, but cigarette smoking and depression are significantly associated independent of the other behaviors.

Cardiology: Clinical Studies Platform Session

Saturday, March 18, 2006

4:00pm-5:45pm

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4:00pm

Fellow in Training

Pulmonary Hypertension in Children with Sickle Cell Disease

Muhammad A. Khan, Erika Berman Rosenzweig, Robyn J. Barst, Margaret T. Lee, Tania Small, Mitchell S. Cairo, Sujit S. Sheth. Pediatric Cardiology, Childrens Hospital of New York, New York, NY; Pediatric Hematology and Oncology, Childrens Hospital of New York, New York, NY. BACKGROUND: Pulmonary hypertension (PH) is increasingly recognized as a significant cause of morbidity and mortality in adult patients with sickle cell disease (SCD), with a prevalence of 20-30% and 18-month mortality rate of 16%. However, its prevalence in the pediatric population is unknown.

OBJECTIVE: We sought to determine the prevalence of PH in children and adolescents with SCD and identify potential risk factors associated with this complication.

DESIGN/METHODS: We included children ages 6 to 20 years old followed at our Comprehensive Sickle Cell Center who had doppler echocardiography done within the last two years. Tricuspid regurgitant jet velocity (TRV) was measured by doppler echocardiography. Pulmonary hypertension was defined as a TRV ≥ 2.5 m/s. A retrospective chart review was also performed. Data were analyzed to determine the prevalence of PH in this population and to identify clinical and laboratory parameters that may be associated with PH.

RESULTS: Fifty patients had available echocardiographic studies (Hgb SS =33, Hgb S/B⁰ Thalassemia =1, and Hgb SC =16; mean age = 13 + 4 years; males =28, females =22). Eight of 50 patients (16%) had PH (Hgb SS = 6, Hgb S/B⁰ Thalassemia =1, Hgb SC = 1; males = 7, female =1). All were teenagers except one (7y/o). PH was associated with laboratory markers of hemolysis (low hemoglobin, increased reticulocyte count, high LDH and high AST) [$p < 0.05$], but not markers of inflammation (WBC and platelet count), Hgb F⁰, renal function (creatinine), or iron overload (ferritin, iron, transferrin saturation). History of other sickle cell complications (VOC, acute chest syndrome, priapism), asthma, hydroxyurea treatment, degree of hypoxemia were not associated with PH.

CONCLUSIONS: These data suggest that PH associated with SCD begins in childhood. Laboratory markers of increased hemolysis and liver disease are associated with PH. Early screening and diagnosis could enable early treatment with SCD-directed therapy such as chronic transfusion or hydroxyurea, as well as targeted treatment of the PH with the goal being to decrease morbidity and mortality in SCD.

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4:15pm

Medical Student

Cardiac Risk After Craniopharyngioma Therapy: A Cross-Sectional Pilot Study

Sandy Mong, Scott L. Pomeroy, Frank Cecchin, Mark E. Alexander. Harvard Medical School, Boston, MA; Neurology, Children's Hospital Boston, Boston, MA; Cardiology, Children's Hospital Boston, Boston, MA.

BACKGROUND: Craniopharyngioma is the most common nonglial intracranial tumor in children. Treatment is associated with significant endocrine and neurologic impairment. Recent deaths of two survivors with cardiac findings suggested a need to systematically evaluate cardiac morbidity. OBJECTIVE: Determine if treated patients have potential substrates for sudden cardiac death. DESIGN/METHODS: Record review of two index pts was performed. Prospective cardiac screening of 11 pts followed at Children's Hospital between 1990-2005 was conducted, including 15-lead, 24 hour and signal-averaged ECG; exercise testing, t-wave alternans, serum markers of cardiac injury cardiac MRI (cMRI) and echocardiogram.

RESULTS: Index cases: An 18 yo male collapsed in ventricular fibrillation during mild exertion and subsequently expired. An obese 18 yo female with recurrent syncope, type II diabetes, asthma and prolonged QT, expired of respiratory insufficiency. Prior echocardiogram was normal. Autopsy revealed an enlarged left ventricle with fatty infiltrate.

Prospective cases: Mean age 18.2 (range 11 to 27). Median duration between diagnosis and follow-up was 9y. All had received subtotal resection; 67% radiotherapy; and 42% had recurrences. All had pancytopenia, 75% visual loss; 92% obesity (median BMI 37); 60% sleep disturbance. Systolic and diastolic blood pressures averaged 116 ± 17 and 64 ± 15 mmHg. 6 of 11 pts had at least one abnormality of cardiac structure, function or rhythm. Three pts (27%) had QTc exceeding 450msec (462-529) with high inter-rater reliability (kappa 0.75). QTc for the cohort ranged between 386 and 529 with a mean of 444 ± 44 . Isolated patients had abnormal signal-averaged ECG, low-grade ectopy, aortic root dilation, and elevated CPK-MB with normal troponin levels. No patient had obvious ventricular dysfunction, though echocardiograms were all technically limited. A significant minority was not eligible for cMRI due to body size restrictions. CONCLUSIONS: Intensive cardiac evaluation of survivors identified nearly a third with significant QTc prolongation. Stimulants and QTc prolonging medication should be used with caution in this population, and routine EKG screening may identify those at highest risk.

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4:30pm

Medical Injury Diagnosis and High Resource Utilization During Congenital Heart Surgery Admissions

Oscar J. Benavidez, Jean A. Connor, Kimberlee Gauvreau, Kathy J. Jenkins. Cardiology, Children's Hospital Boston, Boston, MA.

BACKGROUND: The Institutes of Medicine estimates that medical errors cost between \$17 billion and \$29 billion annually in the U.S. The costs associated with medical error/injury among congenital heart surgery admissions are understudied.

OBJECTIVE: To determine the independent contribution of medical injury diagnoses on increased resource utilization during congenital heart surgery admissions.

DESIGN/METHODS: Data were obtained from the Healthcare Cost and Utilization Project Kid's Inpatient Database year 2000. We identified congenital heart surgery admissions < 18 years of age. High resource use admissions were defined as admissions above the 90th percentile for total hospital charges. Medical injury diagnoses were identified by a method published by the Agency for Healthcare Research Quality using ICD-9-CM codes. Multivariate analyses using generalized estimating equations adjusted for previously identified factors associated with high resource use to estimate the independent effect of a medical injury diagnosis on high resource use. These factors

include: Risk Adjustment for Congenital Heart Surgery risk categories, age, prematurity, major non-cardiac structural anomalies, Medicaid, weekend admission and state. The added explanatory power attributed to a medical injury diagnosis was measured by an increase in the area under the receiver operator curve (ROC).

RESULTS: Among 10,602 of congenital heart surgery admissions identified, the median total charges were \$51,125. The threshold for high resource use was total charges \geq \$192,272. High resource admissions accounted for >40% of the total charges for all admissions. Medical injury diagnoses were identified in 3360 (32%) of congenital heart surgery admissions; 18% were classified as high resource use compared to 6% without a medical injury ($p < 0.001$). Multivariate analyses revealed that admissions with a medical injury diagnosis were much more likely to exceed the threshold for high resource utilization (OR 3.2, $p < 0.001$). The addition of medical injury diagnosis to the multivariate model increased the area under the ROC from 0.837 to 0.863.

CONCLUSIONS: Congenital heart surgery admissions with a medical injury diagnosis are three times more likely to exceed \$192,272 in total charges despite adjusting for known risk factors for high resource use. Medical injury reduction may result in both an economic and clinical benefit.

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4:45pm

Ph.D. Student

Flow Disturbances with Small Pressure Change: Relevance to Obstructed Total Caval Pulmonary Connection (TCPC)

Joshua Wiesman, Nancy Ross-Ascuitto, Donald Gaver, Robert Ascuitto. Pediatrics, Biomedical Engineering, Tulane University, New Orleans, LA.

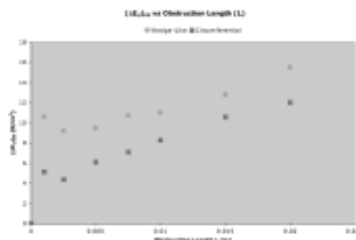
BACKGROUND: TCPC is an operation for univentricular heart. Cavopulmonary blood flow is passive and of low velocity. Therein, pressure changes (ΔP) across obstructions are small. However, these flow disturbances can cause re-distribution of flow velocity, a critical determinant of energy loss.

OBJECTIVE: Assess flow energetics relevant to TCPCs, using a computer-based (FEMLAB, Comsol, Inc., MA) description of non-pulsatile flow through a conduit, taken to simulate blood flow in an obstructed cavopulmonary pathway.

DESIGN/METHODS: Energy losses ($\Delta E_{i,p}$) were determined for flow (1L/min) crossing wedge-like or circumferential obstructions of lengths (1 to 20 mm), each producing 40% reduction in conduit (dia. 15 mm and length 70 mm) cross-sectional area. Fluid viscosity 3.5×10^{-3} N-s/m². For a flow transition (i to f), there is a pressure [$(\Delta E_{i,p}) = \langle P \rangle - \langle P_f \rangle$] and kinetic energy [$(\Delta E_{i,p,KE}) = (\rho/2) \langle V_i^2 \rangle - (\rho/2) \langle V_f^2 \rangle$] contribution. The symbol $\langle \rangle$ implies averaging, pressure (P) or kinetic energy ($\rho/2V^2$), with respect to flow. Distal pressure 12 mmHg. Pressure and velocity distributions were obtained from numerical solutions of the Navier-Stokes equations.

RESULTS: ΔP averaged 0.3 mmHg. Yet, $(\Delta E_{i,p})$, 60 N/m², was the major part of $\Delta E_{i,p}$. Figure shows the magnitude of $(\Delta E_{i,p,KE})$. Residual kinetic energy increased with obstruction length, and for wedge-like compared to circumferential obstructions. Flow stagnation and reversal are demonstrated.

CONCLUSIONS: For non-pulsatile flow in an obstructed conduit, ΔP is small, as found clinically. 1) Pressure work still is crucial to overcome viscous forces; 2) Kinetic energy loss is less for elongated compared to discrete obstructions; 3) Wedge-like obstructions produce less "net" energy loss than do circumferential; and 4) There is flow stagnation and reversal. Each impacts pulmonary perfusion with TCPCs.



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5:15pm

Medical Student

Prevalence of Congenital Cardiovascular Malformations Varies Between Whites, Blacks, and Hispanics

Amitoz S. Manhas, Paul Visintainer, Cheryl Hunter-Grant, Heather L. Brumberg. New York Medical College, Valhalla, NY.

BACKGROUND: The prevalence of congenital cardiovascular malformations (CCVMs) has been found to differ between Whites and Blacks. However, little attention has been focused on rates in the Hispanic population.

OBJECTIVE: To determine the prevalence of CCVMs in the Hudson Valley Region of NY State by race.

DESIGN/METHODS: Data from the NY State Department of Health Congenital Malformations Registry were obtained by race from 1992 to 2001 across the 7 counties of the Hudson Valley Region. Live-birth cases diagnosed up to 2 years of age using the British Pediatric Association coding system were included in year-of-birth registration. Prevalence was calculated using race-specific births from Vital Statistics data. Poisson regression, adjusting for population size, was used for analysis of relative risks (RR).

RESULTS: There were 3,075 CCVMs in 2,303 children from a birth population of 297,606. For all CCVMs there were 14.4 malformations/1000 live births in Non-Hispanic Whites (NHW), 12.8/1000 in Non-Hispanic Blacks (NHB), 8.8/1000 in Hispanics and 8.4/1000 in Others. The risk of all CCVMs was lower in NHB [RR=0.89, 95%CI 0.80-0.99], Hispanics [RR=0.61, 95%CI 0.54-0.68], and Others [RR=0.58, 95%CI 0.50-0.69] when compared with NHW. The risk of Tetralogy of Fallot in Hispanics [RR=0.31, 95%CI 0.14-0.67] was significantly lower than NHW, but not in NHB and Others. The risk of Great Vessel anomalies relative to NHW was lower in NHB [RR=0.48, 95%CI 0.24-0.95] and Hispanics [RR=0.33, 95%CI 0.16-0.67] but not in Others. The risk of Ventricular Septal Defects in comparison with NHW was lower in NHB [RR=0.60, 95%CI 0.48-0.75], Hispanics [RR=0.63, 95%CI 0.52-0.77], and Others [RR=0.65, 95%CI 0.49-0.86].

CONCLUSIONS: In the Hudson Valley Region, all CCVMs and specific anomalies such as Tetralogy of Fallot have the highest prevalence in Whites with Hispanics consistently maintaining a lower risk. These data suggest a targeted approach for diagnosis and treatment.

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5:30pm

Fellow in Training

Improvement in Mortality for Congenital Heart Surgery in Guatemala

Luis A. Larrazabal, Kathy J. Jenkins, Kimberlee Gauvreau, Guillermo A. Gaitan, Aldo R. Castaneda. Cardiology, Childrens Hospital Boston, Boston, MA; Pediatric Cardiology and Cardiac Surgery, UNICAR, Guatemala, Guatemala.

BACKGROUND: In 1997 an effort was made to disseminate US and European Cardiac Surgical Practices to a developing program in Guatemala, a Central American emerging country with more than 12 million inhabitants.

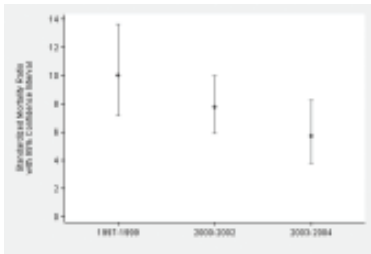
OBJECTIVE: To describe the rate of improvement of risk adjusted in-hospital mortality in the only center for congenital heart surgery (CHS) in Guatemala, which has also become a referral center for Central America and the Caribbean.

DESIGN/METHODS: A population-based retrospective cohort study was done, including all patients that underwent CHS from February 1997 to July 2004. Data were divided in three groups for analysis (97-99, 00-02, 03-04). We used hospital data from the 2000 Kids' Inpatient Database (27 states and 313 institutions) as a benchmark. The Risk Adjustment for Congenital Heart Surgery (RACHS-1) method was used to adjust for case mix. Standardized mortality ratios (SMR) and 95% CI were calculated.

RESULTS: Between 1997 and 2004, 1328 surgical procedures were performed. The age distribution among patients was 5% ≤ 30 days, 19% 31 days to 1 year, 74% ≥ 1 year. 97 (8%) had a major noncardiac structural anomaly. 161 (13%) had more than one procedure. The rate of improvement in risk-adjusted mortality in Guatemala was noted by a decrease of SMR from 10.0 (7.2, 13.7) in 1997-99 to 7.8 (5.9, 10.0) in 2000-02 and to 5.7 (3.8, 8.3) in 2003-04. 22% of deaths (28/130) were prevented by improvement strategies. The RACHS-1 method showed better discrimination (area under the ROC curve 0.854) than in prior reports.

CONCLUSIONS: Dissemination of practices from US and Europe has resulted in rapid, substantial reduction in mortality after CHS in Guatemala.

Measurement of rate of improvement in risk-adjusted mortality may be an important quality indicator for developing programs.



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4:15pm

Fellow in Training

A Brief Screen for Adolescent Depression in the Pediatric Emergency Department

Maia S. Rutman, Edmond Shenassa, Thomas Chun, Bruce M. Becker. Emergency Medicine, Brown Medical School, Providence, RI; Centers for Behavioral and Preventive Medicine, Brown Medical School, Providence, RI.

BACKGROUND: Depression is a common psychiatric problem for adolescents. Nevertheless, adolescents are rarely formally screened for depression when being treated in the Pediatric Emergency Department (PED).

OBJECTIVE: To examine the sensitivity and specificity of one- and two-question instruments to screen for depression in adolescents in the PED.

DESIGN/METHODS: Cross-sectional study of a convenience sample of adolescents 12-17 years of age presenting to an urban PED with sub-critical illness or injury between 4/05 and 11/05. Participants completed a demographic questionnaire and three depression screens: the Yale-Brown one-question instrument (Figure 1), a two-question case finding instrument for depression that has been validated in adults (Figure 1), and the Center for Epidemiologic Studies 20-question screen (CESD). Data was analyzed using SPSS®.

Figure 1: One- and Two-Question Instruments

One-Question Instrument: Do you often feel sad or depressed?

Two-Question Instrument, Question 1: During the past month, have you often been bothered by feeling down, depressed, or hopeless?

Two-Question Instrument, Question 2: During the past month, have you often been bothered by little interest or pleasure in doing things?

RESULTS: One hundred and eighty one patients were approached, of whom 130 (72%) agreed to be screened. Forty-six (35%) of the 130 study participants screened positive on the CESD using a cutoff score of ≥16. A "yes" response to the one-question instrument had a sensitivity of 65% and specificity of 94% when compared to the CESD, while a "yes" response to one or both questions of the two-question instrument had a sensitivity of 76% and specificity of 86% when compared to the CESD (Table 1).

Table 1: Performance of brief screens compared with CESD

	Sensitivity, % (95%CI)	Specificity, % (95%CI)	Positive Predictive Value, % (95%CI)	Negative Predictive Value, % (95%CI)
One-question screen	54 (40-88)	94 (89-99)	83 (70-96)	79 (71-97)
Two-question screen	76 (64-88)	86 (68-100)	74 (54-94)	86 (68-100)

CONCLUSIONS: The two-question instrument is sensitive and specific for detecting depression in adolescents being treated in the PED. This screen takes less than one minute to administer, and is a practical addition to patient evaluation in the PED setting.

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4:45pm

Ultrasound Measurement of the Inferior Vena Cava Diameter in the Assessment of Children with Dehydration

Lei Chen, Yunie Kim, Karen Santucci. Pediatrics, Yale University School of Medicine, New Haven, CT; Yale University School of Medicine, New Haven, CT.

BACKGROUND: Dehydration is a common condition in children. Various physical exam findings and laboratory results are used by clinicians to evaluate the degree of dehydration in children. Accurate assessment of intravascular volume status, however, is fraught with difficulties. Bedside ultrasound measurement of the inferior vena cava (IVC) diameter may offer a more objective and noninvasive measure of intravascular volume in children.

OBJECTIVE: To compare the IVC diameter of dehydrated children with controls and to compare the IVC diameter before and after intravenous hydration in the subjects.

DESIGN/METHODS: A prospective case-control study was carried out in an urban pediatric emergency department. Children between birth and 16 years of age were eligible as subjects if they presented with clinical evidence of dehydration and were treated with intravenous (IV) fluids. Bedside ultrasound measurements of the IVC and aorta (Ao) were taken before, and immediately after, IV fluids were administered. An age, gender, and weight-matched control without dehydration was enrolled for each subject. The IVC/Ao ratios of subjects and controls were compared using the Wilcoxon signed rank test, as were the ratios pre- and post- IV hydration for each subject.

RESULTS: During the study period 25 pairs of subjects and matched controls were enrolled. The mean (SD) age of the subjects was 8 years (+/-5.6). Mean (SD) IVC/Ao ratio for subjects was 0.74 (+/- 0.13), compared with 1.01(+/- 0.11) for the controls (p<0.001). After hydration the mean (SD) IVC/Ao ratio in the subjects was 1.10 (+/-0.18). This difference between pre- and post- hydration ratios was also significant (p<0.001).

CONCLUSIONS: The IVC/Ao ratio was smaller in children with dehydration as compared to controls, as measured by bedside ultrasound. In addition, increases in the ratios were measured after IV hydration. Bedside ultrasound measurement of the IVC is an objective method in evaluating children with dehydration.

Emergency Medicine Platform Session

Saturday, March 18, 2006

4:00pm-5:45pm

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4:00pm

Round Versus Square Head Otoloscope for the Diagnosis of Acute Otitis Media

David M. Spiro, Khoonyen E. Tay, James Dziura, Cosby G. Arnold, Eugene D. Shapiro. Pediatric Emergency Medicine, Yale University School of Medicine, New Haven, CT; GCRC, Yale University School of Medicine, New Haven, CT; Emory University, Atlanta, GA.

BACKGROUND: Otoscopy is the routine method used to make the diagnosis of acute otitis media (AOM). Various otoscopes use different speculum shapes and integrated light sources from within the otoscope head. No prior research has evaluated if otoscope type affects final diagnoses or observations of the tympanic membrane (TM).

OBJECTIVE: To determine differences in final diagnoses and observations of the TM using the round head (RH) versus square head (SH) otoscope and to describe otoscopic findings of clinicians who diagnose AOM.

DESIGN/METHODS: This study was a prospective cross-over trial among children aged 4 to 36 months who presented to a Pediatric Emergency Department with URI, fever or fussiness. After otoscopy, a clinician recorded otoscopic findings of the left ear using either the RH or SH. A second clinician, blinded to the findings of the first examiner, performed an otoscopic exam in the same ear using the other type of head. The order of the first otoscope head used was alternated.

RESULTS: There were 112 subjects (median age = 12 months) examined by 16 different clinicians. There were no statistically significant differences between the RH and SH in frequency of diagnosis of AOM (21% vs. 21%; p=0.77) or other reported TM observations. Frequencies and agreements of TM observations are shown in Table. For all subjects diagnosed with AOM by either clinician, 30% reported the TM was not bulging and 34% reported seeing a light reflex.

CONCLUSIONS: Although frequencies for final diagnosis and reported characteristics of the TM were similar, agreement between the observations was poor to fair. AOM was diagnosed in many patients who were reported to have findings not consistent with a middle ear effusion.

Table: Frequency and Agreement of Final Diagnosis and Otoscopic Observations

Observation	Round Head (%)	Square Head (%)	% Overall Agreement	Kappa	95% Confidence Limits
Diagnosis of AOM	21	21	20%	0.00	0.00 - 0.10
Light Reflex Observed	34	34	20%	0.00	0.00 - 0.20
TM Not Bulging Observed	30	30	20%	0.00	0.00 - 0.10
TM Bulging Observed	40	40	20%	0.00	0.00 - 0.10
Middle Ear Effusion	30	30	20%	0.00	0.00 - 0.10

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5:00pm

Fellow in Training

Predicting Pertussis in a Pediatric Emergency Department (PED) Population

Jennifer E. Mackey, Wojcik Susan, Boyle Margaret, Long Ray, Callahan M. James, Grant D. William. Emergency Medicine, Upstate Medical University, Syracuse, NY; Infection Control, Upstate Medical University, Syracuse, NY.

BACKGROUND: Cases of pertussis, a potentially life-threatening illness in infants less than 6 months of age, are at a 40-year high. In 2003, there were 11,647 cases of pertussis nationally and 1,217 cases in New York State alone. Because children frequently present to emergency departments for initial evaluation, quick recognition of this illness would allow rapid triage, isolation and prevention of transmission.

OBJECTIVE: The purpose of this study was to determine if a decision rule could be developed for the identification of pertussis positive children presenting to a Pediatric Emergency Department (PED).

DESIGN/METHODS: We report a retrospective, case-control chart review of PED patients (0 to 18 years of age) presenting between January 1, 2003 and December 31, 2004. Cases (n=19) were patients with a positive PCR for pertussis. Controls (n=172) were patients with a negative PCR but suspected to have pertussis. Initial analysis focused on the exploration of medical history and physical examination findings as predictors using laboratory verification of the presence of pertussis as a binary outcome variable. Forward selection logistic regression was employed.

RESULTS: Four variables appear to distinguish pertussis positive children. First, a parental history that the child turned blue/purple/cyanotic during coughing spells (ChiSq = 11.58, p<0.0007). Second, whether the child was less than two months old (ChiSq = 8.93, p<0.0028). Third, whether the child was coughing on physical exam (ChiSq = 6.87, p<0.0090). Finally, the presence of rhonchi on physical examination also appeared to distinguish pertussis positive patients (ChiSq = 8.62, p< 0.0033). Overall tau-C = 0.882.

CONCLUSIONS: Infants under 2 months who have spasms of cough or choking associated with cyanosis and rhonchi should be identified in triage and isolated immediately and tested for pertussis. There are significant cost implications in the early identification of pertussis in the PED. For 2003 and 2004 we documented 31 PED staff who were placed on a prophylactic course of azithromycin. Drugs alone represented \$1,116. Decreasing the transmission of pertussis to other patients and staff in the PED can potentially lead to reduced hospital costs for prophylactic medications and work hours lost.

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5:15pm

House Officer

The Association of Body Mass Index and Ankle Injuries in Children

Mark R. Zonfrillo, Jeffrey A. Seiden, Ellen M. House, Eugene D. Shapiro, Robert Dubrow, Mark D. Baker, David M. Spiro, Department of Pediatrics; Department of Epidemiology and Public Health; Department of Pediatrics, Section of Emergency Medicine, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Obesity is a worldwide epidemic. Children at risk for overweight (body mass index percentile [BMI-P] ≥85 and <95) or overweight (BMI-P ≥95) experience significant medical problems. Trauma is the leading etiology of childhood morbidity and mortality. No previous study has evaluated the association between BMI-P and acute ankle injuries in a pediatric population.

OBJECTIVE: To determine if an association exists between incidence and severity of ankle injuries and BMI-P.

DESIGN/METHODS: This ongoing study was conducted in an urban pediatric emergency department as a case-control analysis of children aged 5 to 19 years. Consecutive children with acute ankle trauma were prospectively identified and enrolled as cases. Children with a chief complaint of fever, headache, or sore throat were prospectively enrolled as controls. Demographic information, weight, height, and a validated physical activity score were obtained. BMI-Ps were calculated using pediatric norms. Injury severity was scored for cases.

RESULTS: There were 105 cases and 125 controls enrolled (mean ages 14 and 11, respectively). There was a significant association between ankle trauma and being overweight (age-adjusted OR=2.78; 95% CI=1.44-5.37) and a significant trend of increasing ankle injury risk with increasing BMI-P category (p= 0.002). These findings were unchanged after adjustment for additional baseline characteristics. There was no association between injury severity and BMI-P (p=0.52).

Odds ratios for ankle injuries in relation to BMI Percentile

BMI Percentile	Unadjusted OR (95% CI)	Multivariate-adjusted OR* (95% CI)
<85	1.00	1.00
≥85 - <95 (only for overweight)	1.54 (1.27-1.87)	1.51 (1.03-2.20)
≥95 (overweight)	2.43 (1.31-4.55)	2.34 (1.43-3.76)
p-value for trend	0.004	0.003

*Adjusted for age, gender, race, insurance status, and activity score

CONCLUSIONS: This is the first study to describe an association between the incidence of ankle injuries and being overweight in children. These new findings have significant implications for prevention, diagnosis, and management of trauma.

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5:30pm

Fellow in Training

End Tidal Carbon Dioxide Changes with Bronchodilator Therapy During Acute Asthma Exacerbations in Children

Melissa L. Langhan, Mark R. Zonfrillo, Alia Bazyz-Asaad, James Dziura, David M. Spiro, Department of Pediatrics, Section of Emergency Medicine; Department of Pediatrics; Department of Pediatrics, Section of Pulmonary Medicine, Yale-New Haven Children's Hospital; General Clinical Research Center, Yale-New Haven Hospital, New Haven, CT.

BACKGROUND: Clinical scoring systems, such as the Pulmonary Score (PS), are used to classify asthma exacerbations; however they are subjective and imperfectly related to asthma severity. End-tidal carbon dioxide (ETCO₂) is a noninvasive, objective marker of respiratory status. No previous studies have evaluated the effects of nebulized bronchodilator therapy on ETCO₂.

OBJECTIVE: 1) To determine if quantitative ETCO₂ changes with bronchodilator therapy in children during asthma exacerbations. 2) To determine if ETCO₂ correlates with the PS.

DESIGN/METHODS: In this ongoing study, we enrolled children presenting to a pediatric ED with a known diagnosis of asthma during an acute asthma exacerbation (wheeze, cough, increased work of breathing). On arrival and after all asthma related treatments, vital signs, ETCO₂, and the PS were recorded.

RESULTS: 33 subjects were enrolled (mean age 9.7 years, range 1 - 19 years) who received a minimum of one nebulized treatment. The mean ETCO₂ on arrival was not significantly associated with the number of treatments [34.4, 33.1, and 28.9 mmHg for 1, 2, and ≥3 treatments (p=.07)], whereas prior to disposition there was a significant association between ETCO₂ and number of treatments [34.7, 31.3, and 29.8 mmHg for 1, 2, and ≥3 treatments (p=.02 for trend)]. The ETCO₂ was significantly higher in discharged patients (n=25) versus those admitted (n=8) both on arrival [33.9 vs 28.5 mmHg (p=.04)] and prior to disposition [33.9 vs 27.3 mmHg (p=.002)]. Adjustment for respiratory rate did not appreciably change these aforementioned results. PS was also significantly associated with disposition status (p=.008). There was no significant correlation between the changes in ETCO₂ and PS from arrival to disposition.

CONCLUSIONS: ETCO₂ at disposition decreases with the number of bronchodilator treatments

given for acute asthma exacerbations over time. ETCO₂ on arrival and at disposition is lower in patients admitted to the hospital compared to those discharged home. ETCO₂ may be an objective method to assess therapeutic response and disposition of patients with acute asthma exacerbations.

Neonatology II: Animal Models and Translational Studies Platform Session

Saturday, March 18, 2006

4:00pm-5:45pm

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4:00pm

Circulating Stem Cells in the Preterm Neonate

Matthew J. Bizzarro, Vineet Bhandari, Dianne S. Krause, Brian Smith, Jan Gross, Pediatrics, Yale University School of Medicine, New Haven, CT; Laboratory Medicine and Pathology, Yale University School of Medicine, New Haven, CT; Laboratory Medicine and Internal Medicine, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Neonates have higher levels of circulating CD34⁺ stem cells than adults. Animal data indicate that CD34⁺ cells home to the alveoli of injured lung tissue. We hypothesize that CD34⁺ stem cells may play a role in the recovery of injured lung in the premature neonate. **OBJECTIVE:** To measure circulating CD34⁺ stem cell levels in premature neonates and to determine if there is a correlation between the initial CD34⁺ counts and measures of pulmonary function and neonatal morbidity, including necrotizing enterocolitis, sepsis, bronchopulmonary dysplasia, and intraventricular hemorrhage.

DESIGN/METHODS: In neonates of gestational ages (GA) 24 to 32 weeks, peripheral CD34⁺ cell counts were measured in the peripheral blood using FACS at 0 to 2, 6 to 8, 13 to 15, and 20 to 22 days of life. Data pertaining to prenatal care, demographics, and short-term outcomes were collected. Pulmonary function tests (PFTs) were also performed to coincide with CD34⁺ sampling.

RESULTS: 30 preterm neonates with median GA of 24 weeks and birth weight of 641 grams were analyzed. A mean value of 99.4 CD34⁺ cells/microliter was observed in the 1st week of life with a decline by 50% at the 4th week. These levels are higher than those previously observed in umbilical cord blood (40 cells/microliter), the peripheral blood of more mature preterm (37 cells/microliter) and term neonates (32 cells/microliter) at birth, and adults (2 cells/microliter). In addition, a significant inverse correlation was observed between initial CD34⁺ count and GA (P=0.01) and a direct correlation between CD34⁺ cell count and the total white blood cell count (WBC) obtained at the same time (P<0.001). When both GA and WBC count were controlled for using logistic regression, no significant correlations were seen with PFTs and short-term outcomes. **CONCLUSIONS:** Extremely premature neonates have remarkably high levels of circulating CD34⁺ stem cell counts in their peripheral blood at birth which subsequently decline over a 4 week period. These levels correlate with the WBC count and, in an inverse manner, with GA. While they may be involved in the repair of injured tissue, the role of circulating CD34⁺ cells in preterm neonates remains unclear.

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4:15pm

CC10 Reduces the Inflammatory Response in Piglet Meconium Aspiration Syndrome (MAS)

Robert M. Angert, Aprile L. Pilon, Hschi-Chi Koo, Ellen M. Gurzenda, Lynda Adrouche-Armani, Davis M. Jonathan, Neonatology/Pediatrics, Winthrop University Hospital, Mineola, NY; Claragen, College Park, MD.

BACKGROUND: MAS is a devastating disease that primarily affects full-term newborns. Despite recent advances in therapy, the morbidity and mortality rates remain unacceptably high. Newer therapies such as surfactant and nitric oxide, neglect the immune response and the ongoing destruction of surfactant by phospholipases that occurs in MAS. CC10 is a powerful anti-inflammatory protein that also has antiphospholipase properties.

OBJECTIVE: To determine if the administration of CC10 in a piglet model of MAS would preserve surfactant function and reduce inflammation.

DESIGN/METHODS: 16 newborn piglets were sedated, intubated and catheterized. All piglets received via endotracheal tube: pooled samples of human meconium (3mL/kg), surfactant, and CC10 (5mg/kg) (n=8) or saline (n=8). Arterial blood gas analysis, vital signs, urine output, and clinical effectiveness of ventilation were assessed. Serum and tracheal aspirates (TA) were collected at t=0 and 24h. Bronchoalveolar lavage (BAL) was performed on half of the animals, while the others lungs were formalin perfused, weighed and removed for histological analysis. Serum, TA, and BAL samples were analyzed for TNF- α , IL-8.

RESULTS: TA analysis revealed large increases in both IL-8 and TNF- α after meconium instillation. The CC10 treated animals had significantly lower TNF- α levels at 24 h (561±321 vs. 1357±675, P<0.05). There were no differences among CC10 treated animals and controls in alveolar-arterial O₂ gradient, O₂ requirement, ventilator pressure, serum or BAL cytokine levels. Pressure volume curves were the same among both groups. Histological analysis of the specimens revealed inflammatory infiltrates and thickened alveolar walls, but there was no difference among CC10 and control animals.

CONCLUSIONS: Piglets subjected to our MAS model and treated with CC10 had significantly lower TA TNF- α levels compared to control animals illustrating CC10's powerful anti-inflammatory properties. Other measures of inflammation and surfactant function failed to show significant differences likely due to the ability of artificial surfactant to overcome the phospholipase activity of meconium. In addition, these measures may take more than 24 h to become evident. CC10 is a promising anti-inflammatory agent.

Funded by: R43 HL073572

100

4:30pm

Fellow in Training

Quantification of Nitric Oxide Metabolites in a Newborn Piglet Model of Lipopolysaccharide-Induced Sepsis

Michael A. Padula, Ted H. Elsasser, Diane Wray-Cahen, Andrew J. Gow, Harry Ischiropoulos, Neonatology, Children's Hosp. of Philadelphia, Phila, PA; Growth Biology Lab, USDA, Beltsville, MD; CDRH, FDA, Laurel, MD.

BACKGROUND: Sepsis in newborn infants is commonly associated with systemic hypotension and varied organ perfusion. Nitric oxide (NO) and NO-derived metabolites, specifically S-nitrosothiols & nitrite, are recognized to play an important role in vascular regulation. Dynamic changes in these metabolites in neonatal sepsis have not been reported.

OBJECTIVE: We aimed to validate analytical methods of biologic samples and to detect the selectivity, dynamic & linear range of response among a variety of NO-containing compounds via several methods of reductive chemistry.

DESIGN/METHODS: To quantify levels of S-nitrosothiols & nitrite in plasma, potassium iodide/iodine (KI₃) in acetic acid and sodium phosphate buffered Cu(I)/cysteine were employed in conjunction with gas-phase chemiluminescence. These reductive chemistries were evaluated in terms of selectivity, dynamic and linear ranges of response for different NO-containing compounds +/- 1% sulfanilamide (SNA) in acetic acid and/or 2% HgCl₂ treatment. Plasma was from 4 wk-old Yorkshire/Poland-China piglets harvested at 0, 1, 2, 4, 6 & 8 hrs following 10µg/kg lipopolysaccharide administration via IP injection.

RESULTS: Detection of S-nitrosothiols was equivalent among the KI₃ and Cu(I)/cysteine methods for synthesized adducts & biological samples. Variability was <10% with lower limits of detection of ~100nM & a linear dynamic range extending to 100µM. Nitrite was detected in the KI₃ system but not with Cu(I)/cysteine. 8 hrs after induction of sepsis a significant decline in systemic levels of S-nitrosothiols as compared to the baseline control was observed (341±86 vs. 164±16, n=3). In contrast the levels of nitrite remained unchanged (966±228 vs. 975±182 n=4).

CONCLUSIONS: S-nitrosothiol detection with the Cu(I)/cysteine system is equivalent in sensitivity and precision to the KI₃ system and may be preferred for detection of low molecular mass and protein S-nitrosothiols in biological samples since need for treatment with acidified SNA to remove nitrite is eliminated. Steady state levels of S-nitrosothiols progressively decline after sepsis in newborn piglets without a change in levels of nitrite suggesting that these species may be readily consumed in the systemic circulation during sepsis.

101

5:00pm

Neonatal Resuscitation in Lambs with 100%O₂ Decreases Pulmonary Vasodilator Response to Inhaled Nitric Oxide (NO) and Acetylcholine (ACh)

Satyan Lakshminrusimha, Frederick C. Morin III, Robin H. Steinhorn, Daniel D. Swartz, Rita M. Ryan, Sylvia F. Gugino, Bobby Mathew, Karen A. Wynn, James A. Russell, Pediatrics, Physiology & Biophysics, SUNY, Buffalo; Pediatrics, Northwestern University, Chicago.

BACKGROUND: The optimal FiO₂ of the gas used for neonatal resuscitation is controversial. We have previously shown that resuscitation with 100% O₂ increases contractility of isolated pulmonary arteries (PA) in neonatal lambs [Lakshminrusimha et al, Ped Res in press].

OBJECTIVE: To study the effect of ventilation with 100%, 50% and 21% O₂ on in vivo PA responsiveness in near-term lambs.

DESIGN/METHODS: 141d gestation lambs were delivered by C-section and ventilated with 100%, 50% or 21% O₂ for 30 min (n=4, 3 & 3 respectively) and then weaned to 21% O₂. Pulmonary vascular resistance (PVR) and PA pressure were continuously recorded. Subsequently, after 60 min of ventilation with 21% O₂, an IV infusion of thromboxane analog U46619 at 1µg/kg/min was started and when PVR increase was stable, inhaled NO at 20ppm was administered for 10min. After recovery from NO, and on U46619 infusion, ACh at 1µg/kg/min was infused through the PA over 10 min.

RESULTS: 100% O₂ resuscitation resulted in a greater decrease in PVR at 5min compared to 21% O₂ (0.17 ± .01 vs. 0.36 ± .06 mmHg/ml/kg/min, p<0.05). However, by 30 min the decrease in PVR was similar between all the groups. U46619 infusion resulted in a larger increase in PVR in lambs exposed to 100% O₂ compared to 50% or 21% O₂ (table). Inhaled NO (20 ppm) during U46619 infusion resulted in greater decrease in PVR in the 21% and 50% O₂ compared to 100% O₂ group. PA infusion of ACh did not decrease PVR in 100% O₂ group, but reduced PVR by almost half in 50% and 21% O₂ groups.

CONCLUSIONS: We conclude that exposure to 100% O₂ at birth results in a greater initial decrease in PVR compared to 50% and 21% O₂ at 5 min but not at 30 min. 100% O₂ resuscitation results in subsequent increase in PA contractility and poor dilator responses to NO and ACh. We speculate that generation of oxygen free radicals during 100% O₂ ventilation is partly responsible for these responses.

PVR mmHg/ml/min/kg as a % of baseline prior to initiation of the drug

Group	U 46619 (1mg/kg/min)	NO (20 ppm)	Ach (1mg/kg/min)
21% O ₂	674 ± 141	47 ± 8*	51 ± 19*
50% O ₂	670 ± 266	64 ± 10	50 ± 12*
100% O ₂	831 ± 248	79 ± 7.7	97.2 ± 7.7

* p < 0.05 cf 100% O₂ group

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5:15pm

Fellow in Training

Resuscitation in 21% Versus 100% O₂—Effects on Arterial Blood Gases (ABG) and Antioxidant Enzyme (AOE) Activities in Preterm Newborn Lambs

A. Patel, R. M. Ryan, S. Lakshminrusimha, K. A. Wynn, L. C. Nielsen, H. Wang, V. H. Kumar, Dept of Pediatrics, SUNY, Buffalo, NY.

BACKGROUND: Current NRP guidelines propose the use of 100% O₂ for resuscitation (RES) of newborns. A reduction in mortality has been seen in infants resuscitated with room air. No studies have been done in premature infants comparing room air and 100% O₂ at RES.

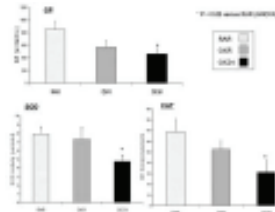
OBJECTIVE: To study the effect of RES with 100% O₂ versus 21% on ABG and AOE activity in lung homogenates (LH) in premature lambs.

DESIGN/METHODS: Preterm lambs (128 days) were delivered via C-section, intubated, given surfactant & ventilated. Prior to delivery lambs were assigned to 100% O₂ (OXR) or 21%O₂ (RAR) for the initial 30 min. After 30 min FiO₂ was changed to maintain a PaO₂ of 45-70mm Hg. A third

group of lambs (OX24) was ventilated with 100% O₂ for 24 hrs (n=5 in each group). ABGs were done every 5 min for 1st 30 min, then hourly. Blood was collected at prebirth and 24 hrs. At 24 hrs the lambs were killed & superoxide dismutase (SOD), catalase(CAT) and glutathione peroxidase(GP) activity were measured in the LH and RBC lysate. Results are expressed as mean (SEM) and analyzed by ANOVA.

RESULTS: There was no significant difference in pH, PaCO₂ or base deficit among the groups. SOD, CAT and GP activity were significantly decreased in LH in the OX24 group compared to the RAR group. In linear regression analysis lung SOD, CAT and GP activity were independently associated with alveolar oxygen content regardless of the group. There was no significant difference in RBC lysate AOE activity among groups.

CONCLUSIONS: Room air RES did not result in significant metabolic and respiratory acidosis in preterm lambs. Lung AOE activity was inversely related to alveolar oxygen exposure. We speculate that this lack of upregulation in enzyme activity after hyperoxic exposure may contribute to the development of BPD in preterm infants (Funded by AAP / NRP grant to VHk).



103

5:30pm

MMP-2 and MMP-9 Activity in Lung Homogenates Following Resuscitation in Room Air or Oxygen in Term and Preterm Newborn Lambs

Vasanth H. Kumar, Daniel D. Swartz, Anupama Patel, Lori C. Nielsen, Huamei Wang, Karen A. Wynn, Rita M. Ryan, Department of Pediatrics (Neonatology), State University of New York, Buffalo, NY.

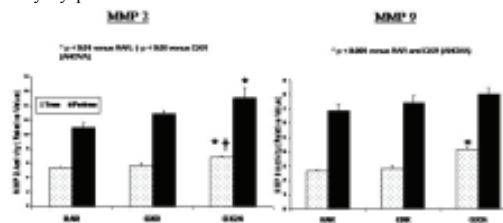
BACKGROUND: Hyperoxia contributes to oxidative stress and lung injury in infants. Matrix Metalloproteinases (MMPs) degrade and remodel extracellular matrix (ECM) in lung injury. Relationships between resuscitation (RES) in room air or oxygen and MMP activities in the lung are not clear.

OBJECTIVE: To measure MMP-2 and MMP-9 activity in lung homogenates (LH) in term and preterm newborn lambs following RES in RA and O₂.

DESIGN/METHODS: Term (139d) and preterm (128d) lambs were delivered by C-section, intubated and ventilated immediately after birth, randomized to 100% O₂ (OXR) or 21% (RAR) [N=6 in each group] for 30 min. After 30min, the FiO₂ in both groups was altered to target PaO₂ of 45-70 mm Hg. A third group of lambs was exposed to 100% O₂ for 24 hrs (OX24). All lambs were killed at 24 hrs and MMP-2 and MMP-9 activity were measured by gelatin zymography in lung tissues. Results are expressed as mean (SEM) and were analyzed by ANOVA.

RESULTS: In term lambs, MMP-2 and MMP-9 activity was significantly higher in the OX24 group compared to RAR and OXR group (see figure). In preterm lambs, MMP-2 activity was significantly higher in OX24 compared to RAR group. Overall, MMP-2 and MMP-9 activities were significantly increased with lower gestational age (p < 0.0001) and with hyperoxia independent of the groups (p < 0.002) (two-way ANOVA).

CONCLUSIONS: Prematurity and O₂ exposure for 24 hours are independently associated with higher MMP-2 and MMP-9 activity. Higher MMP activities following O₂ exposure in preterm infants presumably contributes to ECM remodeling, and may predispose to development of broncho-pulmonary dysplasia in these infants.



Predictors and Mechanisms of Disease Platform Session

Saturday, March 18, 2006

4:00pm-5:45pm

104

4:00pm

Do TNFα Polymorphisms Predict BPD?

Sonya S. Strassberg, Ioana A. Cristea, Dajun Qian, Nora Ali, Jason A. Herrick, Lance A. Parton, Pediatrics, Division of Neonatology, New York Medical College, Maria Fareri Children's Hospital of Westchester Medical Center, Valhalla, NY; Biostatistics, City of Hope National Medical Center, Duarte, CA.

BACKGROUND: BPD is the most common chronic lung disease of infancy. A "New" BPD has been characterized in preterm infants that may begin *in utero*, and then progress post-natally, resulting in arrested lung development and alveolar hypoplasia, with relatively less contributions from the "Classical" ventilation-induced lung injury and oxygen toxicity. Foundations for this "New" BPD may be derived from pro-inflammatory genes including tumor necrosis factor-α (TNFα), which may have the dual capability of disrupting preterm lung development during inflammation. **OBJECTIVE:** SNPs of the pro-inflammatory TNFα gene place preterm infants at increased risk for BPD.

DESIGN/METHODS: Infants (105) with birthweights ≤ 1 kg, who survived to at least 36 weeks postmenstrual age (PMA) or discharge were enrolled into this study. They were stratified for BPD according to their need for supplemental oxygen at 28 days and at 36 weeks PMA (Non-, Mild, Moderate, or Severe BPD). DNA was extracted from buccal swabs and analyzed for the TNF α SNPs: -1031, -863, -857, -308, and -238. The PHASE software (version 2.1) was used to reconstruct haplotypes and estimate their frequencies within the study population. Linkage disequilibrium between pairs of SNPs were quantified using D' statistic. Relationship between BPD severity and each common haplotype with 10 or more copies was evaluated using Wilcoxon rank-sum test.

RESULTS: Differences in antenatal steroid administration, in birth weight and gestational age (all $P < 0.001$), but not in racial distribution between the groups were found. Linkage disequilibrium between all pairs of loci indicated 2 SNP blocks at loci (-1031, -863, -857) and (-308, -238). Haplotype-specific analysis revealed no significant association between BPD severity and any of the 5-marker common haplotypes with 10 or more copies in this study population. Additionally, no significant association was observed in any 3-SNP haplotypes at (-1031, -863, -857) and 2-SNP haplotypes at (-308, -238).

CONCLUSIONS: No association between BPD severity and the 5 TNF α SNPs was found. Joint analysis with other candidate genes as well as the use of family data may improve the power in association analysis between BPD severity and genetic foundations from the TNF α gene.

105 4:15pm

Single Nucleotide Polymorphisms of IL8 (-781) and Autistic Spectrum Disorders

John W. Harrington, Nora Ali, Patrick Maffucci, Ioana A. Cristea, Lance Parton, Pediatrics, New York Medical College, Valhalla, NY; Neonatology, New York Medical College, Valhalla, NY.

BACKGROUND: Autism is a neuro-developmental disorder of both genetic and non-genetic origin. Activation of the inflammatory response system-mediated through increased production of pro-inflammatory cytokines has been proposed to be associated with the manifestations of autism. Variable cytokine expression may be genetically controlled by single nucleotide polymorphisms (SNPs), which may trigger an exaggerated level of cytokine mediator expression. **OBJECTIVE:** To determine the SNP frequency for the pro-inflammatory cytokine gene of IL8 (-781) in patients with autistic spectrum disorders (ASDs)

DESIGN/METHODS: A buccal swab was obtained on family cohorts of ASD patients over the age of two and (unaffected parents or unaffected sibling over the age of three). DNA was isolated followed by PCR SNP analysis. ASD was diagnosed by a developmental pediatrician utilizing the DSM-IV criteria and/or an autism screening test (CARS or ADOS). Each subject also completed a brief questionnaire that inquired about: sex, age, ASD type, overall health, illnesses, hospitalizations, medications, and ethnicity.

RESULTS: 34 subjects and 34 controls were obtained for testing. Subjects represented 25 males and 9 females with a mean age of 6.7 years (range 2-16). 59% Caucasian, 24% Mixed, 9% Middle Eastern, 6% Central/South American, and 3% African American. ASD diagnosis were 12/34 with classic autism, 5/34 with aspergers, and 17/34 with PDD-NOS. Genotype frequency and stratification for IL-8 SNP (-781) are shown in the tables. 24% of subjects had a history of asthma. PCR-SNP analysis was not successful on all samples.

CONCLUSIONS: IL8 (-781) polymorphism has a significantly higher genotype frequency in this population of ASD patients. The higher frequency of asthma in subjects may be a confounding factor.

IL-8 (-781) SNP				
ASD	CC (wildtype)	CT (hetero)	TT (homo)	Total
0	10	9	2	21
1	2	4	1	7
2	1	2	0	3
4	3	5	3	11

$p=0.058$, IL8 (-781) SNP, stratified by ASD category

IL8 (-781), Genotype Frequency			
ASD	CC	CT	TT
Absent	10	9	2
Present	6	11	4

$p=.008$

106 4:45pm

Shared Genetic Susceptibility to Retinopathy of Prematurity (ROP) and Bronchopulmonary Dysplasia (BPD)

Matthew J. Bizzarro, Naveed Hussain, Rui Feng, Jeffrey R. Gruen, Heping Zhang, Vineet Bhandari, Pediatrics, Yale University School of Medicine; Pediatrics, University of Connecticut School of Medicine; Biostatistics, University of Alabama at Birmingham; Epidemiology and Public Health, Yale University.

BACKGROUND: Besides immaturity of the target organs, ROP and BPD share environmental risk factors such as oxygen exposure.

OBJECTIVE: We hypothesized that, in addition to the environmental factors, there is a genetic susceptibility to ROP and BPD. In addition, ROP and BPD are significant predictors of each other.

DESIGN/METHODS: A retrospective study was performed using premature twins born at ≤ 32 weeks gestational age (GA) (1994-2004) from 2 centers. Only infants who survived beyond 36 weeks postmenstrual age (PMA) were included. ROP was diagnosed by an experienced pediatric ophthalmologist while BPD was defined as the need for oxygen supplementation at 36 weeks PMA in association with characteristic radiographic changes. Zygosity data were obtained by placental examination with gender confirmation. Data analysis was performed using mixed effect logistic regression analyses and latent variable probit modeling.

RESULTS: 61 monozygotic (MZ) and 127 dizygotic (DZ) twin pairs were identified and analyzed. Demographic data for birth weight (BW), GA, gender, respiratory distress syndrome (RDS), BPD, ROP, duration of ventilation and supplemental oxygen use, and length of stay were comparable between MZ and DZ twin pairs. While 51% of babies with BPD had ROP, 58% of infants with ROP had BPD. For ROP, GA ($p=0.01$, OR 0.59; 95% CI 0.41-0.85) was a significant independent variable. For BPD, BW ($p=0.02$, OR=0.998, 95%CI=0.996-1.0), RDS ($p=0.001$, OR=24.77, 95%CI=5.15-119.06), and institution ($p<0.003$, OR 4.86, 95% CI 2.12-11.13) were significant. After controlling

for covariates, genetic factors accounted for 67% ($p<0.0001$, 95%CI 35%-99%) of the variance in liability for ROP and 75% ($p<0.0001$, 95% CI 49%-100%) for BPD. Furthermore, ROP and BPD were significant predictors of each other.

CONCLUSIONS: Besides shared environmental factors, there is a strong, shared genetic predisposition to ROP and BPD.

107 5:00pm

Urine Proteomic Biomarkers Distinguish Steroid-Sensitive (SSNS) and Steroid-Resistant (SRNS) Idiopathic Nephrotic Syndrome (INS) of Childhood

Robert P. Woroniciecki, Ibrahim F. Shatat, Frederick J. Kaskel, Tatyana N. Orlova, Edmond O'Riordan, Michael S. Goligorsky, Children's Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY; Renal Institute, New York Medical College, Valhalla, NY.

BACKGROUND: Unrelenting proteinuria is associated with progression to chronic kidney disease. Response to steroid therapy, defined as disappearance of proteinuria, is the most accurate predictor of favorable outcome in children with nephrotic syndrome.

OBJECTIVE: Based on the known differences between SSNS and SRNS we investigated if the application of a new technological platform to examine the urine proteome, surface enhanced laser desorption and ionization mass spectroscopy, would permit the non-invasive prediction of these syndromes.

DESIGN/METHODS: Twenty-five patients with INS and 17 control patients were enrolled in this cross sectional study. Albumin depleted, midstream urines were analysed using surface enhanced laser desorption and ionisation and mass spectroscopy (SELDI-MS). Data was analysed using multiple bioinformatic techniques. Patient classification was performed using Biomarker Pattern Software and a generalized form of Adaboost.

RESULTS: Urinary proteomic data distinguished INS from control patients with a sensitivity of 92.3%, specificity of 93.7%, positive predictive value of 96% and negative predictive value of 88.2%. Perfect classification of patients as SSRS or SRNS was achieved (See table. PPV/NPV=positive/negative predictive value).

A protein of mass 4144Da was identified as the most important classifier in distinguishing SSRS from SRNS. Two further peaks selected from the list of important variables characterized the SSNS group: 2802 and 8054, whereas a single peak of 5121 was also specific for the SRNS group. A protein of mass 4144Da was identified as the single most important classifier in distinguishing SSRS from SRNS.

CONCLUSIONS: SELDI-MS combined with bioinformatics can identify different proteomic patterns in INS. Characterization of the proteins of interest identified in our proteomic approach and their prospective clinical validation may yield a valuable clinical tool for non-invasive prediction of treatment response and prognosis.

	Disease (biopsy)	Control (clinical)	Error rate
Disease (predicted)	10	0	0
Control (predicted)	0	10	0
Sensitivity	100	PPV	100%
Specificity	100	NPV	100%

108 5:15pm

Fellow in Training

Expression Profiles as Predictors of Bronchopulmonary Dysplasia in Extremely Low Gestational Age Newborns

Jennifer N. Cohen, Yao Sun, Linda Van Marter, Alan Leviton, Elizabeth Allred, Isaac Kohane, Neonatal/Perinatal Medicine, Children's Hospital Boston, Boston, MA; Neonatology, Kaiser Permanente Santa Clara, Santa Clara, CA; Neurology, Harvard Medical School, Boston, MA; Neuroepidemiology, Children's Hospital Boston, Boston, MA; Informatics, Children's Hospital Boston, Boston, MA.

BACKGROUND: Approximately half of all infants born before the 28th week of gestation develop bronchopulmonary dysplasia (BPD). Inflammatory regulators appear to be involved in the development of BPD both antenatally and postnatally. Postnatal factors contributing to BPD include hyperoxia, hypoxia, infection, patent ductus arteriosus, oxygen toxicity and barotrauma from mechanical ventilation.

OBJECTIVE: To evaluate to what extent RNA expression profiles in umbilical cord tissue distinguish between infants who do and do not develop BPD

DESIGN/METHODS: Flash frozen pieces of umbilical cord were available from 21 infants born before gestational age 28 weeks who developed BPD (defined as oxygen dependent at 36 weeks postmenstrual age), and from 34 of their peers who did not develop BPD. RNA extraction and microarray hybridization were performed at the core laboratory at Children's Hospital Boston. **RESULTS:** Infants who developed BPD had decreased umbilical cord expression of mitochondrial membrane, energy metabolism (oxidative phosphorylation, citric acid cycle), RNA synthesis, and DNA repair gene sets. These genes were also expressed at lower levels in those with the lowest gestational age. We are not yet able to distinguish gestational age correlates from insult/response contributions to BPD pathogenesis.

CONCLUSIONS: Expression profiles evident at the time of birth provide a meaningful window into the physiologic development of extremely low gestational age newborns. Expression profiling is likely to help identify pathways that contribute to the evolution and development of BPD.

109 5:30pm

Fellow in Training

Is Proximity to a Nuclear Power Plant Associated with Increased Rates of Congenital Malformations?

Tania Mangones, Paul Visintainer, Cheryl Hunter-Grant, Heather L. Brumberg, Pediatrics, Division of Neonatology, Westchester Medical Center, Valhalla, NY; Epidemiology, New York Medical College, Valhalla, NY.

BACKGROUND: The recent revelations of radiation leaks at the Indian Point nuclear power plant have raised public concerns as to the safety of nuclear reactors and the potential consequences of exposure to ionizing radiation. Animal studies have shown increases in malformations with exposure to ionizing radiation, however, in humans the effects of chronic low dose ionizing radiation exposure are unclear.

OBJECTIVE: To determine whether residential proximity to a nuclear power plant is associated

with increased prevalence of certain congenital cancers, congenital anomalies, genetic syndromes, low birth weight, and prematurity.

DESIGN/METHODS: NY State Department of Health Vital Statistics and Congenital Malformations Registry databases from 1992-2001 were collected for 5 Hudson Valley counties in a 20-mile radius from the Indian Point nuclear plant. Four zones of 5-mile increments based on zip codes were created to reflect proximity to the reactor. Data included congenital leukemia, CNS neoplasms, congenital hypothyroidism, neural tube defects, cleft lip, cleft palate, microcephaly, trisomies 13,18,21, low birth weight (<2500g) and prematurity (<37 wks). Standardized rate ratio (SRR) was used to compare prevalence of total anomalies between the Hudson Valley Region and NY State. Poisson regression, adjusting for population size, was used for analysis of birth defects in relation to nuclear plant proximity.

RESULTS: Over the 10 year period 633 malformations in 603 children were identified from a birth population of 322,528; yielding a rate of 1.96 malformations per 1,000 births in the Hudson Valley Region. This rate was lower than the NY State rate of 5.4 malformations per 1,000 births [SRR=0.365, 95% CI 0.334-0.391]. The prevalence of defects, prematurity and low birth weight in the Hudson Valley Region were not significantly related to proximity to the nuclear power plant.

CONCLUSIONS: The congenital malformations identified in the areas surrounding the Indian Point nuclear power plant did not substantiate an association between proximity of the reactor and the occurrence of birth defects. This study provides baseline population data for comparison of the occurrence of malformations in the event of a nuclear plant accident.

General Pediatrics II: Attitudes and Perceptions of Caregivers and Caretakers Platform Session

Saturday, March 18, 2006

4:00pm-6:00pm

110

4:00pm

Undergraduate Student

Parent Attributions for Difficulties Experienced by Children with ADHD

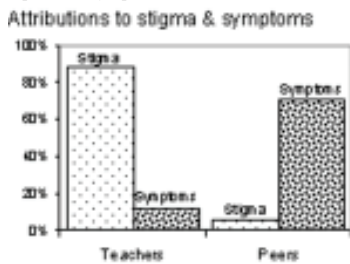
Bridget Perrin, Leandra Godov, Chris Sheldrick, Ellen C. Perrin, Biological Sciences, Tufts University, Medford, MA; Developmental-Behavioral Pediatrics, Floating Hospital for Children, Tufts New England Medical Center, Boston, MA.

BACKGROUND: ADHD is the most common neuropsychiatric condition of childhood, affecting 5-10% of the school-age population. ADHD often receives critical media attention, and parents of children with ADHD report being acutely aware of stigmatizing attitudes towards their children. Negative attitudes may be based on stereotypes about the nature and implications of the condition (ADHD) itself, and/or on discomfort with the disruptive behaviors often associated with it.

OBJECTIVE: To understand how children and their parents experience stigma associated with ADHD, and to what they attribute it (stereotype vs. behavior).

DESIGN/METHODS: Using a semi-structured protocol, we interviewed 17 parents of children between 8 and 18 years old who had a diagnosis of ADHD. Parents were asked several open-ended questions about the child's experiences with peers, siblings, and at school, and to report about specific positive and negative experiences related to having the diagnosis of ADHD. Reports of negative experiences were coded with particular attention to parents' attributions for these experiences.

RESULTS: All 17 parents reported that their children had negative experiences associated with ADHD. Parents were far more likely to attribute negative experiences with teachers to stigma associated with stereotypes about ADHD (88%) than to its symptoms (12%), and to attribute negative experiences with peers to symptoms of ADHD (71%) than to stereotypes (6%).



CONCLUSIONS: From the perspective of many parents, both *stigma associated with the 'label' of ADHD and the disruptive symptoms of ADHD* contribute to pervasive negative experiences their children encounter. Parents' attributions regarding the source of these experiences differ by context.

111

4:15pm

Fellow in Training

Parental Beliefs on Overweight and Lifestyle Changes in Latino and African-American Early School Age Children

Shuba Kamath, Carolyn Rosen, Richard Adams, Danielle Laraque, Pediatrics, Mount Sinai School of Medicine, New York, NY; Division of Health Policy, New York Academy of Medicine, New York, NY.

BACKGROUND: The prevalence of childhood overweight is increasing at alarming rates across the country and disproportionately affects minority children. Understanding parental perceptions of overweight and assessing parents' readiness to modify certain lifestyle behaviors are important in formulating culturally-specific strategies in the treatment and prevention of overweight.

OBJECTIVE: To assess the beliefs of parents of minority early school age children on nutrition and physical activity using the framework of the Health Belief Model (HBM). The components of the HBM include a) perceived severity (PS) b) perceived benefits (PB) c) perceived barriers (PB2) d) cues to action (CA) e) perceived self-efficacy (PSE).

DESIGN/METHODS: This is an ongoing, cross-sectional, prospective study using a self-administered survey in a convenience sample at an urban primary care pediatric practice. Children

ages 5 to 10 without significant medical history presenting for a medical visit were included. The survey includes questions on the five components of the HBM. The child's weight and height were collected by chart review.

RESULTS: 146 eligible subjects were approached; 107 (73%) participated. 100/107 had complete data. 84% of the respondents were mothers. 54% were Latino; 39% were Black. 41% of the children had a BMI > 85%, 25% had a BMI > 95%. Parents who scored higher on the PS scale were more likely to have a child with a BMI >85% (p<0.05). Parents who had a higher score on the PSE scale were more likely to have a child with normal weight (p<0.05). Parents who scored higher on the PB scale were more likely to report intention to make a behavior change (p=0.05).

CONCLUSIONS: Latino and Black children in this urban practice have high rates of overweight. These results suggest that parents of overweight children may understand the serious consequences of childhood overweight but have low self-efficacy in making healthy nutrition and activity choices for their child. Therefore, effective interventions to treat and prevent overweight may need to emphasize increasing self-efficacy in parents.

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4:30pm

Medical Student

Pediatric Healthcare Provider Beliefs Regarding Low-Level Lead Exposure and Adverse Effects in Children

Rachel E. Outterson, Vinay K. Aakalu, Nathan Graber, Maida Galvez, Deborah Vasquez, Ray Combill, Community and Preventive Medicine, Mount Sinai School of Medicine, New York, NY; Family, Community and Preventive Medicine, Wyckoff Heights Medical Center, Brooklyn, NY.

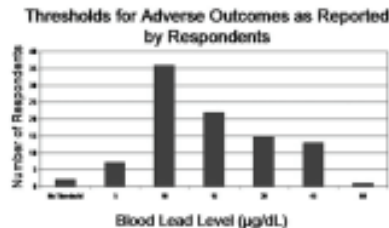
BACKGROUND: Only 66% of NYC children have a blood lead level (BLL) measured at 1 or 2 years old. It is unclear if pediatric health care providers' (HCPs) knowledge and beliefs about lead poisoning influence BLL screening practices.

OBJECTIVE: To investigate knowledge and beliefs that may influence BLL screening by inner-city HCPs in at-risk communities.

DESIGN/METHODS: A 30-question, self-administered, anonymous survey was delivered to HCPs in East Harlem and Bushwick, NY.

RESULTS: Of 99 HCPs surveyed, 88% (n=87) consider an "elevated BLL" to be < or =10 µg/dL, the CDC's definition of a level of concern. However, 52% (n=51) of HCPs do not believe that adverse effects of lead poisoning are seen at this BLL. Chi square analysis shows this high threshold does not differ by neighborhood, practice type, specialty, number of patients/week or years in practice. HCPs with a high threshold to expect adverse effects are more likely to agree that "low level lead poisoning has few or no significant adverse health effects" and that this is a barrier to their BLL screening (p = .007). In a self-assessment, only HCPs from this group rated their knowledge of lead poisoning screening and treatment "comprehensive".

CONCLUSIONS: Pediatric HCPs in inner-city practice are aware of the CDC's BLL of concern yet many do not think this level is associated with adverse outcomes in children. This belief may create a barrier to screening. Targeted educational efforts stressing the adverse effects of low-level lead poisoning are needed to increase blood lead screening and ensure appropriate response to low-level lead poisoning. The self-estimation of comprehensive knowledge in some HCPs may pose a challenge to such efforts.



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4:45pm

Bright Futures Health Supervision Guidelines Encounter Forms for Families Did Not Increase Parental Participation in Well-Child Care

Eugene Dinkevich, Pam Sass, Anne Skamai, Departments of Pediatrics, SUNY-Downstate College of Medicine, Brooklyn, NY; Department of Family Medicine, SUNY-Downstate College of Medicine, Brooklyn, NY.

BACKGROUND: Anticipatory guidance (AG) is recommended for health promotion during well child care (WCC). Previous research has shown that parents want information about psychosocial issues, while physicians prefer to talk about medical issues. Bright Futures Health Supervision Guidelines developed Encounter Forms for Families (EFF) to help increase parental participation in WCC and focus AG discussions on psychosocial issues.

OBJECTIVE: The objective of this study was to determine EFFs effectiveness in increasing parental participation in AG.

DESIGN/METHODS: We conducted a randomized, controlled study of WCC visits for children 2-30 months at an inner-city resident continuity clinic. Fifty residents were randomized to the intervention or control group. In the intervention group, EFFs were given and explained to parents prior to WCC visits. Control group received standard WCC and no EFFs. Residents were audiotaped 1 or 2 times. Roter Interaction Analysis System was used to quantify AG topics and who (physician or parent) initiated the discussion. AG was classified into 8 mutually exclusive topics. Inter-rater reliability for AG topics was 0.87. Thirty two residents per group were required to obtain 80% power to detect a moderate effect size. Group differences were tested with univariate parametric (t-tests) and non-parametric (Wilcoxon Mann-Whitney) statistics as appropriate.

RESULTS: Seventy six WCC visits were audiotaped and analyzed, 36 in the intervention group and 40 in the control group. For all visits, the mean visit length was 26.7 min with 7.5 min spent on AG. The mean number of AG topics discussed per visit was 5. Nutrition, development and immunizations were each discussed in 98% of visits. Safety was discussed in 79%, family issues in 72%, sleep in 52%, oral health in 19%, and discipline in 10%. Overall, parents initiated 18% of AG discussions. When EFFs were given to parents, there were no differences in the length of time spent on AG, the number of topics discussed, or the proportion of AG initiated by parents.

CONCLUSIONS: EFFs were not effective in increasing parental participation in AG. We found that overall, parents initiated few AG discussions. More research is needed to find effective ways to increase parental participation in WCC.

114 5:15pm

House Officer

The Prevalence and Correlates of the Use of Over-the-Counter Cough and Cold (OTCC) Medicines in Asthmatic Children in South Bronx

Maria Andrea Alano, Sameera Haroon, Delsa Compres, Ronald Bainbridge, Ayoade Adeniyi, Richard Neugebauer, Anantha Harjithi, Department of Pediatrics, Bronx-Lebanon Hospital Center, Bronx, New York City; Albert Einstein College of Medicine, Bronx, New York City.

BACKGROUND: Although studies failed to demonstrate any benefit of OTCC medications for asthma, many patients still use these before or in combination with the regular asthma medications. Limited data exist regarding the frequency and correlates of use of these medications in asthmatic children. South Bronx has the highest rate of asthma prevalence among children in the city of New York with hospitalization rate four-fold higher in the low income neighborhoods.

OBJECTIVE: To determine the prevalence sociodemographic and clinical correlates of use of OTCC medications among asthmatic children below 19 years old living in the South Bronx.

DESIGN/METHODS: A cross sectional survey of 140 asthmatic patients was conducted. Information collected included socio-demographic characteristics, the type of health insurance, use of OTCC medications for treatment of asthma and/or coughs and colds. All variables were compared between users and non-users of OTCC medications.

RESULTS: Majority of respondents were Hispanics (70%), 81% on Medicaid, 58% of the children under age 8 years, and 40% of caregivers under 30 years. By caregiver or patient's report, 46% of the children have well controlled and 51% poorly-fairly controlled asthma. Severity of asthma was mild in 69% and moderate or severe persistent in 30%. Eighteen percent of all patients admitted to having used at least one of the OTCC medications for asthma exacerbation within the last year. Of those with mild intermittent asthma, 9.4% used OTCC medications compared to 38% with severe persistent asthma. Patients with more severe asthma used OTCC more frequently ($p < .01$).

CONCLUSIONS: Our findings suggest that a substantial proportion of patients and caregivers of asthmatic children give OTCC medications for asthma exacerbations. Severity of asthma was directly related to the frequency of OTCC use. Further study is warranted to delineate in detail the correlates of inappropriate OTCC use.

115 5:30pm

House Officer

Use of Complimentary and Alternative Therapies in an Hispanic Immigrant Inner City Population

Ranjini Chugh, Margarita Fermin, Candace Erickson, Pediatrics, St. Barnabas Hospital, Bronx, NY; Pediatrics, Columbia University College of Physicians and Surgeons, New York, NY.

BACKGROUND: 12-21% pediatric patients use CAM. These samples have only 2-5% Hispanics. Immigrants may come from cultures where CAM practices are common, so knowing their use of such practices is helpful.

OBJECTIVE: To determine the use of specific CAM practices in our largely Hispanic immigrant pediatric population. We hypothesized that there would be higher rates of CAM use in children whose caregivers had used CAM, had a child with a chronic illness, and were recent immigrants. DESIGN/METHODS: A structured interview assessing demographics, children's ongoing medical problems and use of CAM modalities was administered by bilingual research assistants to a convenience sample of female caretakers of 4 - 18 yr olds presenting to 3 inner city general pediatric clinics on specified days during July - August 2005. Statistical analysis was performed using SPSS version 11.

RESULTS: 101 female caregivers (94% mothers) were interviewed. The children were 53.9% male, with a mean age of 9.2 yrs. 86.3% were Hispanic and 9.8% African-Americans. 76.2% of caregivers were NOT born in the US. Of those, the mean years in US was 12. The mean highest grade completed was 10.4. 38.6% of the mothers worked. 52% had children with ongoing medical problems. 23.5% had children with asthma.

37% of mothers reported that their children used at least 1 CAM modality. 30% used home remedies, 18% herbs and 12% prayer healing. 1-4% used chiropractic, massage, acupuncture, spiritual healing or naturopathy. Parents only reported using CAM modalities for their children that they had used themselves. All parents reporting use of a CAM modality for themselves or their child found it helpful.

Use of CAM by children in this population was highly correlated with the mother's use of CAM ($r=.70$, $p<.001$), but was not significantly related to age or sex of the child, mother's age, country of birth, years since immigration, ethnicity, educational level, employment status, or having a child with an ongoing medical problem or with asthma.

CONCLUSIONS: Reported use of CAM (mostly home remedies, herbs and prayer healing) by inner city, immigrant, Hispanic pediatric patients is higher than has been reported in other populations. The use of CAM in these children is highly correlated to use of CAM by the caregiver, but not with other variables.

116 5:45pm

House Officer

Custody Concerns: Parental Wills in an Inner-City Pediatric Clinic

Mathew H. Baldasaro, Cheryl D. Tierney, Pediatrics, Baystate Children's Hospital, Springfield, MA.

BACKGROUND: It is generally accepted that parents should make end of life plans that help ensure appropriate care of their children in the event of their own deaths. However, the number of parents who have actually performed this task is unknown. Such preparations may be even more important in an inner-city as crime rates are high, and many children live in single-parent homes.

OBJECTIVE: Specific aims of this study were (1) to identify the proportion of parents/guardians attending our pediatric clinic who have a will or guardianship, (2) to assess parental desire for information, and (3) to identify predictors of readiness to complete a will or guardianship.

DESIGN/METHODS: 109 questionnaires available in English and Spanish were distributed to parents/guardians bringing children to our pediatric clinic.

RESULTS: 98 questionnaires were completed and analyzed. The age range of responders was 16-70 years with a mean of 31.6 (SD=9.2). 56% of responders identified themselves as a single parent and the most common ethnicity was Hispanic (72%). 5% of responders had completed a will or guardianship, while 26% of parents revealed they would not want their child going to the other parent in the event of their own death. Being uninformed about wills decreased with greater parental age from a rate of 63% for 16-19 year olds, to 36% for 20-29 year olds, 21% for 30-39 year olds, 14% for 40-49 year olds, and 0% for 60 year olds and older (MH χ^2 , $p<0.01$). 72% of responders would like free information about wills and guardianships. Having been in a serious accident predicts both having completed a will or guardianship and readiness to complete one in the next 30 days (Fisher's Exact Test, $p=0.02$ and 0.03 respectively).

CONCLUSIONS: While only a small percentage of parents have a will, the majority of parents would like more information to be provided by their pediatrician. The importance of this is emphasized by the fact that a significant percentage of parents would not want their child going to the other parent in the event of their own death. Our data suggest that younger parents are less informed about wills, are pre-contemplative, and thus represent a potential target group for a simple information-based intervention. However, our data also suggest that parents who have been in a serious accident are more ready to complete a will and thus represent a target group for an action-based intervention such as providing them with a legal action kit.

Poster Session II

Saturday, March 18, 2006

6:00pm-7:30pm

117 Poster Board 1

House Officer

Transitional Medicine: How We Train Emergency Physicians To Care for Adults with Congenital Heart Disease

Keith P. Cross, Karen A. Santucci, Pediatric Emergency Medicine, Yale New Haven Children's Hospital, New Haven, CT.

BACKGROUND: Currently in the US, approximately 85% of children with significant congenital heart problems survive to adolescence and adulthood. This survival rate represents a dramatic improvement in the medical and surgical care of adult congenital heart disease (ACHD) during the last 35 years. Nevertheless, these patients remain at increased risk for significant cardiac problems long after primary interventions are completed. They are more likely than the general population to seek urgent medical care, often in an emergency department (ED) setting. They represent a new and growing population of ED patients with a specialized set of problems not traditionally part of the training for Emergency Medicine (EM) physicians.

OBJECTIVE: We investigated the current scope and status of training for EM physicians in the acute management of congenital heart disease patients as they grow to adolescence and adulthood. DESIGN/METHODS: We conducted two cross-sectional surveys to assess the current training environment for two specific groups: (1) US general emergency medicine (GEM) residency programs, and (2) US and Canadian pediatric emergency medicine (PEM) fellowship programs. Surveys were mailed to program directors during the summer of 2005. 198 surveys were sent out: 134 to GEM residency directors, and 64 to PEM fellowship directors.

RESULTS: The response rate overall was 67%, with a 64% response rate from the GEM residency directors, and 75% from the PEM fellowship directors. Across all programs, 43% (55 of 129 respondents) were "Unsure" about the existence or location of an ACHD clinic in their area. When asked to rate the importance of ACHD as a training topic, 39 of 46 PEM fellowship directors (85%) and 62 of 84 GEM residency directors (74%) ranked it as "Low priority" or "Unnecessary". However, 69 of 126 respondents (55%) were "Unsure," "Uncomfortable," or "Worried" about the ACDH training their trainees receive (PEM - 58% and GEM - 53%). Additionally, most program directors (75%) estimated that their trainees care for five or fewer ACHD patients annually.

CONCLUSIONS: There appears to be a mismatch between the growing need for ACHD emergency care, and the current training of both GEM residency and PEM fellowship programs.

118 Poster Board 2

Correlation Between Carboxyhemoglobin and Fetal Hemoglobin

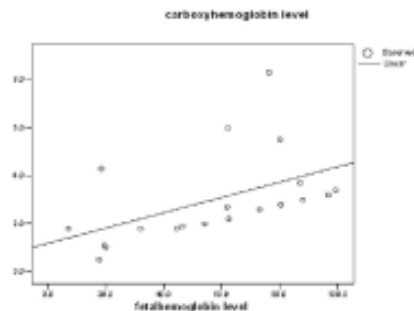
Allen L. Hsiao, Karen A. Santucci, M. Douglas Baker, Carl R. Baum, Pediatrics, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Carbon monoxide (CO) poisoning is often unrecognized: symptoms are non-specific and may not be detected on exam. Laboratory evaluation is the only way to accurately measure carboxyhemoglobin (COHb) levels. Laboratory medicine literature reports fetal hemoglobin (HbF) may interfere with the accurate measurement of COHb. However, little clinical literature exists; ill-appearing infants have received hyperbaric treatment for ultimately falsely elevated COHb delaying antibiotic administration. The potential for a poor outcome is high as HbF has a higher affinity for CO. Recent literature suggests SIDS may be related to CO poisoning. OBJECTIVE: A pilot study to explore the correlation between age, percent HbF, and percent COHb in infants.

DESIGN/METHODS: A prospective convenience sample of infants 0 to 167 days age presenting to an urban Pediatric ED. To minimize confounding factors, infants were enrolled only during temperate months and if without risk factors for CO exposure (i.e., second-hand smoke, other exposure). Blood samples were sent to the lab for analysis of percent HbF and percent COHb. Analysis of preliminary data in this ongoing study was performed using Spearman Bivariate Correlations with SPSS 12.0 (SPSS, Inc.).

RESULTS: From June 2005 through August 2005, 21 infants (57.1% male, 42.9% female) age 5 to 112 days of age were enrolled. Twenty matched samples of blood were available for analysis. HbF ranged from 7% to 99.4%; COHb ranged from 0.5% to 8.3%. Bivariate analysis of age, HbF and COHb revealed statistically significant correlation between HbF and COHb ($\rho = .661$, $p = 0.002$) and negative correlation between age and COHb ($\rho = -0.635$, $p = 0.002$). Analysis confirmed expected negative correlation of age with HbF ($\rho = -0.868$, $p < 0.001$).

CONCLUSIONS: Preliminary results indicate a linear correlation between measured percent fetal hemoglobin and percent carboxyhemoglobin.



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Poster Board 3

House Officer

Apnea Hypopnea Index (AHI) Is a Marker of the Sleep Disturbance in Children with Obesity

Shalaka Indulkar, Radhika Purushothaman, Viral Gala, Amrit Bhangoo, Sunil Sinha, Margarita Smotkin, Irina Kazachkova, Henry Anhalt, Michael Marcus, Svetlana Ten, Pediatrics, Maimonides Infants and Children's Hospital, Brooklyn, NY; Pediatric Endocrinology, Saint Barnabas Medical Center, Livingston, NJ.

BACKGROUND: The incidence of sleep apnea among obese children is reported to be around 30%. AHI is the average number of apneas and hypopneas per hour.

OBJECTIVE: The objective of our study was to determine the prevalence of sleep apnea among obese children and determine the relation between AHI, obesity and sleep.

DESIGN/METHODS: The records of 67 children referred for polysomnography based on obesity and history of snoring were analyzed. Children were divided into 3 groups: group 1 (n=20), with mild sleep apnea (AHI <15 events/hour), group 2 (n=29) with moderate sleep apnea (AHI 15-30 events/hour) and group 3 (n=18) with severe sleep apnea (AHI >30 events/hour).

RESULTS: 70% of children with obesity and snoring already had moderate to severe sleep apnea at 11.5 ± 3.8 yrs of age. Only 13% had mild sleep apnea with AHI <5. Group 3 had higher arousal index, awakening index, desaturation index, percentage of sleep time (%ST) with oxygen saturation (O₂SAT) <90% compared to groups 1 and 2. Group 3 had higher BMI than group 2. Group 3 had lower vitamin D, mean O₂SAT, %ST with O₂SAT >89%, than group 1 and 2. It had lower sleep efficiency than group 2 and lower minimum O₂SAT than group 1. There were no differences in age, lipid profile, glucose, insulin, HbA1c, leptin, blood pressures, and liver function tests between the groups. There was a tendency to higher leptin level, HbA1c and diastolic BP in group 3 (p=0.07). AHI had negative correlation with vitamin D, sleep efficiency and % ST with O₂SAT >90% (p < 0.01). AHI correlated positively with %ST with O₂SAT <90% and with total desaturation index (p < 0.01). BMI correlated negatively with mean O₂SAT, the %ST spent with O₂SAT >90% and positively with % ST with O₂SAT 80-89% (p < 0.05). Insulin resistance index Quicki had a negative correlation with AHI in stage 2 of sleep, but a positive correlation with awakening index (p < 0.05).

CONCLUSIONS: 70% of obese children had moderate to severe sleep apnea by 11 years of age with decreased O₂SAT during sleep and abnormal sleep architecture. Severe sleep apnea was seen in 27% of obese children and was associated with higher BMI, insulin resistance and low vitamin D levels.

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Poster Board 4

Fellow in Training

Lamotrigine and Phenytoin, but Not Amiodarone, Impair Peripheral Chemoreceptor Responses to Hypoxia

E. Vincent S. Faustino, David F. Donnelly, Department of Pediatrics, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Amiodarone (Amio), lamotrigine (LTG) and phenytoin (PHT) inhibit a persistent sodium current (INaP) in neurons caused by channel transitions from inactive to open states. Previously, we demonstrated that inhibition of INaP by riluzole impairs action potential (AP) generation in carotid body (CB) chemoreceptors and the ventilatory response to acute hypoxia.

OBJECTIVE: To determine the effect of therapeutic levels of Amio, LTG and PHT on the peripheral chemoreceptor response to hypoxia *in vitro* and hypoxic ventilatory response *in vivo*

DESIGN/METHODS: APs of single axonal fibers were recorded using suction electrodes advanced into the petrosal ganglion of an *in vitro* rat peripheral chemoreceptor complex (CB/carotid sinus nerve/glossopharyngeal nerve/petrosal ganglion). AP frequency (at pO₂=150 and pO₂=90), conduction time, duration and amplitude were measured before and during perfusion with Amio, LTG, PHT or vehicle. Hypoxia-induced catecholamine secretion within the CB (an index of presynaptic glomus cell function) was measured using amperometry. Respiration at room air and at 12% O₂ or 5% CO₂, before and after IP administration of Amio, LTG, PHT or vehicle was measured in rats using whole body plethysmography. Serum drug levels were measured via HPLC.

RESULTS: LTG (10 μM) and PHT (5 μM), but not Amio (5 μM), decreased AP frequency compared to vehicle-treated complexes without affecting the other AP parameters or magnitude of CB secretion. Likewise, LTG (5 mg/kg) and PHT (10 mg/kg) blunted the ventilatory response to hypoxia but not to hypercapnia. In contrast, Amio neither altered chemoreceptor activity *in vitro* nor ventilatory response to hypoxia or hypercapnia. Mean drug levels were therapeutic.

CONCLUSIONS: LTG and PHT impair peripheral chemoreceptor function and ventilatory response to acute hypoxia, probably through an action on the afferent nerve terminals. In contrast, Amio had no effect on hypoxia transduction. These results are consistent with INaP serving an essential function in chemoreceptor AP generation and that its inhibition leads to a diminished ability to sense low O₂. Amio, in contrast, does not impair chemoreceptor function at therapeutic dosages, suggesting a reduced effect on INaP.

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Poster Board 5

Medical Student

Fecal ASCA Measurements in the Assessment of Pediatric Patients with Known or Suspected Crohn's Disease

V. Tang, T. R. Walker, T. M. Saslowsky, K. Ong, K. Tygrett, J. H. Boone, P. A. Rufo, Center for Inflammatory Bowel Disease, Children's Hospital Boston, Boston, MA; Techlab, Inc., Blacksburg, VA. **BACKGROUND:** Non-invasive clinical tests are being used in the diagnosis and assessment of patients with Inflammatory Bowel Disease (IBD). Previous studies have shown that serum anti-*Saccharomyces cerevisiae* antibodies (ASCA) can be measured in 40-60% of adult and pediatric patients with Crohn's disease (CD). Elevated serum ASCA titers are found in less than 5% of patients with ulcerative colitis (UC). Antibodies are secreted into the gastrointestinal tract via biliary excretion or receptor mediated transport. We hypothesize that measuring secreted ASCA in the stool of patients may help clinicians with a non-invasive method of screening for CD in patients with symptoms suspicious of IBD.

OBJECTIVE: To examine the utility of measuring fecal ASCA levels as a screening measure for CD in pediatric patients with known or suspected IBD.

DESIGN/METHODS: 60 patients aged ≤18 years (22 female, 38 male), including 38 patients with CD, 6 with UC, 2 with indeterminate colitis, and 14 healthy controls submitted specimens. Diagnosis of IBD was based on endoscopic, radiologic, and histologic findings. Fecal samples were diluted 1:10 and analyzed using a qualitative ASCA ELISA immunoassay. A spectrophotometer using an optical density of 450 nm was employed and results ≥0.150 were considered positive. Samples were measured blinded of a subject's diagnosis.

RESULTS: 58% (22/38) of patients with CD tested positive for ASCA, and 50% (3/6) patients with UC tested positive for fecal ASCA. No control subjects tested positive for fecal ASCA. Fecal ASCA displays sensitivity and specificity values of 58% and 85%, respectively, with a positive predictive value of 88% in identifying CD in pediatric patients with known or suspected IBD.

CONCLUSIONS: The prevalence of antibodies to ASCA appears to be comparable in stool or serum. The specificity of serum ASCA testing is superior to that measured in the feces. However, the positive predictive value of fecal ASCA testing in pediatric patients with CD is comparable to that reported in previous serum-based studies. Fecal ASCA testing offers the advantage of being inexpensive and noninvasive. Along with other diagnostic assays, such as those for fecal lactoferrin, fecal ASCA testing may prove useful for the assessment of pediatric patients suspected for having IBD.

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Poster Board 6

Expedited HIV-Testing in the Labor and Delivery Setting: The Use of Rapid HIV-Testing in a South Bronx Community Hospital

Claudia J. Alvarado, Laura Daugalaite, Carlos Barahona, Caroline A. Nubel, Kelly Monaghan, Marilyn Crane, Stefan Hagmann, Murli U. Purswani, Department of Pediatrics, Bronx-Lebanon Hospital Center (BLHC), Bronx, NY; Department of Ob/Gyn, BLHC, Bronx, NY.

BACKGROUND: As of November 2003, New York State Department of Health (DOH) reduced its requirement for reporting back results of expedited HIV-testing (ExpHIV) to labor and delivery (L&D) from 48 to 12 hours. This led to the replacement of the HIV enzyme-linked immunosorbent assay (ELISA) with any of the current FDA-approved rapid HIV diagnostic tests (RapHIV). Rapid testing of women and/or their infants in the peripartum period is viewed as a means to screen women with unknown HIV status providing increased opportunity to offer timely intervention to reduce perinatal HIV transmission.

OBJECTIVE: To describe the frequency and reasons for ExpHIV and to determine the positive-predictive value (PPV) of RapHIV in L&D.

DESIGN/METHODS: Data was abstracted retrospectively utilizing the L&D log book, the ExpHIV log book and the hospital's computerized laboratory reporting system from 11/1/2004 to 10/31/2005. Reactive RapHIV (OraQuick, OraSure Technologies) was confirmed by ELISA and western blot. The mother/infant pair were managed as HIV-infected/HIV-exposed respectively pending confirmation, according to DOH guidelines.

RESULTS: During the 12-month period, 2885 women delivered and 276 (9.6%) received ExpHIV, yielding an average number of 23 tests/month (range 9-35). The breakdown of reasons for ExpHIV were available for 119 patients (6/1/05 to 10/31/05). Of these 75.6% was for non-availability of prenatal records (PR), 16.8% due to lack of prenatal care, 1.7% due to need for repeat testing and 5.9% for no prior test. RapHIV was reactive in 8 instances and confirmed in 7, yielding a PPV of 87.5%. The prevalence of HIV in women delivering at this hospital for this period was 47 of 2885 (1.6%).

CONCLUSIONS: Most women undergoing ExpHIV at this hospital had prior testing in other institutions. False-positives (FP), though unlikely, may occur. Implementing a universal system allowing immediate access to PR will reduce the number of ExpHIV performed, and consequently, FP. This is important because of stress to parents undergoing counselling and testing in a vulnerable situation, and the emotional trauma associated with preliminary management of a mother/infant pair with a FP result.

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Poster Board 7

RSV Genotype and Severity of Disease in Children

Richard A. Martinello, Issac Lazar, Carla Weibel, Eugene D. Shapiro, Jeffrey S. Kahn, Internal Medicine, Yale University, New Haven, CT; Pediatrics, Yale University, New Haven, CT.

BACKGROUND: There are 2 subgroups of respiratory syncytial virus (RSV), A and B, and isolates from each subgroup may be further divided into multiple genotypes. Previous investigation has suggested RSV subgroup and genotype is associated with severity of disease.

OBJECTIVE: To determine if there is an association between RSV genotype and severity of disease

DESIGN/METHODS: We conducted a matched case-control study in which cases were children with RSV disease who were admitted to the Pediatric Intensive Care Unit (PICU) at Yale-New Haven Hospital. Controls had RSV disease but received solely outpatient care. Up to 2 controls were matched to each case by season and age. Patients were excluded if they had a co-morbid risk factor for severe RSV disease, received PICU care for a reason other than severe RSV disease, the medical record or RSV genotype result was unavailable or if no suitable control was matched. RT-PCR was used to amplify the RSV G gene from each isolate. Subgroup and genotype was identified by phylogenetic analysis of the RSV G nucleotide sequence.

RESULTS: From 10/01/00 to 5/30/04, 1733 patients were diagnosed with RSV of which 98 (6%) received PICU care and 737 (43%) received solely outpatient care. There were 37 eligible cases (38%) and 54 matched controls; 56% of all subjects were < 6 months-old. RSV subgroup A was identified in 25 cases (68%) and 37 control-patients (69%) ($P=0.877$). RSV A genotypes A2, A3 and A4 were identified from 10 (26%), 13 (35%) and 2 (5%) case and 24 (44%), 10 (19%) and 3 (6%) controls, respectively. RSV B genotypes B1, B2 and B3 were identified from 1 (3%), 4 (10%) and 7 (18%) case and 9 (17%), 6 (11%) and 2 (4%) controls, respectively. There was a trend for genotypes A3 (OR 2.1, $P=0.152$) and B3 (OR 3.8, $P=0.114$) to be found more frequently in the case group and for genotype B1 (OR .17, $P=0.097$) to be more frequent in the control group. **CONCLUSIONS:** No statistically significant association between either RSV subgroup or genotype was found. Additional studies of the association between genotype and severity of RSV disease may be warranted.

124 Poster Board 8

Fellow in Training

A Computer-Based, Multivariate, Economic Analysis of Neonatal-Intensive-Care-Unit-Based Influenza Vaccine Administration to Parents in a Low-Socio-Economic, Urban Setting

Shetal I. Shah, Martha Caprio, Pradeep V. Mally, Karen Hendricks-Munoz, NICU, NYU School of Medicine, New York, NY.

BACKGROUND: Trivalent inactivated influenza (TIV) vaccine has been shown to reduce the number of influenza-related outpatient visits and hospitalizations in children up to 24 months of age. The AAP and CDC recommend TIV to first-person contact of infants less than 6 months of age. Yet, the economic implications of using the NICU to capture the parents of these infants has not been evaluated.

OBJECTIVE: To determine the direct and indirect costs of a program to administer influenza vaccine to parents in the NICU in a cohort of tertiary care units serving a primarily low socio-economic population.

DESIGN/METHODS: Probabilities of hospitalization and efficacy of prophylaxis were based on published results where possible with an estimated 10% reduction in hospitalization for parents of patients who received vaccine. Variables in the three and four-tiered analysis included presence of chronic lung disease, estimated presence of siblings, vaccination status of siblings, sero-conversion rate of vaccine and parental vaccination status. 2632 patients were analyzed using 2003 admission data from the New York City Regional Perinatal Center encompassing 11 Level III NICUs. Hospitalization costs, indirect costs, and outpatient costs were assessed using previously published standard calculations.

RESULTS: On the basis of this computer-model, costs were \$188.05 per patient-per-influenza-season, including \$6.80 per-patient in outpatient costs. This increased to 191.30 per patient when parental medical savings were included. Administration of NICU-based influenza vaccine increased costs to \$200.46 per-patient-per-influenza-season, but decreased outpatient costs to \$1.40 per-patient. The cost rose to \$201.14 per patient upon inclusion of parental medical savings. For cost-savings to equal costs of vaccine administration, either a 20% reduction in hospitalization for infant of vaccinated NICU patients must be achieved or the sample size per influenza season must increase to 3,215 patients.

CONCLUSIONS: The cost of influenza vaccine administration to NICU parents was higher than the financial burden of influenza in this population. Cost-savings do not occur until the treated cohort increases to 3,215 patients. Further studies will eliminate the estimates used in the study and more accurately assess financial savings

125 Poster Board 9

Fellow in Training

Is Urinary Transforming Growth Factor beta-1 (TGF- β 1) a Useful Biomarker in Idiopathic Nephrotic Syndrome (INS) of Childhood?

Ibrahim F. Shatat, Edmond O'Riordan, Frederick J. Kaskel, Robert P. Woroniecki, Pediatric Nephrology, Children's Hospital at Montefiore of the Albert Einstein College of Medicine, Bronx, NY; Renal Institute, New York Medical College, Valhalla, NY.

BACKGROUND: The response to steroid therapy is used to characterize the INS of childhood as either steroid sensitive (SSNS) or steroid resistant (SRNS). Factors that can contribute to the differences between the two groups remain unknown.

Based on our prior data using protein microarray chips which showed greater urinary cytokine expression in SSNS as compared to SRNS and controls (Cs), we attempted to quantitate TGF- β 1 levels by analyzing urine samples from the same patient population.

OBJECTIVE: To confirm and quantitatively measure the differences in urinary TGF- β 1 levels between SSNS, SRNS and Cs.

DESIGN/METHODS: To determine differences in urinary TGF- β 1 between SSNS, SRNS and Cs, with a cross sectional study design and using ELISA we re-analyzed the urine samples of 30 patients from our previous patient population; SRNS (n=9), SSNS (n=11), and C (n=10).

Urinary TGF- β 1 levels (pg/ml) corrected for urine creatinine (mg/dl) did not follow a normal distribution and values are presented as medians \pm SEM. Non-parametric tests were used to test for statistical significance.

RESULTS: Mean age, gender, glomerular filtration rate (calculated using the Schwartz formula), and body mass index were not statistically different between the groups. Urine protein to creatinine ratios were 0.19 \pm 0.12 in SSNS vs. 4.1 \pm 3.4 in SRNS, $P=0.0013$.

Using protein microarray chips, median urinary TGF- β 1 levels corrected to urinary creatinine in SSNS and SRNS were higher by 4.7 X, 1.3 X above C respectively, $P=0.003$, however, when measured by ELISA, SSNS and SRNS median urinary TGF- β 1 levels (pg/ml) corrected to urinary creatinine were 0.33 (5.8 X), 0.02 (1.9 X) greater than Cs respectively, but did not reach statistical significance, $P=0.28$.

CONCLUSIONS: Protein microarray chips showed differences in urinary cytokine profiles and TGF- β 1 levels between SSNS and SRNS and Cs. Using ELISA, urinary TGF- β 1 levels trended to correlate with the array results, but were not statistically significant. This discrepancy may be related to smaller sample size, test sensitivity, and the small differences in TGF- β 1 (pg/ml) between the three groups.

126 Poster Board 10

Characteristics of Pulmonary Hypertension (PH) in Infants < 37 Week Gestation (GA)

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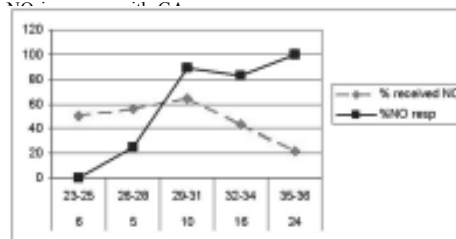
BACKGROUND: Characteristics of premature infants who developed PH and their response to nitric oxide (NO) are not well described.

OBJECTIVE: To identify risk factors for PH in infants < 37 week GA and specifically to evaluate their response to NO.

DESIGN/METHODS: A retrospective chart review was conducted of all infants < 37 wks GA from 6/2000 to 10/2005 who had echocardiographic diagnosis of PH in the first 4 weeks of life & a comparison non-PH group generated matched for GA & birthdates. Data on prenatal & postnatal characteristics, response to NO, and mortality were collected. NO responders were defined by an increase in PaO₂ by \geq 20 mm Hg on NO. Univariate analysis was done by t test, chi square or Fisher exact test. Factors with p values < 0.2 by univariate analysis were included in stepwise logistic regression.

RESULTS: There were 61 PH infants and 149 non-PH infants with an average GA of 32 wks. The percent of infants who received NO and who responded to NO are presented in the figure, with the n noted for each GA group. Percent responders is significant by ANOVA. Variables that were significantly associated with PH were lower apgar1 and apgar5, less antenatal steroids, RDS, PDA, sepsis, hypotension, premature prolonged rupture of membranes (PPROM), oligohydramnios (oligo), pulmonary hypoplasia & higher birthweight (bw). On stepwise logistic regression, bw, apgar5, sepsis, hypotension, oligo & pulmonary hypoplasia were independently associated with PH (all < 0.01). Mortality was 26% (16/61) in the PH group and 5.3% (8/149) in the non-PH group ($P=0.000$).

CONCLUSIONS: Low apgar score at 5 min, Oligohydramnios and pulmonary hypoplasia are associated with the development of PH in premature infants. Majority of premature infants with PH respond to conventional therapy. Infants < 25 wk GA are refractory to NO, and the incidence of responders to NO is significantly lower.



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Fellow in Training

Comparison of Pulmonary Outcomes in a Premature Cohort: O₂ Requirement at 36 Weeks GA, Outpatient Diuretic Use, and Respiratory Readmissions

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BACKGROUND: Pulmonary sequelae of prematurity include respiratory readmissions and diuretic dependence after NICU discharge. An O₂ requirement at 36 wks adjusted GA is a standard surrogate endpoint for long-term pulmonary morbidity.

OBJECTIVE: We tested whether the same risk factors are associated with these 3 respiratory endpoints, as well as the associations between the endpoints themselves.

DESIGN/METHODS: We conducted a cohort study of infants \leq 32 weeks GA and BW < 1250g enrolled in the NO CLD multicenter randomized trial of inhaled nitric oxide who had presented to a 12-mo follow-up visit as of Oct. 05. We constructed logistic and Poisson regression models adjusting for BW.

RESULTS: 323 infants met criteria: 56% required O₂ at 36 wks, 24% received outpatient diuretics, and 20% had at least 1 respiratory (wheezing or infection) readmission (range 0-10 readmissions/patient). O₂ at 36 wks was associated with diuretic use ($p<0.001$, positive predictive value 34%, negative predictive value 90%), but not with respiratory readmission rate. Rate of readmission was increased in infants with a family history of asthma ($p=0.001$), black ($p<0.001$) or Hispanic ($p=0.028$) mothers, and a steroid course in the NICU ($p=0.035$), and decreased with prenatal care ($p=0.035$) and multiples ($p=0.002$). There was no association between readmission and sex or PRSS (peak respiratory severity score, MAP x FIO₂, age 4-10 days). Diuretics were associated with higher PRSS ($p=0.03$) and steroids in the NICU ($p=0.038$), but not with the other risk factors. Odds of O₂ at 36 wks increased with higher PRSS ($p<0.001$) and steroid exposure in the NICU ($p<0.001$), decreased in females ($p=0.012$) and Hispanics ($p=0.022$), and were not associated with the other risk factors.

CONCLUSIONS: O₂ at 36 wks was a poor predictor of diuretic use and respiratory readmission in this cohort. The 3 endpoints tested had different risk factor profiles, suggesting overlapping but unique causal pathways. Respiratory outcomes should be studied directly and individually, as opposed to solely relying on O₂ status at 36 wks or grouping outpatient morbidities into a composite pulmonary outcome measure.

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Fellow in Training

Ventilator Associated Pneumonia in a High Risk NICU Population

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BACKGROUND: Very few studies exist on Ventilator Associated Pneumonia (VAP) in the newborn population. A previous study in our NICU identified infants \leq 29 wk GA at greatest risk. **OBJECTIVE:** To describe the risk factors and outcomes associated with VAP in babies \leq 29 wks GA in the NICU.

DESIGN/METHODS: All infants \leq 29 weeks GA admitted to the NICU at John Dempsey Hospital between July 1 2002 and June 30, 2004 who required assisted ventilation for \geq 48 hrs were identified using a patient database. Their medical records were reviewed for demographic data, signs and symptoms of VAP as defined by the National Nosocomial Infections Surveillance System (NNIS),

prenatal and perinatal factors including: maternal PIH and chorioamnionitis; use of prenatal steroids and perinatal antibiotics; presence and treatment of RDS and PDA, total ventilator days and duration of ventilation before development of VAP. Outcomes reviewed were bronchopulmonary dysplasia (BPD), retinopathy of prematurity (ROP), necrotizing enterocolitis (NEC), periventricular leukomalacia (PVL), length of stay (LOS) and death. Infants with congenital anomalies, genetic syndromes, congenital pneumonia or who died before 28 days of life were excluded from the study. Statistical comparison was made between the infants who developed VAP and those that did not. RESULTS: 357 infants with GA \leq 29wks were admitted during the study period. 155 required mechanical ventilation for \geq 48hrs. 27 infants met exclusion criteria. Results were analyzed for 128 infants. 24 infants met NNIS criteria for VAP. Rate of VAP was 19% or 4.25/1000 ventilator days. Mean GA and BW was lower for infants with VAP vs no VAP (25.6 \pm 2.2wk vs 27 \pm 3.1wk, $p < 0.01$; 826 \pm 153g vs 968 \pm 257g, $p = 0.01$). Total ventilator days and LOS was longer in the VAP group (36d vs 17d, $p < 0.01$; 108d vs 89d, $p < 0.01$). There was a linear increase in incidence of VAP after 7 days of intubation. BPD was significantly associated with VAP (83% vs 60% $p = 0.03$). Mortality was 8% in the VAP group vs 2% in the no VAP group, $p = 0.13$. After controlling for GA, total ventilator days was significantly increased by development of VAP ($p < 0.005$). CONCLUSIONS: Risk factors for VAP in preterms are low GA and prolonged mechanical ventilation. VAP is associated with increased incidence of BPD. This underscores the need for increased efforts toward earlier extubation and the use of non invasive ventilation techniques in this high risk population.

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Poster Board 13

House Officer

Prophylactic Fluconazole Therapy for Very Low Birth Weight Infants Colonized with *Candida*

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BACKGROUND: There has been an increase in the incidence of invasive Fungal Infection in VLBW infants likely due to the increased survival of VLBW infants and the invasive nature of NICU care they need. Review of our internal database revealed increased incidence of candida sepsis in BHMC during 2002-2003 compared to Vermont Oxford data. We decided to use fluconazole prophylaxis only in colonized VLBW infants to limit exposure to the drug. OBJECTIVE: To reduce the morbidity and mortality of the VLBW infant colonized with *Candida* by fluconazole prophylaxis.

DESIGN/METHODS: During 07/04 to 06/05 surveillance cultures were performed for fungal colonization in all infants weighing less than 1500g at birth and weekly thereafter. Prophylactic fluconazole was instituted at a dose of 3mg/kg every 48 hrs in colonized infants for 6 weeks or when wt reached 1500g. Fungal blood cultures were taken if infant showed signs of sepsis. We compared a baseline period (1/02-5/04) with intervention period (7/04-6/05) of fluconazole prophylaxis given to colonized VLBW infants. The two study groups were similar in demographic characteristics.

RESULTS: During intervention period the incidence of invasive candidiasis decreased from 12.1% to 8.2% and cases per 1000 patient days decreased from 2.1 to 1.6.

Multiple regression analysis showed the decrease in *Candida* sepsis was not significant. Significant changes of colonization with non-albicans *Candida* was noted. No adverse effects of Fluconazole therapy were noted.

CONCLUSIONS: Fluconazole prophylaxis for colonized VLBW infants may decrease invasive candida sepsis. Colonized ELBW infants is the subgroup identified by our study to benefit most by the prophylaxis. Multicenter randomized trial for further defining inclusion criteria for prophylaxis is needed.

Comparison of Neonatal Outcome (%)

	Preprophylaxis period	Post prophylaxis period	P value
Infants #	141	85	
Candida Sepsis	17(12)	7(8)	0.50
Late Bacterial Sepsis	53(38)	27(31)	0.41
NEC	3(2)	0(0)	0.00
Oxygen @ 36wks	32 (23)	13(15)	0.19
LOS (day)	57.6 \pm 36	54.5 \pm 31	0.21
Mortality	22(15.6)	8(9)	0.10

Candida sepsis differences by birthweight subgroup

	Preprophylaxis VLBW	Prophylaxis ELBW	VLBW	ELBW
Infants #	72	69	48	37
Surveillance positive	-	-	1	6
Candida Sepsis #(%)*	3(4)	14(20)	1(2)	6(16)

* $p < 0.025$

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Poster Board 14

Fellow in Training

Outbreak of Parainfluenza Virus Type 3 in a Neonatal Intensive Care Unit

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BACKGROUND: Parainfluenza (PIV) is a paramyxovirus, causes $>30\%$ of all acute respiratory infections in infants and children and has a pleomorphic presentation as croup (PIV1 & 2) or more commonly as bronchopneumonia & bronchiolitis (PIV-3). PIV-3 is found endemically with outbreaks in Spring and Summer and is atypical as it is commonly acquired < 6 mo postnatal life, at an age where maternal antibodies would otherwise attenuate PIV1&2 infections. In the NICU, PIV outbreaks are uncommon, and mortality is unusual unless accompanied by immune compromise and lower respiratory tract invasion.

OBJECTIVE: We describe an outbreak of PIV-3 in 3 neonates hospitalized in a regional perinatal center.

DESIGN/METHODS: PIV-3 was identified and control measures were implemented including isolation of affected infants, cohorting of exposed infants, contact precautions and viral surveillance cultures (Cx) of exposed infants and symptomatic health care workers (HCWs).

RESULTS: In July 2003 a 5 mo old, 28 wk GA infant with short gut syndrome and liver failure developed cough, nasal congestion and a new requirement for O_2 . He required intubation 3 days after presentation for CO_2 retention, was treated with Ribavirin at 5d but died on day 12. His mother had a URI prior to presentation of neonatal signs. One week later, a 6-wk old intubated 30 week GA male with multiple congenital abnormalities and fungal sepsis residing in the same room, developed increasing O_2 requirements. Viral Cx on Case #2 was +, but negative in 7 other exposed, asymptomatic room-contacts; HCW's were all negative. One additional 33 wk neonate in the same room was discharged from the NICU at postnatal day 8, one day before the index case presented. She was readmitted with apnea and URI symptoms and was found to be PIV-3 Cx + and later discharged home.

CONCLUSIONS: PIV-3 is an uncommon pathogen in the NICU. Despite the contagious nature of this virus and its long period of infectivity, the spread of the outbreak was limited to one geographical area of the NICU. Ribavirin had no apparent salutary effect. When faced with a case of URI symptoms or sudden unexplained respiratory compromise, especially in the setting of a patient who is immune-compromised or with coexisting morbidities, a high index of suspicion for PIV-3 should be raised, cohorting implemented and cultures obtained.

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Poster Board 15

Fellow in Training

Infection-Induced Placental Inflammatory Responses: Does the Type of Organism Matter?

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BACKGROUND: Infections induce increased levels of pro-inflammatory cytokines, which have been implicated in the pathogenesis of preterm labor. Conversely, anti-inflammatory cytokines, such as IL-10, may exert tocolytic effects. It is unclear whether the type of organism causing uteroplacental infections determines the relative expression of pro- and anti-inflammatory cytokines. OBJECTIVE: In these studies, we compared the placental inflammatory response induced by bacterial lipopolysaccharide (LPS, endotoxin from gram-negative bacteria), lipoteichoic acid (LTA, a cell wall component of gram-positive bacteria) and heat-killed *Gardnerella vaginalis* (GV). We hypothesize that the responses to these agents are distinct and that they can be modulated by IL-10 treatment.

DESIGN/METHODS: Cultured placental explants from term samples collected before the onset of labor were treated with LPS, LTA or GV, with or without IL-10, for 24 hours. The treatment doses for LPS, LTA and GV were selected by determining the concentrations of each agent required to induce PGE2 production comparable to that of explanted tissues obtained from placentas after the onset of labor. COX-2 expression and cytokine production were quantified by immunohistochemistry, western blot, Bio-Plex™ array (panel of 17 cytokines), and quantitative PCR.

RESULTS: LPS, LTA and GV treatments strongly induced PGE2 in placental explant cultures. All of the 17 cytokines tested were expressed in the placenta, except for IL-5, IL-7 and IL-17. LPS, LTA and GV treatments all significantly increased the production of pro-, relative to anti-inflammatory cytokines, but this effect was more pronounced with LPS treatment. Interestingly, GV treatment induced significantly greater expression of IL-6 than LPS or LTA. Moreover, while IL-10 down-regulated the production of most inflammatory cytokines in response to all three agents, it only reduced GV-induced production of IL-6. IL-6 production in response to LPS and LTA was not affected by IL-10.

CONCLUSIONS: These findings demonstrate that placental infections by different organisms appear to activate different signaling pathways, triggering distinct cytokine responses. We speculate that the efficacy of IL-10 as a tocolytic agent in infection-mediated preterm labor may be dependent on the cause of the infection.

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Poster Board 16

Placental Pathology in Asymptomatic Infants Screened for Early-Onset Sepsis

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BACKGROUND: Group B streptococcus (GBS) is a significant cause of early-onset sepsis. Despite CDC guidelines and implementation of intrapartum antibiotic prophylaxis (IAP), cases of early-onset GBS (EOGBS) continue to occur. Efforts to evaluate asymptomatic infants with intrapartum clinical risk factors (RF) remain important but inconsistent, likely related to absence of universal guidelines for management. Reviewing placental pathology in these infants may contribute to refining guidelines.

OBJECTIVE: To determine the relationship between markers for sepsis in asymptomatic infants and placental histologic evidence of chorioamnionitis (CA) and fetal inflammatory response (FR).

DESIGN/METHODS: Retrospective chart review of asymptomatic infants ≥ 35 weeks GA screened for sepsis in our nursery between January-June 2005. Clinical history, lab data including infant CBC with immature to total (I/T) ratio and blood culture (Bcx), and placental pathology grading CA and FR for severity were reviewed.

RESULTS: 124 infants with at least one clinical RF, mean GA 39 weeks, and mean BW 3340g were included. RF included mothers screened GBS positive with IAP < 4 hours prior to delivery (IGBS) (N=19, 15%), maternal temperature 38-38.4°C (N=51, 41%), rupture of membranes ≥ 18 hours (PROM) (N=38, 31%), and clinical CA (N=36, 29%). 3 cases of EOGBS were identified from positive Bcx (all screened GBS negative). Abnormal I/T ≥ 0.2 were noted in 12/124 infants (10%). Placental CA (PCA) was noted in 54/124 infants (44%) and was moderate to severe in 22 (18%). PCA and severe FR occurred more often with maternal temperature $\geq 38^\circ C$ present than without (53% vs. 22%, $p = 0.01$ and 70% vs. 30%, $p = 0.01$), with clinical CA than without (61% vs. 36%, $p = 0.025$ and 33% vs. 10%, $p = 0.01$), and with abnormal I/T than without (75% vs. 40%, $p = 0.025$ and 58% vs. 12%, $p = 0.001$). There was no difference in PCA or FR with IGBS or PROM ($p > 0.05$).

CONCLUSIONS: Screening asymptomatic infants with CBC and Bcx identified all cases of EOGBS. Interestingly, all occurred in mothers screened GBS negative. Intrapartum maternal temperature $\geq 38.0^\circ C$, clinical CA, and abnormal I/T ratios were significantly more likely to correlate with PCA and severe FR. Evaluation of high risk asymptomatic infants for EOGBS is clinically indicated even with negative maternal GBS screening.

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Is It Safe To Keep Umbilical Vein Catheters for Longer Than 7 Days?

Nadine El-Khoury, Sulaiman Sannoh, Barbara Clones, Boriana Parvez, Pediatrics- Division of Newborn Medicine, Westchester Medical Center- Maria Fareri Children's Hospital, Valhalla, NY. **BACKGROUND:** Umbilical vein catheters (UVC) provide secure, relatively safe, less painful and cost effective intravenous access in sick neonates. CDC guidelines (2002) recommend that UVC can be used up to 14 days if managed aseptically. These recommendations were supported by epidemiological studies and theoretical rationale and not by randomized controlled trials. However, complications such as infection, portal vein thrombosis and necrotizing enterocolitis continue to be a concern. Therefore, despite these recommendations, many clinicians remain reluctant to keep UVC for longer than 7 days.

OBJECTIVE: To determine whether extended use of UVC for more than 7 days and up to 14 days is associated with increased risk of infection or NEC.

DESIGN/METHODS: We conducted a prospective observational study of all UVC in our regional perinatal center from June 1st to November 30th, 2005. We compared the incidence of catheter related sepsis and NEC, with UVC in place, between 2 groups of patients: short use UVC group (≤ 7 d) and extended use UVC group (> 7 d).

RESULTS: We identified 73 patients with UVC. BW was 1925 ± 170 g (*Mean \pm SEM*) in the short use UVC group (38% < 1000 g) vs. 1535 ± 187 g in the extended use UVC group (48% < 1000 g), $p=ns$. GA was 31.4 ± 5.7 weeks (*Mean \pm SD*) in the short use (40% < 28 weeks) vs. $30.7\% \pm 5.2$ weeks in the extended use group (43% < 28 weeks), $p=ns$. All UVC were radiologically confirmed to be in optimal position in IVC, just outside the right atrium. 50 catheters were removed at or before 7 days and 23 remained for longer than 7 days (10.6 ± 2.3 days; range 8-14 days). In the short use UVC group, UVC related sepsis rate (defined by positive blood culture with UVC in situ) was 2% (1/50) or 5.4/1000 catheter days. In the extended use UVC group, sepsis rate was 8.7% (2/23) or 8.2/1000 catheter days ($p=ns$). Incidence of NEC was 4% in each group.

CONCLUSIONS: In this small series, the extended use of UVC was not associated with significantly increased risk of infection or NEC. Therefore, we suggest that optimally placed UVC may be used safely for up to 14 days. This practice, combined with aggressive advancement of enteral feeds may prevent the need for other central venous catheters and their attendant complications and cost.

134 Poster Board 18 Fellow in Training

The Effects of Low Dose Indocin (0.1mg) Treatment on PDA Closure in VLBW Neonates

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BACKGROUND: Prophylactic dose (0.1mg/kg/dose) has been implicated in prevention of pulmonary hemorrhage and higher grades of intraventricular hemorrhage. However timing, associated morbidities and potential benefit of low dose compared to Indocin treatment dose in VLBW infants has not been fully characterized.

OBJECTIVE: 1) To determine the rate of PDA closure with different doses of indomethacin [0.1mg/kg compared to 0.2mg/kg].

2) To identify neonatal morbidity in the two groups including the risk of requiring ductal ligation. **DESIGN/METHODS:** Retrospective chart review of all infants with a birth weight of ≤ 1500 gms admitted to the Neonatal Intensive Care Unit (NICU) diagnosed with a PDA by cardiac ECHO from October 2003 to June 2005. Infants were divided into 2 groups: Group A, Infants with small PDA (≤ 1.5 mm) and Group B, infants with large PDA (> 1.5 mm).

RESULTS: There were 147 infants ≤ 1.500 gms admitted during this study period. Thirty-seven infants 25% [33/147] were evaluated at < 12 hours of life and diagnosed with PDA. Five infants received no intervention for the condition.

70% [21/30] of the neonates with ductus received low dose prophylactic indocin [0.1mg/kg] within 24hrs of life with a 90%; [19/21] closure rate. No infant had increased NEC or intestinal perforation. 30% [9/30] of infants received a treatment dose [0.2mg/kg] within 24hrs of life with a 55% [5/9] closure rate. 26% [8/30] infants received a 2nd course of Indocin. All who required a second dose required surgical ligation of their ductus. This group of neonates had a smaller mean GA and BW with increased morbidity.

CONCLUSIONS: Infants ≤ 1500 gms with symptomatic PDA requiring therapy achieved PDA closure in a majority of cases with a prophylactic dose schedule of Indocin treatment within the first 24hrs of life. All neonates requiring a second course of Indocin required surgical ligation and presented with increased morbidity. Low dose early indomethacin may be useful to effectively close most patent ductus arteriosus in this population. In addition, low dose indocin was not associated with increased morbidity including intraventricular hemorrhage, NEC or intestinal perforation.

	Ligation vs. Non-Ligation		P-Value
	Ligated	Non-Ligated	
N	10	27	
LOS (days)	85.6 ± 22.6	62 ± 25.4	0.01
O ₂ @ 36 weeks	70% [7/10]	14% [4/27]	0.01

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Hydrolyzed Protein Formula for Gut Priming in VLBW Infants

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BACKGROUND: Pregestimil is a hydrolyzed casein formula used in term neonates with milk protein allergy or postsurgically & for feeding intolerance in VLBW's. However it is not designed to meet the nutritional requirements of preterm neonates.

OBJECTIVE: To determine whether hydrolyzed casein formula ameliorates the feeding intolerance in VLBW neonates without adversely affecting somatic growth, the incidence of necrotizing enterocolitis, sepsis or biochemical rickets.

DESIGN/METHODS: We conducted a retrospective survey of VLBW babies born in a community Level III NICU. The exclusion criteria were death/transfer < 7 d of age, SGA & perforated NEC. Demographic, outcomes and nutrition data for the first 5 postnatal wks were collected in two

groups: Pregestimil (Preg) $> 80\%$ of feeds vs. Intact protein (Int) group-feeds as preterm formula or breast milk.

RESULTS: From the 63 VLBW infants born from Nov'03-Oct'05, 30 neonates met the inclusion criteria.

	Demographic & Outcome Data		
	Preg Grp	Intact Protein Grp	All
n	10	20	30
GA	27 ± 1	28 ± 2	28 ± 2
BW	0.93 ± 0.1	0.96 ± 0.2	0.95 ± 0.2
CGA at d/c	36 ± 2	37 ± 2	37 ± 2
Apgar 1/5 min	7/9	7/8	7/8
Vent days	9 ± 12	7 ± 10	8 ± 11
Sepsis	4/10	8/20	12/30
Susp NEC	2/10	3/20	5/50
Rickets	0/10	1/20	1/30

Values are mean \pm SD; Apgars as median

The growth of Preg and Int groups were: 10 ± 8 & 10 ± 7 g/kg/d from 2nd wk, increasing to 16 ± 7 & 14 ± 4 g/kg/d by the 4th wk respectively; similar to the *reference fetus*. However after the 4th wk, the Preg group exhibited slower growth velocity: 10 g/kg/d. As 7/10 Preg group infants received Preg after feeding intolerance their time to full PO feeds was 23 ± 10 vs 19 ± 10 d in Int group. However 3/20 infants in the Int group did not reach full feeds until 35d. ELBW vs. VLBW neonates showed similar results. Calcium, alk phos & albumin levels were similar weekly and at the end of the observation: [Ca: 9.7 ± 1 vs 9.5 ± 0.4 ; Alk phos: 306 ± 124 vs 315 ± 103 ; albumin: 2.6 ± 0.3 vs 2.5 ± 0.3]. The incidence of PDA, IVH, BPD & ROP was not statistically different.

CONCLUSIONS: Pregestimil can be used as a substitute formula in the first 4 postnatal wks since adequate growth can be achieved. However, subsequently, a formula designed for preterm infants is recommended or Preg should be supplemented with breast milk fortifier to make it nutritionally appropriate.

136 Poster Board 20 Fellow in Training

Autonomic Reactivity During Car Seat Testing in Preterm Infants

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BACKGROUND: The AAP recommends monitoring of preterm infants in a car seat prior to hospital discharge. During car seat placement, some preterm infants experience adverse cardiorespiratory events. Little is known about factors that predispose infants to these events. Altered autonomic activity during semi-upright tilt in the car seat may contribute.

OBJECTIVE: To evaluate heart rate (HR), heart rate variability (HRV), blood pressure (BP) and surface temperature in preterm infants during car seat testing.

DESIGN/METHODS: Continuous measurement of HR and surface temperatures from six sites (anterior fontanel, forehead, abdomen, flank, forearm and leg) and intermittent oscillometric BP measurements (every 10 min) were made in 38 preterm infants prior to discharge (BW 700-3015 g, gestational age 24-35 wk, postconceptional age 35.5 \pm 1.5 wk). Data were collected for 30 minutes with the infants in a supine position, then for 90 minutes during and 30 minutes after semi-upright tilt in the car seat. Mean values for HR, HRV, BP, and surface temperatures prior to, during and after car seat testing were compared using paired t-test.

	Autonomic activity		
	Baseline(Pre tilt)	During Tilt	p value
HR (bpm)	163 ± 11.9	165.7 ± 10.9	< 0.05
HRV (msec)	16.1 ± 4.7	14.5 ± 4.9	< 0.05
Temperature-Fontanel (°C)	33.4 ± 1.0	34.9 ± 0.8	< 0.0001
Temperature-Forehead (°C)	34.3 ± 0.4	34.6 ± 0.6	< 0.0001
Temperature-Abdomen (°C)	36.2 ± 0.4	36.5 ± 0.4	< 0.0001
Temperature-Flank (°C)	36.0 ± 0.3	36.5 ± 0.3	< 0.0001
Temperature-Forearm (°C)	33.3 ± 0.8	33.5 ± 0.9	< 0.0001
Temperature-Leg (°C)	32.8 ± 0.9	33.2 ± 0.9	< 0.0001

Similar differences in HR, HRV and surface temperatures were observed when infants were returned to a supine position following tilt. No significant differences were observed in BP measurements.

CONCLUSIONS: During semi-upright tilt in the car seat, preterm infants demonstrate higher surface body temperature indicative of vasodilation; and compensatory increase in HR with lower HRV. These changes suggest altered autonomic activity during car seat placement. We speculate that immature autonomic regulation may contribute to the adverse events that some preterm infants experience in car seats. Improved understanding of their autonomic control may help predict preterm infants at risk for these events.

137 Poster Board 21 Fellow in Training

A Unique Way of Decreasing Hospital Cost: The Infant Apnea Program

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BACKGROUND: Apnea of prematurity (AOP) is a common problem in the NICU. Length of stay (LOS) for premature infants can be prolonged due to this problem. Despite this, there is no universally accepted protocol on the appropriate discharge (d/c) of infants. The infant apnea program (IAP) with intensive oversight may be a useful method to enhance safe&early discharge of patients (pts) who present with AOP.

OBJECTIVE: Use of an IAP can assist in safely discharging pts ≤ 35 wks, decreasing LOS,&hospital cost (HC)without \uparrow readmission.

DESIGN/METHODS: A chart review was done on of all pts ≤ 35 wks d/c home to an IAP during 1/04 through 6/05. All pts ≤ 35 wks had a sleep study done prior to d/c&analysis of pre d/c clinical status. An abnormal (abn) sleep study was defined as apnea (A) ≥ 20 sec, bradycardia(B) heart rate (HR) ≤ 80 , & A ≤ 20 sec with a 33% decel in HR from baseline. Parents of pts discharged received CPR&monitor training as well as a pre instructional education by specially trained RN. The IAP

consisted of a specially trained RN & MD who are available 24/7. The parents are contacted by the IAP the day after d/c, and then followed up weekly. These pts were divided into two groups (readmit {RA}&non-readmit {NR}). RA & NR were further subdivided into those d/c with abn&nml clinical status. Abn clinical status was defined as any evidence of A's or B's 5 days prior to d/c.

RESULTS: 166 pts \leq 35wks were included in the study.

	Clinical Status Abn @ D/C	Clinical Status Nml @ D/C	
N	65	101	
GA [Mean \pm SD]	30.5 \pm 2.2	30.6 \pm 2.6	
BW [Mean \pm SD]	1522.8 \pm 425.3	1459.1 \pm 475.2	
Corrected Age [Mean \pm SD]	35.7 \pm 1.6	36.4 \pm 2.9	
# NML Sleep Study	28	65	
#RA	11%[7/65]	7%[7/101]	NS
#NR	58	94	
HC Savings NR*	\$1,398,264.00		

* Est. 7days clinical assessment before d/c; 1Cost/bed \$2,944/d & MD cost of \$500/d.

CONCLUSIONS: The use of an IAP was associated with decrease LOS & HC. All pts d/c with abn clinical findings-where in other centers might be retained for an additional 7 to 10 days-were safely discharged home to an IAP with no mortality. This suggest that pts with mild symptoms of AOP may be d/c safely under the care of an IAP leading to significant HC saving. We speculate, nationally, a savings of \$3 billion(499,008 preterm infants² x 30% x *) a year in HC if pts are d/c to IAP. The IAP provides a smooth transition from the NICU to the home.

¹NYU Billing; ²March of Dimes

138 Poster Board 22

Hemangioma and Retinopathy of Prematurity: A Possible Association

Vijayakumar Praveen, Ramesh Vidavalur, Ted S. Rosenkrantz, Naveed Hussain, Department of Neonatal Perinatal Medicine, University of Connecticut Health Center, Farmington, CT.

BACKGROUND: Since the speculation in the 1940s that ROP (retinopathy of prematurity) was a postnatally growing hemangioma of the retina, there have been many advances in its diagnosis, screening and treatment. Recent research in the role of oxygen regulated angiogenic factors like VEGF /IGF-1 in the neovascularization of ROP, lead us to speculate that elevated levels of VEGF might promote other vascular overgrowths e.g. hemangiomas (Silverman W, 2004). A recent study concluded that large hemangiomas may be associated with early or persistent retinal neovascular activity(Tawansy et al, 2005).

OBJECTIVE: To study the association between cutaneous hemangiomas and ROP.

DESIGN/METHODS: A retrospective cohort study of preterm neonates weighing <1500 gm at birth, born during the 5 year period (11/01/00-10/31/05) at John Dempsey Hospital was done using the institution's neonatal database. Data were collected on demographics (gestational age, birth weight, gender, race), presence of cutaneous hemangioma recorded on physical examination at discharge (size <1 cm or \geq 1 cm, number), ROP (highest stage diagnosed, laser therapy), and use of antenatal/ postnatal steroids. Chi-square test, t- test and multiple logistic regression analyses were used where applicable.

RESULTS: Of the 585 VLBW neonates, 90% (527/585) survived. Of the survivors, 12.5% (66/527) had cutaneous hemangiomas on physical examination at discharge. Multiple hemangiomas were present in 20 neonates and 22 had hemangiomas that were \geq 1 cm in size. ROP was present in 59% of those with hemangiomas vs. 41.9% in those without (p = 0.008). Univariate analysis showed low gestational age (p < 0.0001), low birth weight (p < 0.0001) and postnatal steroid use (p = < 0.0001) to be predictors for ROP while antenatal steroids (p = 0.25) and gender (p = 0.26) were not. Multiple logistic regression analyses controlling for birth weight, and antenatal steroids found hemangiomas to be independently associated with ROP (any stage) (p = 0.046) while the association did not hold true for postnatal steroid use. The number of hemangiomas showed a trend for association with higher severity (\geq Stage III+) of ROP (p = 0.051) while their size did not.

CONCLUSIONS: Cutaneous hemangiomas are associated with ROP (any stage). The biological mechanism of this association needs to be studied.

139 Poster Board 23

House Officer

Incidence of Periventricular Leukomalacia: Seventeen Years of Experience at a Community Hospital

Natinder Saini, Madhavi Jasti, Khaja Raziuddin, Rica Vizarra Villonco, Vesna G. Sutija, Department of Pediatrics, New York Methodist Hospital, Brooklyn, NY.

BACKGROUND: The cause of periventricular leukomalacia (PVL) is multi-factorial.

OBJECTIVE: The purpose of the study was to determine the incidence of PVL and its relationship to the magnitude of mean airway pressure and other ventilatory characteristics in very low birth weight infants.

DESIGN/METHODS: A retrospective cross-sectional study included 364 very low birth weight (VLBW) (480-1250g) infants born between June 1986-December 2004 at NY Methodist Hospital. Infants' gestational age, birth weight (BW), mean airway pressure (MAP), duration of supplemental oxygen (O₂), and use of dexamethasone were the variables of interest. The goal of our conservative respiratory therapy was to maintain PaO₂ between 50-80 mmHg and PCO₂ between 40 and 50 mmHg and pH around 7.3. This was achieved by a lower mean airway pressure (7-15) and a higher intermittent mandatory ventilation (IMV) of 60/min initially. A routine head ultrasound was obtained in the first 72 hours of life. If abnormal findings were detected, additional weekly exams were performed. A discharge ultrasound of the neonatal brain was performed in the department of radiology and a CT-scan, if ultrasound was abnormal until year 1993. After 1993, a portable discharge ultrasound exam was substituted. A developmental follow up was done by a pediatric neurologist until 1996, and subsequently followed by a pediatric development specialist.

RESULTS: The incidence of PVL was 2.75%: 6.15% (4/65) in neonates with the lowest BW (501-750g), 3.27% (5/153) in neonates with BW between 751-1000g and 0.68% (1/146) in neonates with BW above 1001g. The incidence of intraventricular hemorrhage (IVH) Grade I, Grade II and Grade III was 9%, 1.9% and 3.6%, respectively. The MAP for PVL infants was 8.25-9.5cm H₂O and for Non-PVL infants 7.9-8.2 cm H₂O, (p=0.17). All of the PVL neonates required O₂ during the first 28 days of life, while 78.68%, 29.73% and 6.89% of neonates without PVL within the 3 BW categories, respectively, required such intervention. The mean postnatal week for discontinuation of O₂ in PVL neonates was 32-33 weeks, comparable to non-PVL neonates,

(p>0.05). The proportion of neonates that required O₂ supplementation beyond 36 weeks postnatally was comparable in PVL and non-PVL infants.

CONCLUSIONS: The incidence of PVL and IVH was low and compares favorably to nationally reported data.

140 Poster Board 24

Fellow in Training

Resuscitation Decisions (RD) in the Delivery Room (DR) at the Edge of Viability (EOV) and with Known Trisomy 18(TR18). Is the Gender of the Provider Important?

Melanie P. McGraw, Jeffrey M. Perlman, Pediatrics, Weill Cornell Medical College, New York, NY.

BACKGROUND: Resuscitation decisions at the EOV are difficult and controversial. This is in part due to competing ethical interests of limiting interventions to situations where benefit is reliably expected to outweigh harm i.e. avoiding futile treatment while simultaneously trying to honor maternal preferences (MP) in decision-making. International neonatal guidelines state that initiating resuscitation (IR) is not indicated for GA < 23 wks and lethal anomalies i.e. confirmed TR18, (Circulation 2005).

OBJECTIVE: To determine factors influencing IR, and to investigate the impact of gender on RD at the EOV and with TR18 in the DR.

DESIGN/METHODS: A multiple choice questionnaire listing clinical scenarios in which the provider (P) was asked whether he/she would consider IR at known GA of 22, 23 and 24 wks, and confirmed TR18 with congenital heart disease (CHD) \geq 36 wks, was mailed to neonatologists and fellows staffing level III NICUs in NYC. Potential factors influencing IR included MP, neonatal condition (NC) at birth, OB care or legal concerns (LC), and consideration of futility in terms of intact neurologic outcome (ranging from < 5 to > 30%).

RESULTS: 54 / 71(76%) surveys were completed, male n=29, female n= 25. At 22 wks GA, 18 (33%) P would consider IR and were more likely to be male n=14 (77%), p=0.01, as well practicing >5 years n=15(83%) p=0.006. The primary factor for IR was MP (50%) but 6 (33%) P favored NC over MP; 5 (83%) of these considered intact survival \leq 20% as acceptable. At 23 and 24 wks GA, 96% and 100% of P respectively would consider IR. For TR18, 24/54(44%) would consider IR with no difference in gender or length of practice. MP (70%) was the primary reason to IR but LC was a significant factor for 45% vs 0% for 22 wks (p=0.009)

CONCLUSIONS: At 22wks known GA and for confirmed TR18 with CHD, more P than anticipated 33% and 44% respectively would consider IR. At 22wks P were more likely to be longer practicing males; an effect not seen with TR18. MP was the primary indication for IR for both. Where NC was the driving force at EOV, "intact" survival did not factor in decision-making. Since virtually all respondents would IR at 23 and 24 wks GA where both survival and/or outcome without any disability remains low, (Marlow NEJM2005), MP should be the primary factor in decision making at the EOV.

141 Poster Board 25

Reliability of Immunization Records in Internationally Adopted Children

Bindy Crouch, Paul J. Lee, Maria Alonso, Dorothy Lane, John J. Chen, Leonard R. Krilov, Dept. of Preventive Medicine, SUNY Stony Brook School of Medicine, Stony Brook, NY; Dept. of Pediatrics, Winthrop-University Hospital, Mineola, NY.

BACKGROUND: Internationally adopted children often arrive with documentation of vaccinations given in their countries of origin. However, the reliability of these records and current guidelines for their interpretation are unclear.

OBJECTIVE: To determine the reliability of documented vaccines in internationally adopted children through measurement of antibody titers.

DESIGN/METHODS: Using a retrospective chart review, we identified children seen between January 2003 and December 2004 with documentation of 2 or more doses of DTP, Polio, and/or Hepatitis B vaccines and 1 or more doses of Measles, Mumps, and/or Rubella vaccines given in their countries of origin. Antibody titers were drawn at their initial evaluation in the U.S. The percentages of children with positive antibody titers (as defined by a clinical U.S. laboratory) to the respective vaccines were calculated and compared for gender, country of origin, and residence (orphanage vs foster home).

RESULTS: 1) Based on 2 doses of vaccine, timing of vaccine was appropriate for 100% of children receiving DTP, 99.4% of those receiving Polio, and 100% of those receiving Hepatitis B vaccines.

2) 13 (21%) children with Measles vaccine, 2 (4.2%) with Mumps vaccine, and 2 (8.0%) with Rubella vaccine received the vaccine prior to age 1 year. For these vaccines, the timing was not related to titers.

3) Country of origin was significant only for Hepatitis B vaccine with children from Korea having a significantly lower percentage of positive titers (p=.019).

4) There were no significant relationships between gender or orphanage vs foster home and vaccine titers.

CONCLUSIONS: To our knowledge, this is the largest study to evaluate the reliability of documented immunizations in internationally adopted children. With the exception of Hepatitis B among children adopted from Korea and Mumps, percentages of positive antibody titers are similar to rates reported in U.S. vaccine studies. This information may be useful in interpreting vaccination records of internationally adopted children.

Vaccine	Antibody	Total patients (n)	Positive titer	% with positive titer
DTP	Diphtheria	147	146	99.3%
	Tetanus	147	125	88.0%
Polio	Polio	150	142	94.7%
	Hepatitis B	160	131	81.9%
Measles	Measles	62	57	91.9%
Mumps	Mumps	48	32	66.7%
Rubella	Rubella	25	23	92.0%

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Fellow in Training

Referring Hospitals Survey for Pediatric Transport Team—Quality of Service Assessment Tool

Michael F. Canarie, Heather A. Schmenk, Isaac Lazar, Pediatrics, Yale University School of Medicine; Pediatric Intensive Care Unit, Yale New Haven Hospital, New Haven, CT.

BACKGROUND: A dedicated pediatric transport team is the standard of care for the interhospital transfer of critically ill children. Referring hospital's evaluations can help improve the team's services.

OBJECTIVE: To collect data on our interactions with the referring hospital during the four stages of the transport process: initial call, response time, interaction during the patient's transition to the transport team and overall satisfaction with the service.

DESIGN/METHODS: Questionnaires were developed by the "Transport leadership team" - a group of nurses (RN), physicians (MD) and respiratory therapists (RT) - all transport experts. Response scale extended from poor (1) to excellent (5) for each question. A score of 4-5 was regarded as a high level of satisfaction with the service. The forms were given to the referring hospital's medical personnel prior to the transport team's departure along with a stamped envelope addressed to our transport coordinator.

RESULTS: Thirty-three questionnaires were collected from a total of 148 transports (22%). **Initial call:** 14 calls were accepted initially by RN and 28 by a MD with 93% satisfaction from both. 87.5% of responders were highly satisfied with the initial interaction and 55% thought the fellow's call from the road was very helpful (although 29% would have preferred more active communication with the team en route). **Response time:** Only 19% of the responders were satisfied with our arrival time. (This corresponded to a departure time greater than 60 min. in average of 35% of cases.) **Teams' interaction:** In 83% of the cases, the transport team's personnel were readily recognizable. 93% of the referring teams thought highly favorably of the cooperation between teams, and 90% felt similarly about the team's interactions with the patient's family. **Overall:** The satisfaction with Emergency Medical Team (EMT) personnel, RN, RT and MD team members were 78%, 89%, 97% and 83% respectively. Overall satisfaction level was high in 87% of the cases. 27% stated a desire to get feedback regarding the patient's condition.

CONCLUSIONS: Customer survey methodology was used to assess satisfaction with a dedicated pediatric transport team's performances. This approach provides a valuable means of gathering information that will be applied to improving the transport service and enhancing patient care.

143 Poster Board 27**Sitting in the Front Seat of a Passenger Vehicle: Real-Time Usage and Possible Risk Factors at One Elementary School**

John W. Harrington, Department of Pediatrics, New York Medical College, Valhalla, NY.

BACKGROUND: Motor vehicle crashes are the leading cause of death in children ages 5 to 14. Children seated in the front seats of vehicles are at increased risk of death and injury in crashes due mostly to air bag deployment. However, when parents are asked if their school-age child is allowed to sit in the front seat, their answer may not reflect actual practices. Parents are more likely to consider a short trip to school safer than highway travel, when in fact, most accidents happen within five miles of their home.

OBJECTIVE: To assess the frequency of children exiting and entering the front seat of passenger vehicles at an elementary school where no bus service is provided. To determine if time of day, type of vehicle, or sex of driver increases the risk of an underage child sitting in the front seat.

DESIGN/METHODS: Two elementary schools (K-6) in the same district of Westchester County, New York were chosen as sites, because no bus service is provided and parents generally drive their children to school. The two public elementary schools have an enrollment of 481 and 468 children respectively. A data sheet was developed to record morning drop-offs and afternoon pickups. Drop-off and pick-up observations were confined to a predetermined specified area for a 20 minute period. Data was collected by a single observer during two consecutive weekdays. An observation was only recorded if a single child was entering or exiting a car. Data collected was time, sex of driver, and type of vehicle (car, SUV, or truck)

RESULTS: 274 observations were made (151 in am and 123 in pm). 49 (18%) children under age 13 were in the front seat. 198 (72%) of drivers were female. Children were transported by 147 cars, 124 SUV, and 2 trucks (1 taxi).

CONCLUSIONS: Although many parents state they do not place children under the age of 13 in the front seat, this study shows 18% of children were traveling in this location to and from elementary school. Significant risk factors for traveling in the front seat are having a male driver and traveling in a car versus an SUV.

Risk Factors for Front Seat Passenger

N=274	Front Seat	Front Seat	RR (CI)	p-value
Sex	yes	no		
male	19	57	1.7 (1.0, 2.7)	p= 0.08
female	30	168		
Time				
PM	24	99	1.2 (0.7, 2.0)	p= 0.63
AM	25	126		
Vehicle				
Car (2-4 door)	37	110	3.1 (1.6, 6.0)	p= < 0.01
SUV	10	114		

144 Poster Board 28

House Officer

Hospital Admissions for Children with Autistic Spectrum Disorder in a Tertiary Care Setting: Diagnostic Etiology and Length of Stay

John W. Harrington, Ana Garnecho, Pediatrics, New York Medical College, Valhalla, NY.

BACKGROUND: Autistic Spectrum Disorder (ASD) affects 1 in 166 children and classic autism affects 1/1000. National databases for hospitalization rates for autism appear to reflect the latter group. No studies have concentrated on their medical admissions and length of stay (LOS).

OBJECTIVE: To delineate what medical diagnoses children with ASD are admitted with at a tertiary care Children's Hospital. To calculate average LOS for children with a medical diagnosis and a concurrent ASD and compare this with the hospital average.

DESIGN/METHODS: A retrospective database search at Westchester Medical Center/Maria Fareri Children's Hospital in Valhalla, NY for all admissions of inpatients, ages 0-21 years of age, with the diagnoses codes 299.0 and 299.8 for a two year period (10/1/03-9/30/05) was performed. Psychiatric admissions were excluded. Diagnostic codes and LOS for children with ASD were compared to all children with corresponding admissions via an unpaired T test.

RESULTS: 36 children accounted for 46 admissions (0.1% of total). Average age was 9.4 years (range 2-21 yrs). Four children had a genetic condition: 2 Down Syndrome, 1 Prader-Willi, 1 Rett Syndrome. Four children had multiple admissions. The average LOS was 9.13 days for all diagnoses (min 1 day and max 109 days). Removing outlier of 109 days reduces LOS to 6.9 days. See table 1

CONCLUSIONS: The number of patients admitted with a secondary diagnosis of autism does not match the current prevalence data (1 in 166) for ASD. Outliers may account for some abnormal increase in LOS, but outlier and increase in LOS may be directly related to ASD diagnosis.

N=46 Medical Admissions and LOS for Children with Autism

Diagnosis	number and %	Average LOS	Hospital avg LOS	p value
Seizures	8/46 (17%)	2.4 days	2.5 days	0.47
Trauma	6/46 (13%)	19.8 days	NA	NA
Gastroenteritis	5/46 (11%)	7.8 days	2.3 days	.048
Leukemia*	5/46 (11%)	5.0 days	4.7 days	0.52
Pneumonia	4/46 (9%)	7.5 days	4.1 days	0.28
CNS pathology	4/46 (9%)	8.5 days	NA	NA
Ulcerative Colitis*	3/46 (7%)	36.6 days	5.8 days	.0001
Constipation	2/46 (4%)	2.0 days	1.9 days	NS
All others#	9/46 (20%)	3.3 days	NA	NA
Totals	46/46	9.14 days	4.8 days	.0001

* = represents one patient # = nine patients for 9 separate diagnoses

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House Officer

Prevalence of Parent Reported ADHD in 6-12 Year Old Inner City, Primary Care Patients

Daniela I. Sima, Margarita Fermin, Candace Erickson, Pediatrics, St Barnabas Hospital, Bronx, NY; Pediatrics, Columbia University College of Physicians and Surgeons, NY, NY.

BACKGROUND: Studies of ADHD using DSM-IV diagnostic criteria show prevalences of 3-6%. Studies using only parent reported ADHD symptoms without impairment criteria show higher prevalences of 7.5-8.1%. A survey of pediatricians at 3 Bronx, inner city, primary pediatric clinics estimated a 15% prevalence ADHD. A parent survey done at an affiliated dental clinic found a 25% prevalence. These higher estimates may be due to the population's low socioeconomic status, urban crowding and high rate of immigrants.

OBJECTIVE: To obtain the prevalence of parent reported ADHD symptoms in 6-12 year old children from a largely Hispanic, inner city population who are seen by primary care pediatricians. **DESIGN/METHODS:** A convenience sample of parents of 6-12 year olds presenting at three primary pediatric clinics in Bronx in July-August 2005, were approached by bilingual research assistants to complete English or Spanish versions of a demographic form and the Vanderbilt Parent ADHD Form (VPF). The VPF assesses the symptoms that are DSM-IV diagnostic criteria for ADHD, Oppositional Defiant Disorder (ODD), Conduct Disorder (CD) and screening items for Anxiety/Depression (Anx/Dep). It also queries re impairment in various domains. Statistical analyses were done using SPSS version 11.

RESULTS: 140 of 200 approached subjects (70%) completed the VPF. 73% were Hispanic. Mean age of child was 9.5 yrs and 51% were female. 3.6% were on medication for behavior problems.

The prevalence of ADHD SYMPTOMS was 20.9%, with 5.2% inattentive type (INATT), 7.5% hyperactive/impulsive type (HI) and 8.2% combined type (COMB). When impairment criteria were included, the prevalence of ADHD DIAGNOSIS was 14.9%, with 4.5% INATT, 3.7% HI and 6.7% COMB. %male for the subtypes were INATT: 50%, HI: 80%, and COMB: 60%. Comorbidities of COMB included 82% with ODD, 35% with CD and 35% with Anx/Dep. The mean age of children with INATT, HI, and COMB were not significantly different, likely due to the restricted age range of the sample.

CONCLUSIONS: The prevalence of all ADHD subtypes and ODD in our inner city sample is higher than in the general population. ADHD symptom rates are similar to those of a similar population in the dental clinic survey. This raises concern regarding the pediatric and behavioral resources needed to serve this population effectively.

146 Poster Board 30

House Officer

Monocanalar Silastic Tube Intubation for the Initial Correction of Nasolacrimal Duct Obstruction: A Novel Approach

Amy Vyas, J. Mark Engel, Barbara M. Ostfeld, Pediatrics, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ.

BACKGROUND: The use of silastic tubing in nasolacrimal duct obstruction is associated with a very high success rate (Leone and Van Gemert, Ophthalmic Surgery 1989). However, it is rarely used in the initial procedure due to its relatively high complication rate compared to a simple probing and the fact that a second general anesthetic is usually needed to remove the silastic tubing. More recently, a technique has been described using a different type of silastic tubing, the Ritleng Monoka, which doesn't need a second general anesthetic for removal. The use of the Ritleng Monoka tubing for the initial probing has not been reported in the pediatric or ophthalmologic literature.

OBJECTIVE: To assess success and complication rates of the Ritleng Monoka as the initial procedure for treatment of children 12 months and older for nasolacrimal duct obstructions.

DESIGN/METHODS: We conducted a retrospective chart review (2002-2005) of all children 12 months and older on which we used the Ritleng Monoka as the initial procedure for nasolacrimal duct obstructions. Success was defined as good clearance of fluorescein dye or the absence of tearing. Failure was defined as persistent tearing or no clearance of fluorescein dye leading to the performance of a subsequent surgery. Complications were defined as corneal abrasion, punctal stretching, retained tube after removal, sinusitis, granuloma formation, epistaxis, all of which are observed in the standard bicanalar silastic tubing.

RESULTS: We identified 182 children between 12 and 24 months (17.1±3.7 months) and 22 children older than 24 months (30.1±4.2 months). The success rate for ages 12 months to 24 months was 97%; for those over 24 months, it was 77.3%. This compares favorably to the literature, with typical success rates of 69% for the first group and 33% over age 24 months (Katowitz and Welsh, Ophthalmology 1987). The only complication was corneal abrasion in 2% of the younger group which healed in all cases in 24 hours without further sequelae. No complications were noted in the older group.

CONCLUSIONS: The use of the Ritleng Monoka procedure for the initial probing compares favorably to probing alone, based on the typical success rates reported in the literature for probing alone. The complication rate for the Ritleng Monoka procedure was low and transient in the younger group and absent in the older one.

147 Poster Board 31

Precepting in a Pediatric Resident Continuity Clinic

Laura Dattner, Children's Hospital at Downstate, SUNY Downstate College of Medicine, Brooklyn, NY.

BACKGROUND: Precepting encounters with faculty supervisors, and the feedback provided, are integral to the educational experience of continuity clinic.

OBJECTIVE: To determine faculty and residents' perceptions of feedback given in a continuity clinic.

DESIGN/METHODS: We conducted a cross-sectional study in one pediatric resident continuity clinic. Using anonymous surveys, we asked faculty and residents about feedback given/received in clinic. Faculty preceptors were asked how frequently they gave residents feedback overall, and what specific topics were usually included. Residents were asked how frequently they received feedback overall, what specific topics were usually included, and how satisfied they were with it (on a scale from 1-4, with 4 being "very satisfied"). Specific topics included history taking, the physical exam, medical knowledge, decision-making, counseling, and sensitivity/respect for patients/families. We used univariate analyses where appropriate and logistic regression analyses to identify variables associated with overall satisfaction.

RESULTS: Participants included 12 of 12 preceptors and 44 of 46 pediatric residents (96%) in our continuity clinic. Faculty and resident reports on the overall frequency of feedback were similar. However, for each specific precepting topic, residents reported receiving feedback less often than faculty reported giving it (see Table). According to residents and faculty, topics least likely to be included were exam skills and sensitivity/respect. Fifty seven percent of residents were "very satisfied" with the feedback. Residents who reported usually receiving feedback about medical knowledge were more likely than others to be "very satisfied" (80% vs 20%, $p < 0.001$). Multiple logistic regression analyses confirmed that no other specific precepting topics correlated with resident satisfaction.

CONCLUSIONS: Discussions of physical exam skills and sensitivity/respect were least often included in feedback provided to residents. Residents who usually received feedback about medical knowledge tended to be more satisfied with the feedback overall. These findings can help focus efforts to improve precepting.

Frequency of Specific Topics Included in Precepting Encounters

Topic	Faculty	Residents
Decision-making	92%	71%
Counseling	92%	64%
History taking*	92%	48%
Medical Knowledge	75%	57%
Physical Exam	58%	34%
Sensitivity/Respect**	58%	25%

* $p = 0.008$, ** $p = 0.040$, comparisons of other competencies were not statistically significant

148 Poster Board 32

Body Size and Neighborhood Characteristics: Does Food Store Availability Make a Difference?

Maida P. Galvez, Jodi Siskind, Cherita Raines, Jessica Kobil, Kim Morland, Julie A. Britton, Barbara Brenner, James Godbold, Department of Community and Preventive Medicine, Department of Pediatrics, Mount Sinai School of Medicine, NY, NY.

BACKGROUND: Prior studies have shown an association between fast food restaurants and body size. Less is known about the influence of inner city neighborhood food stores on a child's body size.

OBJECTIVE: We hypothesized that in the inner city, minority community of East Harlem, New York an increased number of food stores with a predominance of high fat, high sugar foods such as convenience stores, is associated with an increase in a child's body size as measured by waist/hip ratio. We hypothesized that this relationship is not true for supermarkets, grocery stores or specialty stores.

DESIGN/METHODS: A cross sectional study utilizing a comprehensive walking survey of East Harlem zip codes 10029 and 10035 was performed. Names and addresses of all food stores were collected and classified into: supermarkets, grocery stores, convenience stores and specialty stores. Eighty-two East Harlem boys and girls ages 6-8 years old were included in the analysis. Anthropometrics (waist/hip ratio) were collected as per a standardized protocol. Stores located within the same census block as the child's home address were identified using ArcGIS software version 8.3, which allowed for geocoding and mapping of both home and store address.

RESULTS: In East Harlem, there were 10 supermarkets, 9 grocery stores, 182 convenience stores and 35 specialty stores. No associations were found between the presence of supermarkets, grocery stores and specialty stores and a child's waist/hip ratio. However, children with no convenience stores present (the lowest tertile) had a mean waist/hip ratio of 0.85 while children with 3 or more convenience stores (the highest tertile) had a mean waist/hip ratio of 0.89 ($p = 0.029$). Results were adjusted for race, gender and age.

CONCLUSIONS: Increased presence of convenience stores within the same census block of a child's residence was associated with a child's waist/hip ratio. This has potential implications for differences in both dietary patterns of inner city minority children and associated health outcomes including obesity and obesity related disorders.

Developmental Biology Platform Session

Sunday, March 19, 2006

9:45am–12:00pm

149 9:45am

Fellow in Training

Gap Junctions in Mouse and Zebrafish Left-Right Development

Ivy Lin, Zhaoxia Sun, Roseanne Titcombe, Martina Brueckner, Pediatrics/Critical Care, Yale University School of Medicine, New Haven, CT; Genetics, Yale University School of Medicine, New Haven, CT; Pediatrics/Cardiology, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Left-right asymmetry during mouse and zebrafish embryogenesis is initiated by an asymmetric calcium signal at the left border of the node. The asymmetry is maintained by a midline barrier. Perturbation of gap junctional communication (GJC) in chick or *Xenopus* embryos disrupts expression of normally unilaterally expressed genes and altered organ situs. Mutations in connexin 43 have been reported in human heterotaxia.

OBJECTIVE: To investigate the role of GJC in mouse node and Zebrafish Kupffer's vesicle.

DESIGN/METHODS: Immunocytochemistry studies were performed in mouse embryos harvested from timed pregnancies and zebrafish embryos staged according to hpf and morphological criteria. Over-expressed connexin 43 zebrafish were generated by injecting rat connexin 43 mRNA at the 1-cell stage.

RESULTS: In order to assess the effect of GJC blockade at a timepoint corresponding to asymmetric perinodal calcium signals, E7.5 mouse embryos were cultured for 20 hrs in still culture with the GJC blocker heptanol (3.5mM). Normal left-sided expression of *Pitx2* was observed in 75% ($n=36$) control embryos and only 8% ($N=12$) heptanol treated embryos. Gap junctions (GJ) at the node were visualized in fixed e7.75 embryos with antiCx43 antibodies. Abundant CX43 containing GJs were at the margins and lateral to the node, and very few CX43 containing GJs were at the midline. Cx40, Cx26 and Cx32 expression pattern is similar but less abundant than Cx43. Zebrafish embryos at the Kupffer's vesicle (KV) stage showed the same distribution pattern as at the mouse node. There were CX43 and CX40 containing GJs around but not within KV. Overexpression of rat CX43 in zebrafish embryos resulted in midline expression of connexin 43 and bilateral expression of the normally left-sided marked southpaw.

CONCLUSIONS: GJs are required for normal left-right development at a timepoint corresponding to cilia-generated nodal flow in mouse, and the expression pattern of CX43 at this timepoint is conserved in zebrafish. Absence of CX43, 26, 40 or 32 in the node and KV suggests that absence of GJs at the node functions as the midline barrier with respect to asymmetric perinodal calcium signals.

150 10:00am

Multiple Signal Transduction Pathways Interact Genetically with a Noonan Syndrome-Related *PTPN11* Gain-of-Function Mutation

In-Kyong Kim, Kimihiko Oishi, Huiwen Ying, Fitnat Topbas, Michael Kaplan, Marek Mlodzik, Leslie Pick, Bruce D. Gelb, Pediatrics, Human Genetics, and Molecular, Cell and Developmental Biology, Mount Sinai School of Medicine, New York, NY; Entomology, University of Maryland, College Park, MD.

BACKGROUND: Gain-of-function (GOF) mutations in *PTPN11*, encoding the protein tyrosine phosphatase SHP-2, cause Noonan syndrome (NS), a developmental disorder with cardiac defects, short stature and dysregulated hematopoiesis. We previously generated a NS transgenic fly model with inducible expression of the commonest mutation, N308D, in *CORKSCREW* (CSW), the *Drosophila* SHP-2 homologue. Ubiquitous transgene expression caused ectopic wing veins due to increased EGFR/Ras/MAPK signaling. Epistatic studies showed genetic interactions with the Notch, BMP/DPP, and JAK/STAT pathways.

OBJECTIVE: To identify novel genes involved in NS disease pathogenesis using the *Drosophila* model.

DESIGN/METHODS: A stable fly stock expressing the N308D transgene ubiquitously (*UAS-csw^{N308D}/CyO; tub-GAL4/TM2*) was crossed to flies with loss-of-function (LOF) alleles of genes involved in cardiac development, growth or hematopoiesis. Ectopic wing vein status was scored and compared to the baseline N308D phenotype using χ^2 testing. Significance threshold was $p < 0.05$.

RESULTS: LOF alleles of Wnt/ β -catenin signaling genes, including the ligand *wingless*, the receptor *frizzled*, and positive regulators *disheveled* and *armadillo* significantly suppressed N308D's ectopic veins. Haploinsufficiency of *insulin-like receptor* also suppressed the phenotype. Rap1 is a Ras-like GTPase with antagonistic effects on Ras signaling. Consistent with that, *Rap1* LOF enhanced the phenotype.

CONCLUSIONS: The GOF mutation, N308D, showed novel genetic interactions during *Drosophila* wing vein development with several genes positively regulating Wnt/ β -catenin signaling, a pathway relevant for cardiac valvulogenesis. The novel interaction with the *insulin-like receptor* pathway may prove relevant for the altered somatic growth in NS. The interaction with Rap1 suggests relevance for cAMP signaling in NS pathogenesis. Taken together with our previous epistatic analyses, there appears to be crosstalk between EGFR and several other signal transduction pathways that is relevant to the pathogenesis of NS. Future work will be directed to confirming these observations in a mouse model of disease.

151 10:15am

Fellow in Training

Transient In Utero Knockout of CFTR Results in a Disruption of Organogenesis and Intestinal Epithelial Differentiation in Sprague-Dawley Rats

Kelly E. Moulton, J. Craig Cohen, Janet E. Larson, Pediatrics/Division of Neonatology, SUNY-Stony Brook, Stony Brook, NY.

BACKGROUND: In previous studies the cystic fibrosis transmembrane conductance regulator (CFTR) has been shown to modify lung parenchyma development. CFTR knockout mice develop lethal intestinal obstruction, suggesting that CFTR plays a role in the development of the intestinal epithelium. Maturation of intestinal epithelium in fetal rats can be measured by the presence of developmental proteins as early as 19 days gestational age.

OBJECTIVE: To investigate the role of CFTR in rat intestinal epithelial development

DESIGN/METHODS: Timed pregnant Sprague-Dawley rats underwent transient in utero knockout (TIUKO) antisense *cftr* gene transfer at 15, 16 and 17 days gestation. The animals were allowed to

deliver and serial evaluation of the proximal jejunum was performed, until the time of weaning. RESULTS: Transient in utero knockout (TIUKO) CFTR antisense treatment at 15 days gestation in Sprague-Dawley rats, was uniformly lethal. The pups developed meconium ileus prior to weaning. The jejunal epithelium showed gross morphologic changes as well as alterations in developmental protein expression. Rat pups undergoing antisense treatment at 16 or 17 days gestation demonstrated poorly differentiated intestinal epithelium on microscopic examination. CONCLUSIONS: In a transient in utero knockout CFTR rat model, intestinal epithelial development and histology were altered. TIUKO treatment at 15 days gestation proved to be lethal prior to weaning and treatment at 16 to 17 days gestation revealed poorly differentiated intestinal mucosa. This suggests that the cystic fibrosis transmembrane conductance regulator is an important factor in intestinal organogenesis.

152 10:30am

Valproic Acid, a Structural Homologue of Diet-Derived Butyrate, Regulates Tyrosine Hydroxylase Gene Expression (TH): A Possible Gut-Brain Link to Behavior

Pranav Patel, Bistra Nankova, Edmund F. LaGamma, Pediatrics, Maria Fareri Children's Hospital-New York Medical College, Valhalla, NY.

BACKGROUND: Valproic acid (VPA) is a widely used anti-seizure and mood stabilizing branched short chain fatty acid (SCFA). The mechanism of action of this well known teratogen as a possible anti-cancer agent has not been completely understood. It is thought to exert its effects via inhibition of histone deacetylases (Phiel et al., 2001), RNA stabilization or transcription. We showed that butyrate regulates TH gene expression in PC12 cells (Patel Dev Br Res 2005) and that butyrate acts via the canonical CRE site and a newly identified distal butyrate response element, BRE in the TH promoter (Patel et al., 2005). VPA is a structural homolog of diet-derived SCFA butyrate possessing two CH₂-CH₂-R motifs; the active moiety for activating TH transcription in PC12 cells. VPA has also been shown to affect TH gene expression in the locus coeruleus (Sands et al., 2000).

OBJECTIVE: We sought to determine whether butyrate and VPA mediate gene expression via similar molecular mechanisms.

DESIGN/METHODS: Point mutations were introduced into the wild-type TH promoter directing a plasmid containing a luciferase reporter gene using PCR-based site-directed mutagenesis. Mutations were verified by sequence analysis. Wild-type and mutated constructs were transfected into PC12 cells. After the designated treatment with valproic acid, PC12 cells were harvested and reporter gene activity measured as an index of TH promoter activity.

RESULTS: Exposure of PC12 cells to VPA caused a significant up-regulation of TH promoter driven expression of a luciferase reporter gene, a result remarkably similar to the butyrate response. There was lower VPA-induced reporter gene activity after a single point mutation of BRE site on the TH promoter. Introduction of point mutation at the canonical CRE site resulted in complete unresponsiveness to VPA induction. Co-expression of dominant negative CREB greatly reduced the effect of both SCFA examined. Results are identical to butyrate effects (DeCastro, Molec Br Res, 2005).

CONCLUSIONS: VPA and its structural homolog, butyrate use common sequences in the TH gene promoter suggesting that transcription factors CREB/ or CREB-related proteins are involved in the transcriptional regulation of TH gene by these SCFA's. We speculate that similar molecular mechanisms mediate the responses to both VPA and butyrate and that butyrate's dietary origin provides insight into the mechanism governing the effects of ketogenic diets.

153 11:00am

Macrophage-Specific Transgenic Overexpression of the Receptor for Hyaluronan-Mediated Motility (RHAMM) Increases Inflammatory Responses

Zheng Cui, Hengjiang Zhao, Gaoyuan Cao, Horace M. DeLisser, Rashmin C. Savani, Division of Neonatology, Dept. of Pediatrics, CHOP-Univ of Pennsylvania, Philadelphia, PA; Pulmonary, Allergy & Critical Care Division, Dept of Medicine, Univ of Pennsylvania, Philadelphia, PA. BACKGROUND: The glycosaminoglycan hyaluronan (HA) and its receptors CD44 and RHAMM have been implicated in inflammation. Specifically, HA-binding peptides and antibody to RHAMM block macrophage migration/chemotaxis in vitro and inhibit lung macrophage accumulation after bleomycin-induced injury.

OBJECTIVE: To determine if overexpression of RHAMM in macrophages enhances macrophage functions in vitro and accumulation of macrophages at inflammatory sites in vivo.

DESIGN/METHODS: A full-length mouse RHAMM cDNA was cloned into pcDNA4/HisMax and stable transfectants in the murine macrophage cell line RAW264.7 were confirmed by RT-PCR, western blots and immunofluorescence. Cells stably transfected with LacZ and parent cells were used as controls. Chemotaxis and proliferation were measured. A transgenic construct using the macrophage-specific Scavenger Receptor A promoter to drive a myc-tagged mouse RHAMM cDNA was used to generate transgenic (TG) lines. Bone marrow-derived macrophages (BMDM) were examined for chemotaxis and proliferation. The effects on inflammatory responses to intraperitoneal (IP) thioglycollate and intratracheal (IT) bleomycin were examined in TG mice.

RESULTS: Cell lines stably expressing full length RHAMM cDNA had a 2.5-fold increase in chemotaxis to HA and proliferation as compared to the parent and LacZ transfected controls. Four TG founders were generated. TG bone marrow-derived macrophages (BMDM) showed a 2-fold increase in chemotaxis to HA and proliferation as compared to non-TG cells. Further, TG mice given IP thioglycollate showed equal peritoneal recruitment of neutrophils at day 1, but significantly higher macrophage accumulation by day 3 as compared to controls. Intratracheal bleomycin in TG mice resulted in increased macrophage accumulation, increased respiratory distress and more destruction of lung architecture as compared to WT mice.

CONCLUSIONS: We conclude that RHAMM promotes macrophage chemotaxis and proliferation, and contributes to the accumulation of macrophages in areas of inflammation. We speculate that strategies to target RHAMM may be useful therapeutic tools to limit lung inflammation after injury.

Funded by HL42672 and HL073896 to RCS

154 11:15am

Heme Oxygenase-1 Is a Signaling Molecule That Regulate Its Own Expression

Qing S. Lin, Sebastian Weis, Guang Yang, Phyllis A. Dennerly, Neonatology, Children's Hospital of Philadelphia, Philadelphia, PA; University of Leipzig, Germany.

BACKGROUND: Heme oxygenase (HO) is the rate-limiting enzyme that degrades cellular heme to biliverdin, carbon monoxide, and iron. Expression of the inducible isoform, HO-1, can be up-regulated by a variety of stress conditions and molecules. Recent studies have shown that HO-1 protein can translocate to the nucleus and that transfection of HO-1 cDNA increased catalase gene expression, suggesting a gene regulatory role for the HO-1 protein.

OBJECTIVE: To understand whether HO-1 can act as a signaling molecule to regulate expressions of antioxidant genes, we evaluated whether delivery of HO-1 protein could modulate the activation of transcription factor AP-1, and regulate the promoter activity of its own gene.

DESIGN/METHODS: In NIH3T3 cells, we introduced purified HO-1 proteins with a protein delivery system or HO-1 cDNA by transfection and examined the activations of key transcription factors such as AP-1. Effects of HO-1 on its own promoter were determined with a luciferase reporter controlled by 15kb of HO-1 promoter. To determine whether this HO-1 promoter activation was caused by the HO-1 enzymatic byproducts, both the active and inactive forms of HO-1 were tested. To evaluate the genomic regions in the HO-1 promoter that respond to HO-1 protein, luciferase reporters controlled by a series of HO-1 promoter deletions were analyzed.

RESULTS: Delivery of HO-1 protein or transfection with HO-1 cDNA resulted in 6 folds increase in AP-1 DNA binding activity. The delivery of HO-1 protein or cDNA resulted in 2 folds increase of HO-1 promoter activation indicated by luciferase expression. These effects still occurred despite inhibition of HO activity or after delivery of an enzymatically inactive form of HO-1. Transfection of HO-1 siRNA into the NIH3T3 cells expressing HO-1 promoter driven luciferase reporter resulted in inhibition of HO-1 promoter activation by HO-1 inducers. 5', 3' and internal deletion analysis of the 15kb HO-1 promoter revealed the specific genomic regions that respond to HO-1 proteins.

CONCLUSIONS: These experiments document positive self-regulation of HO-1 and also suggest that HO-1 protein has a role in oxidative transcriptional activation via AP-1. This mechanism may be useful to maintain HO-1 expression when substrate is limited and may also serve to upregulate other important antioxidant genes.

155 11:30am

Fellow in Training

Mechanical Strain Activates Rho and Induces Stress Fiber Formation in Fetal Lung Type II Epithelial Cells

Ophira Silbert, Yulian Wang, Benjamin Maciejewski, Sunil Shaw, Juan Sanchez-Esteban, Department of Pediatrics, Women and Infants Hospital & Brown University, Providence, RI.

BACKGROUND: Mechanical forces are critical for normal fetal lung development. However, the mechanisms by which pulmonary cells sense and transduce mechanical signals are largely unknown. Actin cytoskeleton plays a key role in mechanotransduction by serving as a scaffold for protein-protein interactions. The Rho GTPases (Rho, Rac, Cdc42) are a family of proteins that regulate actin cytoskeleton organization and gene expression by integrating mechanical cues into specific signal transduction pathways. Its role in lung development is currently unknown. OBJECTIVE: To define the role of the Rho family GTPases in actin cytoskeleton remodeling and fetal type II epithelial cell differentiation mediated by mechanical strain.

DESIGN/METHODS: Fetal rat pulmonary type II epithelial cells were isolated at E19 (term=E22) and cultured on laminin-coated silastic membranes. Cyclic elongation (5%, 60 cycles/min) was applied for varying intervals using the Flexercell FX-4000 Strain Unit to simulate mechanical forces in utero. Cells grown on nonstretched laminin-coated plates were used as controls. Activation of the Rho GTPases was analyzed by affinity precipitation assays. Actin distribution was directly visualized under the microscope using cells infected with adenovirus expressing GFP/actin and exposed to 5% continuous strain using the StageFlexer Jr apparatus. Also, ERK phosphorylation was assayed by western blot.

RESULTS: Mechanical strain maximally activated Rho after 15 min by 2.5-fold. However, neither Rac nor Cdc42 were stimulated by force. Real time fluorescence microscopy showed that mechanical strain reorganizes actin filaments into stress fibers in the direction of the force applied. The actin-polymerization inhibitor cytochalasin D and Rho inhibitors disrupted this organization. Cytochalasin D also significantly decreased strain-induced ERK phosphorylation, a key pathway in fetal type II cell differentiation mediated by force. Currently, we are investigating downstream activators of Rho and studying the role of this pathway in strain-induced type II cell differentiation. CONCLUSIONS: Mechanical strain activates Rho and induces stress fiber formation in fetal type II epithelial cells. Our data also suggest that actin cytoskeleton remodeling may be important for strain-induced fetal type II cell differentiation.

**General Pediatrics III:
Medical Education Platform Session**

Sunday, March 19, 2006

9:45am-12:00pm

156 9:45am

Over the Counter and Under the Radar: Addressing Pediatric Residents' Unfamiliarity with OTC Medications

R. Goldman, M. Schechter, A. D. Racine, Department of Pediatrics, Albert Einstein College of Medicine/Children's Hospital at Montefiore, Bronx, NY.

BACKGROUND: A vast number of over-the-counter (OTC) medications are marketed directly to families for use in children and a majority of American 3 year olds receive OTC medicines in any given month. Little is known about pediatric residents' familiarity with these preparations and ability to appropriately advise parents on the value and safety of these items.

OBJECTIVE: 1) Assess resident knowledge of OTC medicines 2) Develop a hands-on program to increase that knowledge, teach appropriate use and potential misuse of these products, raise awareness of marketing strategies and stress the importance of these issues to pediatric practice and

3) Evaluate the usefulness of this program to trainees.

DESIGN/METHODS: A 24-item close-ended multiple choice pretest was administered to a successive sample of 48 residents to assess knowledge in 3 categories of OTC products: 1) Respiratory 2) GI/Nutrition and 3) Dermatology. Included were questions on items such as Dimetapp®, Children's Mylanta® and Tinctin®. During their outpatient rotation, small groups of residents went with a General Pediatrics Attending to the pharmacy section of a major retailer where they examined products such as antipyretics, decongestants, anti-diarrheals and lice treatments. Medications were discussed with attention to ingredients, efficacy, adverse effects, marketing and pricing. Relevant clinical topics reviewed included management of URIs, constipation and acne. Residents completed a year-end program evaluation.

RESULTS: The pretest was completed by 48 PL-2s and PL-3s. Of these, 55% reported that they personally rarely or never use OTC medicines for URIs. Total scores on the pretest ranged from 21%-58% correct with a mean of 42% (±9%). For specific domains of Respiratory, GI/Nutrition and Dermatology, the mean scores were 30%, 50% and 54% respectively. 35% of residents knew the concentration of Motrin Drops®, 52% knew that Alka Seltzer® and Pepto-Bismol® contain salicylates and 0% knew the active ingredients in Tylenol Cold®. Residents rated this curricular module at a mean score of 4.75 on a 5 point scale of educational usefulness.

CONCLUSIONS: Considerable gaps exist in pediatric residents' knowledge of OTC preparations. Exposing residents to these products through a hands-on interactive program may address these gaps and is valuable in preparing residents to counsel families.

157 10:00am

Have Pediatric Resident Call Schedules Changed in Response to ACGME Work Hour Limits?

Jodi K. Wenger, Stuart N. Karon. Pediatrics, Dartmouth-Hitchcock Medical Center, Lebanon, NH. **BACKGROUND:** The Accreditation Council on Graduate Medical Education (ACGME) mandated restrictions on resident work hours in 2003 because long work hours were linked with serious adverse events for patients and residents.

OBJECTIVE: To quantify whether pediatric resident call schedules have changed in response to ACGME work hour regulations.

DESIGN/METHODS: The number of nights "on call" and days of "night float" were measured in pediatric residency training programs with a minimum of 50 residents during one academic year before and one year after ACGME work hour regulations went into effect. On each date of the resident call schedule, "on call" was defined as any name that appeared; "night float" was defined as the number of times the same name appeared at least 4 days in a row. A secondary dataset analysis of a commercial web-based call management system database was performed. Differences in nights "on call" and days of "night float" between the two years were assessed by year of training and by program using paired Student's *t* tests.

RESULTS: Forty of 46 pediatric residency training programs in the United States with a minimum of 50 residents (87%) use this call management system database, with 24 (60%) having adequate data posted for our two study years for call tallies and 13 (33%) having adequate data posted for our two study years for night float. The total number of residents per program did not change. The mean number of nights "on call" for all programs increased by 13, representing an overall significant 7.6% rise (p=.002), highest among third year residents (10%; p=.012). The mean number of days of "night float" for all programs increased by 16, representing an overall significant 25% rise (p=.007), highest among third year residents (39%; p=.04).

CONCLUSIONS: This study suggests that ACGME work hour regulations have increased the number of nights "on call" and days of "night float" especially for third year residents in large pediatric training programs. Examination of the clinical, educational, and economic implications of these coverage changes is warranted.

158 10:15am

Fellow in Training

Differences in Factors Attendings and Residents Use To Evaluate Third Year Medical Students on Their Pediatric Clerkship Rotation

Steve Paik, Brianna Moore, Mark Graham. Division of Pediatrics, Columbia University, New York, NY; Center for Education Research and Evaluation, Columbia University, New York, NY. **BACKGROUND:** Variations in how attendings physicians and housestaff physicians evaluate medical students during the clinical clerkships are informally well-known yet formally under-researched.

OBJECTIVE: To systematically explore the differences in how attendings and housestaff use a clinical evaluation form (CEF) to rate the clinical performance of medical students in their third year rotation at a major teaching hospital.

DESIGN/METHODS: We analyzed 187 CEFs (attending n=90; housestaff n=97) completed for 52 students in their pediatric clerkship during the 2004-2005 academic year. The assessment was conducted on the following three sets of Likert-scale items: a) 11 performance assessment items related to three subdomains of knowledge, clinical skills and professionalism b) three global measure for the subdomains and c) a summative score. The evaluation of the CEF consisted of factor analysis and linear regression.

RESULTS: There were significant differences in the scoring of items on the CEF by the attendings and housestaff. Attendings had a tendency towards considering the items of professionalism and team relationships as factors in their evaluation; housestaff considered patient care related skills of history taking and physical exam. Regression analysis on the three global subdomains also showed significant group differences. For the attendings, the knowledge items (p<.001) and the professionalism items (p<.05) were significant variables for predicting overall summative scores. In contrast, for the housestaff, the items for global clinical skills were the most significant variables in predicting overall summative score (p<.001).

CONCLUSIONS: Attendings used the items of knowledge and professionalism as factors in evaluating the students whereas the housestaff used clinical skills. These differences are possibly due to the different types of daily interactions that occur between the medical students and the attendings and housestaff. This is of interest because both groups use the same CEF and they may be interpreting CEF items differently. This may reduce the validity of the CEF as an accurate measure of performance. Future research should focus on systematically developing separate forms for different evaluators.

159 10:45am

House Officer

The Incidence of Iron Deficiency Anemia in Female Residents

Asmi F. Alam, Clarice Staves, Phillipa Sprinz. Pediatrics, Baystate Medical Center, Springfield, MA.

BACKGROUND: "Iron lacks the glitter of gold, or the sparkle of silver, but it outshines both in biological importance." Iron deficiency is the most common cause of anemia not only in the U.S., but worldwide. The etiology can be related to blood loss and diet. Residency, in particular, has a disruptive effect on lifestyle routine and eating habits that may affect general nutritional status and well being. Female residents have the added variables of parity and menses.

OBJECTIVE: To determine if there is an increase in the incidence of iron deficiency anemia in female residents throughout their training.

DESIGN/METHODS: Baseline CBC, ferritin, TIBC and iron levels were obtained from each subject upon initiating residency, and then at yearly intervals. A questionnaire to assess race, parity, diet, and call schedule was distributed with each blood draw. A total of 26 female residents were enrolled. 11 were followed over the course of 3 years, 5 were followed for 2 years and 10 were followed for 1 year.

RESULTS: Overall, there was no significant increase in the incidence of iron deficiency anemia in female residents throughout their training. Of the 11 subjects followed over 3 years, 1 subject was noted to have a transient Fe deficiency anemia which resolved spontaneously during residency. 1 subject was noted to have both sickle cell trait and thalassemia trait with baseline anemia and was therefore excluded from the study, while the remaining 9 failed to develop anemia. CBC and iron studies for 5 subjects followed over 2 years were essentially unchanged. The results of the 10 subjects followed over one year are pending. There were 13 Caucasian subjects, 1 African, 1 Haitian, 4 South Asian, 2 East Asian, 1 Persian, 3 Hispanic, and 1 Greek. The results from the questionnaire indicated nulliparity for all 26 subjects and decreased consumption of iron rich foods during call months.

	Hemoglobin	MCV	Ferritin
nml values	14 (12) g/dl *	90 (78) fl *	10-120 ng/ml
baseline	13 g/dl	89.6 fl	32 ng/ml
% D 1 year	1.1% increase	0.04% increase	7.0% decrease
% D 2 years	1.6% decrease	3.1% decrease	18.9% increase

* Mean (- 2 STD)

CONCLUSIONS: Although, one might speculate that the changes in nutritional status and lifestyle experienced during residency may lead to Fe deficiency anemia, this was not substantiated by our findings. This speaks to the resilience of female residents.

160 11:00am

Fellow in Training

Perceptions of Expected Proficiency in Neonatal Resuscitation: A Resident Survey

Dalbir Singh, Karen Hendricks-Munoz, Pradeep Mally. Neonatology, NYU Medical Center, New York, NY.

BACKGROUND: Guidelines of the Neonatal Resuscitation Program (NRP) developed by the American Academy of Pediatrics recommend that individuals specially trained in neonatal resuscitation be available at every delivery. In many settings, the general pediatrician is responsible for managing delivery room resuscitation and stabilizing infants in distress. Gaining knowledge and experience in neonatal resuscitation and acquiring proficiency are important expectations for the pediatric resident in training. As such, it is important to identify in which year of training a pediatric resident expects to become proficient in acquiring these skills and how likely they are able to achieve these goals during their years of training.

OBJECTIVE: 1) To determine the expectation for acquiring resuscitation proficiency for all years of pediatric residents. 2) Self evaluation of proficiency in specific skills during resuscitation at each year of residency training.

DESIGN/METHODS: A cross-sectional survey from 5 US academic residency programs in New York City, of all three years of pediatric residency training. June - Aug 2005. 118 pediatric residents were surveyed of 180.

RESULTS: 100% of residents, years R1-R3, indicated that they believed it was important for them to gain proficiency in neonatal resuscitation. 65% of R1's, 68% of R2's and 80% of R3 believed that they could obtain proficiency with the current curriculum of training. The percent results of responses when they expected to be proficient in each procedure compared to their perception of proficiency for various procedures are listed below.

CONCLUSIONS: Pediatric residents from the 5 academic programs expect to become proficient in neonatal resuscitation before their third year of training. In some cases, first year residents appear to expect to attain this proficiency in their first year but are not achieving this expectation. This data is useful to assist in structuring resuscitation education and proficiency in the NICU

Expected/Attained Proficiency For R1 through R3 (%)

Question	R1	R2	R3
Drying & Bag Mask	95/75	0/96	2/98
Intubation	35/25	50/40	15/65
Medications	38/15	54/45	10/79
Fluids	66/15	35/75	4/99
Line Placement	50/10	38/40	15/75
Leader	15/15	70/40	15/85

161 11:15am

Fellow in Training

Empirical Analysis of the Third Year Pediatric Clerkship Evaluation Forms

Steve Paik, Brianna Moore, Ting Zhang, Mark Graham. Division of Pediatrics, Columbia University, New York, NY; Center for Education Research and Evaluation, Columbia University, New York, NY.

BACKGROUND: Most medical institutions use the clinical evaluation form (CEF) to assess the clinical performance of third year medical students on clerkship rotations. CEFs are often shared and customized by institutions but are rarely studied for reliability and validity.

OBJECTIVE: To empirically analyze the CEF used for evaluating clinical performance of medical students in their third year on their pediatric rotation at a major teaching hospital.

DESIGN/METHODS: We analyzed 187 CEFs completed for 52 third year medical students on

their pediatric clerkship during the 2004-2005 academic year. The CEF consists of three sections: eleven **performance assessment** items (9-point Likert scale) related to three subdomains of knowledge, clinical skills and professionalism; three **global measures** for these subdomains (9-point Likert scale); and a **summative evaluation** (6-point Likert scale). The final grade (Honors, Pass, Fail) was included in the analysis. We compared items for each of the three subdomains, along with the global and summative scores, for internal consistency and validity. In addition, the National Board of Medical Examiners (NBME) pediatric shelf exam scores were used for further validation of the knowledge items.

RESULTS: There was correlation between the performance and global sections in all the respective subdomains. The highest correlations were for knowledge ($r=.66$ $p<.001$) and professionalism ($r=.63$ $p<.001$). Convergence was found for the clinical skills items at the high and low performance extremes. Global scores had an association with the summative scores but not with the final grade. Summative scores had the highest correlation with the final grade ($r=.48$ $p<.001$). Correlation between NBME scores and individual and global knowledge items were ($r=.19$ $p=.057$) and ($r=.28$ $p=.01$), respectively.

CONCLUSIONS: We found a low to moderate correlation between the performance and the summative evaluation sections. Nevertheless, the correlations may be artificially elevated by the rater's tendency to use the highest third of scale on the CEF. Because there was little correlation between the knowledge items and students' NBME scores, it is possible that evaluators are measuring knowledge differently than the NBME. There is a further need to assess all CEF items and its constructs against standardized measures as a tool for validation.

162 11:30am

Educational Goals of Incoming Pediatric Residents

Laura Dattner, Stephen J. Wadowski, Pediatrics, SUNY Downstate College of Medicine, Brooklyn, NY.

BACKGROUND: The RRC's educational goal for residency training in pediatrics is the preparation of "competent general pediatricians." The ACGME has defined six core competencies. Little is known, however, about the educational goals of incoming pediatric residents and how they compare to the core competencies.

OBJECTIVE: To determine the expectations and goals incoming pediatric residents.

DESIGN/METHODS: We conducted a cross-sectional study in one large urban pediatric residency program. In 2004 and 2005, we surveyed incoming pediatric residents about their general expectations and goals for residency. The survey included three questions which were open-ended. For example: "Overall, what are your expectations from/during residency training?" We conducted univariate analyses using Chi-square tests.

RESULTS: Forty-three surveys were returned (65% response rate). Of the respondents, 21 residents (49%) were International Medical Graduates (IMGs), 12 (28%) were US Medical Graduates (USMGs), and 10 (23%) were US citizens who were International Medical Graduates (US/IMGs). The most frequently mentioned expectations and goals related to patient care (see Table). While patient care and medical knowledge issues were frequently included, systems-based practice (SBP) and professionalism were rarely mentioned. USMGs and US/IMGs were more likely than IMGs to include practice-based learning and improvement (PBL/I) as a goal (67% and 60% vs 24%, $p=0.030$). Comparisons of the other competencies were not statistically significant.

CONCLUSIONS: Educational goals of incoming pediatric residents in our study usually included only some of those specified by the ACGME. Although patient care and medical knowledge were often included among the educational goals of incoming residents, the other competencies, especially professionalism and SBP, were infrequently mentioned. These findings suggest that an orientation to all of the core competencies at the onset of residency is indicated, with an emphasis on the importance of interpersonal and communication skills, professionalism and system-based practice. Comparisons of Goals of Incoming Residents

Competency	IMGs (N=21)	USMGs (N=12)	US/IMGs (N=10)	All Residents (N=43)
Patient Care	95%	100%	90%	95%
Medical Knowledge	57%	83%	80%	70%
Interpersonal and Communication Skills	43%	33%	20%	35%
Practice-Based Learning and Improvement	24%	67%	60%	44%
Systems-Based Practice	14%	17%	0%	12%
Professionalism	5%	0%	0%	2%

Infectious Diseases Platform Session

Sunday, March 19, 2006

9:45am-12:00pm

163 9:45am

Association Between Bell's Palsy and Herpes Simplex Virus Infection in Children

Hnin Khine, Jeffrey R. Avner, Margurite Mayers, Amy Fox, Betsy Herold, David L. Goldman, Pediatric Emergency Medicine, Children's Hospital at Montefiore, Bronx, NY; Pediatric Infectious Diseases, Children's Hospital at Montefiore, Bronx, NY; Department of Pediatrics, Albert Einstein College of Medicine, Bronx, NY; Pediatrics, Mount Sinai School of Medicine, New York, NY.

BACKGROUND: Herpes Simplex Virus type 1 (HSV-1) infection has been implicated as a cause of idiopathic peripheral 7th nerve palsy (Bells palsy) in adults but this association has not been studied in children.

OBJECTIVE: To determine if an association exists between HSV-1 infection and Bells palsy (BP) in children.

DESIGN/METHODS: We performed a prospective, case control study of children, less than 21 years old, with BP who presented to an urban pediatric emergency department over 2 years. Control patients were matched for age, sex, and insurance status. Patients with BP and controls had blood tested for both Lyme disease and the presence of specific antibodies to HSV-1 by ELISA. A swab containing saliva and a swab of tears from the affected side of the facial palsy (any side in controls) were tested for the presence of HSV-1 by PCR. Patients with serologic evidence of Lyme disease were later excluded from the study.

RESULTS: To date, 51 BP patients and 48 controls are enrolled, of which data from 44 BP patients and 28 controls are available for analysis. Median age for BP patients was 9.5 years (range 1-20 years). 48% were male. There was no seasonal variation in presentation of BP. Mean duration of symptoms at the time of presentation was 60 hours. 30/38 (79%, 95%CI: 65, 90) of BP patients had a positive HSV-1 ELISA compared to 15/27 (56%, 95%CI: 37, 73) of control patients ($p=0.04$). 10/44 (23%, 95%CI: 12, 36) of BP patients had a positive HSV-1 PCR compared to 2/28 (7%, 95%CI: 1, 21) of controls ($p=0.07$). There were no differences in age, sex, duration of symptoms, or history of recent HSV infection between BP children with a positive HSV-1 PCR and those with a negative HSV-1 PCR. Cold sores were present in 2 (20%) of the 10 BP children with a positive PCR and none (0%) of the 34 BP children with negative PCR.

CONCLUSIONS: The higher rate of positive HSV-1 PCR among children with BP as compared with controls suggests a role of HSV-1 infection in the pathogenesis of BP in children. Given the high prevalence of antibodies to HSV-1 in this cohort, we hypothesize that BP is likely to be associated with HSV reactivation.

164 10:00am Fellow in Training

Human Bocavirus Infection in Young Children

Deniz Kesebir, Marietta Vazquez, Eugene D. Shapiro, Carla Weibel, David Ferguson, Marie L. Landry, Jeffrey S. Kahn, Pediatrics, Yale University School of Medicine, New Haven, CT; Laboratory Medicine, Yale University School of Medicine, New Haven, CT; Epidemiology and Public Health, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Respiratory tract infections are a leading cause of morbidity and mortality in children worldwide. The etiology of a substantial proportion of these infections remains unknown suggesting the possibility they may be caused by previously unknown pathogens. Recently, a novel human parvovirus, designated the human bocavirus (HBoV), was identified in Swedish children with respiratory tract disease. The clinical epidemiology of HBoV remains to be defined. **OBJECTIVE:** To determine whether HBoV was circulating in children in the New Haven, CT area and the clinical features associated with HBoV infection.

DESIGN/METHODS: Two groups of children < 5 years old were screened for the presence of HBoV: children with symptoms of respiratory tract disease and asymptomatic controls. Respiratory specimens were screened by PCR for HBoV NP-1 gene. Each HBoV positive amplicon was confirmed with DNA sequencing and phylogenetic analysis. The frequency of HBoV infection in the 2 groups was compared with the Fishers exact test. Clinical features associated with HBoV infection were obtained by medical record review.

RESULTS: Overall, specimens from 307 children collected from 2001-2004 were screened for HBoV. Nineteen of 211 (9.0%) of symptomatic children and 0 of 96 (0.0%) controls tested positive for HBoV by PCR ($p<0.001$). A majority of HBoV isolates (17 of 19, 89.5%) were identified in specimens collected from October to December. Sequence analysis and comparison of HBoV isolates with HBoV sequence from Sweden revealed rare (<1%) polymorphisms. Clinical features associated with HBoV infection included manifestations of both upper and lower respiratory tract infection.

CONCLUSIONS: HBoV is circulating in New Haven, CT and is associated with both upper and lower respiratory tract disease. Sequence and phylogenetic analysis of HBoV isolates suggests a single viral genotype. Further studies are needed to define the epidemiology of this newly discovered pathogen.

165 10:15am Fellow in Training

Administration of Inactivated Trivalent Influenza Vaccine (TIV) to Parents of High-Risk Infants in the Neonatal Intensive Care Unit (NICU): Effect on Vaccination Rates

Shetal I. Shah, Martha Caprio, Pradeep Mally, Karen Hendricks-Munoz, NICU, NYU School of Medicine, New York, NY.

BACKGROUND: Infants less than 23 months of age with influenza — particularly those discharged from the NICU — demonstrate significant morbidity. TIV is indicated for parents and household contacts of these infants. However the influenza vaccination rate in this population is estimated at 30%; with access and convenience of immunization cited as major obstacles toward higher compliance. To eliminate these barriers, we implemented NICU-based administration of TIV.

OBJECTIVE: To determine if administration of TIV in the NICU increases vaccination rates among parents of this high risk population.

DESIGN/METHODS: For a four-week period at the beginning of influenza season, all parents of admitted patients were informed of the risks and benefits of TIV by placing an information letter at their infant's bedside. All staff were educated about the dangers of influenza and instructed to reinforce the need to obtain vaccination. Immunization was available 20 hrs/day.

RESULTS: Over the study period, 31 children (60 parents) were admitted to the NICU with gestation ages ranging from 24 to 41 weeks. Five parents received the vaccine from their obstetrician. Vaccination rate was 95% (57 parents of 28 infants). 27% of the parent population had never received TIV, despite having previous indications for immunization (smoking, asthma, or other children less than 23 months). 33% of the population received TIV for the first time. There were no differences in vaccination rate based on parental age. No allergic reactions to vaccination were observed. The three full term infants whose parents were not immunized were not offered vaccination and spent < 48 hours in the NICU.

CONCLUSIONS: Administration of TIV in the NICU is an effective means of increasing vaccination rates in parents of this population. In addition, the improved access and convenience allows for an increase in first-time vaccination of parents who were previously eligible to receive TIV, but were never immunized.

166 10:30am Fellow in Training

Influenza Vaccine Coverage Among Children Aged 6-23 Months: 2000-2005

Jennifer R. Verani, Matilde Irigoyen, Shaofu Chen, Frank Chimkin, Division of General Pediatrics, Columbia University Medical Center, New York, NY.

BACKGROUND: Influenza is a significant cause of morbidity for young children and infants. In 2002 ACIP/AAP expanded influenza vaccine recommendations to encourage when feasible the immunization of healthy children aged 6-23 months. Little is known about changes in coverage rates reflecting this new recommendation.

OBJECTIVE: To assess the influenza vaccine coverage rates among children aged 6-23 months within an inner city practice network before and after the change in recommendation for influenza immunization in this age group.

DESIGN/METHODS: We conducted a retrospective review of influenza vaccine coverage among children aged 6-23 months for the 2000-2005 influenza seasons at a practice network in New York City serving a minority, Medicaid population. The study population included five annual cohorts of children aged 6-29 months as of 3/31 of each year with at least one visit to the network in the last 12 months. The source for immunization, demographic and visit data was the hospital immunization registry and the linked billing/registration system. For each cohort, we determined influenza vaccine coverage rates for any dose, two doses (two in one season or one dose in season and another in prior season) and one only.

RESULTS: Five annual cohorts yielded a total n=7,063 (50% male) Coverage rates increased significantly throughout the five year period (see Table). The relationship between year and coverage was linear ($R^2 = 0.9208$). There was also an increase in the proportion of children who should have received two doses but received only one dose.

Influenza Vaccine Coverage: Children Aged 6-23 Months (n=7,063)

Season	% Any Dose	% 2 Doses	% 1 Dose
2000-2001	2.6	1.3	1.3
2001-2002	4.2	2.2	2.0
2002-2003	14.1	7.6	6.4
2003-2004	22.2	12.6	9.6
2004-2005	38.9	22.6	16.3

CONCLUSIONS: Influenza vaccine coverage among children aged 6-23 months increased steadily and significantly from 2000 through 2005. However, more than half the children remained unvaccinated and of those vaccinated, half were only partially vaccinated since they failed to receive a second dose of vaccine.

167 11:00am

Inflammatory Factors in Synovial Fluid from Patients with Acute and Chronic Lyme Arthritis

Paul T. Fawcett, Carlos D. Rose, Victoria L. Maduskuie, Jennifer J. Sanderson, AnneMarie C. Brescia, Phillip A. Stanek, Research Immunology, Alfred I. duPont Hospital for Children, Wilmington, DE; Thomas Jefferson Medical College, Philadelphia, PA.

BACKGROUND: Despite treatment with antibiotics, arthritis persists in 10 to 20 percent of children diagnosed with Lyme arthritis (LA).

OBJECTIVE: To determine if inflammatory factors differ between acute and chronic (LA) synovial fluids (SF) obtained from pediatric patients.

DESIGN/METHODS: SF from patients with either acute (resolution <6 months) or chronic LA (persistence ≥ 6 months) were probed for inflammatory factors by protein array (Ray Biotech, Inc.) and 23 LA SF's were tested for IL-1a, IL-2, IL-12, MMP-3, and TNF-a by quantitative ELISA (R&D Systems, Inc.). Serologic or PCR testing gave no indication of persistent infection. **RESULTS:** SF from patients with acute LA had detectable levels of 22 of 40 inflammatory factors tested while SF from chronic LA patients had detectable levels of 33. One chronic Lyme patient had detectable MIG and IL-3, while a second had detectable levels of IL-2 and EOTAXIN.

Diagnostic Total Factors Mean Number

Category	Detected	of Factors	Factors Detected
Acute LA	22	14.25	EOTAXIN-2, ICAM-1, IL-1b, IL-6, IL-6sR, IL-7, IL-8, IL-10, IL-12p40, IL-12p70, IL-13, IL-16, IP-10, MCP-1, MIP-1 b, MIP-1d, RANTES, TNF-a, TNF-b, sTNF-RI, sTNF-RII, TIMP-2
Chronic LA	33	23.75	EOTAXIN-2, ICAM-1, IL-1 b, IL-6, IL-6sR, IL-7, IL-8, IL-10, IL-12p40, IL-12p70, IL-13, IL-16, IP-10, MCP-1, MIP-1 b, MIP-1d, RANTES, TNF-a, TNF-b, sTNF-RI, sTNF-RII, TIMP-2, EOTAXIN, GCSF, GM-CSF, INF-g, I-309, IL-1 a, IL-3, IL-2, IL-15, PDGF-BB, MIG

Quantitative assessment indicated differences in levels of IL-6, IL-8, IL-10 and TIMP-2 between chronic and acute LA patients. Levels of IL-6 and TIMP-2 appear higher in chronic LA, while IL-8 and IL-10 appear higher in acute LA. ELISA tests indicated TNF-a levels were significantly higher ($p=0.0125$) in SF from chronic LA ($43.1 \text{ pg/ml} \pm 10.8 \text{ S.E.}$) than SF from acute LA patients ($14.5 \text{ pg/ml} \pm 4.5 \text{ S.E.}$)

CONCLUSIONS: Findings indicate that protein array assessment of inflammatory factors may have utility in predicting outcomes in pediatric Lyme arthritis. In addition, our findings suggest that measurement of TNF-a may discriminate between these populations and that anti-TNF-a biologics may be effective in patients with chronic LA.

168 11:15am

The Contribution of Replication Capacity to Evolution of HIV Reverse Transcriptase Inhibitor Resistance

Elijah Paintsil, Asa Margolis, Jennifer A. Collins, Louis Alexander, Pediatrics, Yale University School of Medicine, New Haven, CT; Epidemiology & Public Health, Yale University School of Medicine, New Haven, CT.

BACKGROUND: All currently recommended anti-retroviral therapy protocols employ reverse transcriptase inhibitors (RTIs). The contribution of HIV replicative capacity to the evolution of reverse transcriptase inhibitor resistance has not been elucidated despite its potential implications for therapeutic strategies.

OBJECTIVE: To study the contribution of replicative capacity of mutants to viral fitness and the evolution of drug resistance.

DESIGN/METHODS: In this study we utilized a competitive fitness assay to assess the relative fitness of thirteen drug-resistant HIV mutants in the presence and absence of inhibitor. Among these were 41L/210W/215Y (pathway 1) and 67N/70R/219Q (pathway 2) that confer high-level resistance to zidovudine (thymidine analogue mutations, TAMs), as well as 103N and 181C that confer high-level resistance to nevirapine. The concentrations of inhibitor used in these studies reflect the IC_{50} (10ng/ml of nevirapine), or a typical serum concentration observed for individuals receiving daily nevirapine (150ng/ml) or zidovudine (1.2 ug/ml) treatment.

RESULTS: Our experiments reveal that in the absence of zidovudine the pathway 2 TAMs 67N/70R and 67N/70R/219Q are fitter than their 70R progenitor species, and the acquisition of 41L by the pathway 1 TAM 215Y substantially increases its fitness. In the presence of zidovudine, 215Y is more fit than 70R and 67N/70R, and the pathway 1 TAMs 41L/215Y and 41L/210W/215Y are the most-fit, consistent with their prevalence in clinical samples. In competitions between 103N and 181C without nevirapine, 103N is the fitter species, which is reversed in the presence of 10ng/ml of nevirapine. Moreover, the fitness advantage of 181C increased in the presence of 150ng/ml nevirapine.

CONCLUSIONS: From these studies we conclude that viral replicative capacity contributes substantially to the evolutionary pattern of TAMs and that, as for protease inhibitor resistance, mutations act in primary (increasing resistance) and secondary (increasing fitness) capacities. We also surmise that drug resistance and fitness are competing forces underlying the emergence of nevirapine resistant species 103N and 181C, consistent with the resistance pattern observed in mothers and their infants treated with this inhibitor.

Neonatology III: Basic Science Studies Platform Session

Sunday, March 19, 2006

9:45am-12:00pm

170

9:45am

Fellow in Training

B-Type Natriuretic Peptide (BNP) System in an Ovine Model of Persistent Pulmonary Hypertension of the Newborn (PPHN)

Bobby Mathew, James A. Russell, Robin H. Steinhorn, Sylvia F. Gugino, Lori C. Nielsen, Rita M. Ryan, Satyan Lakshminrusimha, Pediatrics, SUNY, Buffalo; Physiology & Biophysics, SUNY, Buffalo; Pediatrics, Northwestern University, Chicago.

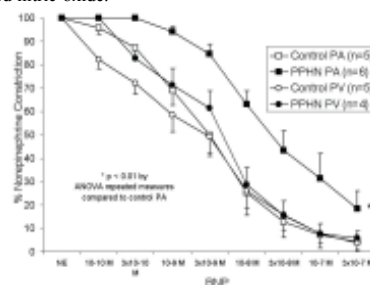
BACKGROUND: BNP is an important stimulant of cGMP production in vascular smooth muscle. It stimulates membrane bound particulate guanylyl cyclase by binding to the natriuretic peptide receptor-A (NPR-A). Recently, BNP levels were reported as diagnostic markers in PPHN. BNP (Nesiritide) is an FDA approved drug for treatment of heart failure in adults.

OBJECTIVE: We studied the changes in function (isolated vessel studies) and expression (RT-PCR) of NPR-A receptors in fifth generation pulmonary arteries (PA) and veins (PV) isolated from late gestation fetal lambs with PPHN induced by ductal ligation.

DESIGN/METHODS: Standard tissue bath techniques were used to study fifth generation PA and PV isolated from PPHN (n = 6) and age matched control lambs (n = 5). All vessels were sub-maximally precontracted with norepinephrine and concentration-response curves for the relaxations to BNP (10^{-10} to 3×10^{-7} M) were obtained. RT-PCR analysis of NPR-A receptor and 18S mRNA were performed.

RESULTS: BNP relaxed PA and PV from both control and PPHN lambs. BNP was a more potent venodilator. PA isolated from PPHN lambs relaxed well to BNP but the responses were significantly lower than controls (fig). RT-PCR analysis of isolated PA and PV segments demonstrated that NPR-A mRNA content (corrected to 18S) from PPHN lambs was similar to controls.

CONCLUSIONS: NPR-A receptor expression is unaltered in the ovine ductal ligation model of PPHN. Functional response to BNP is diminished but still present in PAs isolated from PPHN lambs. We speculate that BNP (either intravenous or inhaled), either alone or in combination with phosphodiesterase 5 inhibitors may offer a therapeutic alternative in babies with PPHN unresponsive to inhaled nitric oxide.



171 10:00am

The Effects of Superoxide Dismutase (SOD) on Actin Dynamics and Endothelial Cell Structure in Response to Hyperoxia

Robert M. Angert, Yuchi Li, Robin H. Steinhorn, Svetla Harkness, Jeffrey A. Kazzaz, Jonathan M. Davis, Pediatrics, CPRI, Winthrop University Hospital, Mineola, NY; Pediatrics, Northwestern University, Chicago, IL.

BACKGROUND: Damage by reactive oxygen species (ROS) has been implicated in the pathogenesis bronchopulmonary dysplasia (BPD). BPD is characterized by significant injury to both epithelial and endothelial cells. Recombinant human SOD prevents ROS-induced cell injury, preserves cell structure and improves clinical outcome in both *in vitro* and *in vivo* models. Actin is a vital cytoskeletal protein that is susceptible to oxidative damage.

OBJECTIVE: To test whether overexpression of SOD can prevent oxidative damage to endothelial cells and preserve actin structure and dynamics

DESIGN/METHODS: Human umbilical vein endothelial cells (HUVEC) were exposed to adenoviral vectors encoding human MnSOD or LacZ control cDNA. Transduced cells were grown on cover slips under 95% O₂ or room air at 37°C for 4 days. Samples were analyzed with SOD and actin antibodies or by fluorescently conjugated dyes to simultaneously detect polymerized and monomeric actin. Metamorphic analysis and quantification were performed. Cell survival was assessed using dye exclusion.

RESULTS: HUVEC exposed to hyperoxia showed disorganized actin and had a swollen, amorphous appearance. There was minimal MnSOD staining in untransduced cells, while MnSOD transduced cells had strong staining, indicating successful gene transfer and expression. These cells also had

more organized, linear actin bundles and were similar to room air controls. Staining for polymerized/monomeric actin revealed organized actin bundles in the MnSOD transduced cells and an increased amount of monomeric actin in the O₂ exposed controls. Polymerized/monomeric actin ratios for Lac Z transduced cells exposed to 4 days of O₂ were 0.060±0.023 versus 0.110±0.011 (p<0.05) for MnSOD transduced cells. While cell structure was significantly improved in MnSOD overexpressors, there were no significant differences in cell survival.

CONCLUSIONS: HUVEC exposed to hyperoxia become swollen, have disorganized (monomeric) actin filaments and abnormal structure. In sharp contrast, cells overexpressing MnSOD had normal structure with organized (polymerized) actin. Protecting cytoskeletal integrity may facilitate normal vascular development and therefore play a role in the prevention of ROS-induced lung injury.

Supported by: 5R01HL054705-09

172 10:15am

Carcinoembryonic Antigen Cell Adhesion Protein: A Novel Type II Cell Marker of Infant Lung Injury?

Nicole A. Bailey, Linda K. Gonzales, Venkatadri Kolla, Roberta A. Ballard, Philip L. Ballard, Pediatrics/Neonatology, Children's Hospital of Philadelphia/Univ of PA, Phila, PA.

BACKGROUND: Carcinoembryonic antigen cell adhesion molecules (CEACAM) are a family of GPI-linked membrane proteins with roles in differentiation, apoptosis and bacterial uptake. CEACAM5/6 are up-regulated during hormone-induced differentiation of cultured human lung type II cells, with some protein localized to lamellar bodies.

OBJECTIVE: We hypothesized that CEACAMs would be present in lung tissue and epithelial cell lining fluid of premature infants with lung disease.

DESIGN/METHODS: CEACAM was assessed by immunostaining in lung tissue (n=12) and by protein blots of serial tracheal aspirate samples from 4 premature infants with lung disease and 9 term infants intubated for surgery.

RESULTS: By immunostaining, CEACAM6 was detected in alveolar type II cells of normal infant lung and was observed at higher intensity in hyperplastic type II cells of infants dying of chronic lung disease. In tracheal aspirates of premature infants, both CEACAM 5 and 6 were detected by western blot (180 and 84 kDa, respectively), with ~5-fold greater abundance of CEACAM6. CEACAM was associated with both tracheal aspirate supernatant (63±6%, mean/SE, n=8) and the surfactant fraction (sedimented at 27,000xg, 1h). The content of CEACAM was low to undetectable in tracheal aspirates obtained during the first days of life and content per total protein increased progressively over the first 2 months. GAPDH and cytokeratin, as markers of epithelial cell damage, were not detected in tracheal aspirates. In intubated term infants, CEACAM5/6 was detected in some but not all aspirate samples. CEACAM was also detected in the medium of cultured human fetal lung type II cells, in part associated with secreted surfactant.

CONCLUSIONS: We conclude that CEACAM5 and 6 are coordinately regulated in developing human lung and are shed and/or secreted from type II cells into the alveolar space. Production of CEACAM5/6 is increased in infants with chronic lung disease. Alveolar CEACAM may be a marker of type II cell hyperplasia in injured lung.

173 10:30am

Fellow in Training

Angiotensin II Stimulates Endothelial Superoxide Generation Via Src Kinase in Bovine Pulmonary Artery Endothelial Cells

Xinmei Li, Lance A. Parton, Susan C. Olson, NICU, Westchester Medical Center, Valhalla, NY; Biochemistry, New York Medical College, Valhalla, NY.

BACKGROUND: Most recently, it has become clear that superoxide anion (O₂⁻) has several potentially important effects on endothelial cells. Endothelial dysfunction is a generally accepted factor contributing to the pathogenesis of Persistent Pulmonary Hypertension of the newborn. Griendling et al. were the first to demonstrate that Angiotensin II (Ang II) activation of the NAD(P)H oxidase in VSMCs leads to the production of O₂⁻. Li and Shah demonstrated that Src kinase plays an important role in activation of NAD(P)H oxidase, which is required for H₂O₂ dependent endothelial nitric oxide synthase (eNOS) expression. But the complete molecular structure of the endothelial oxidase regulated by Ang II is unknown at present and remains to be clarified.

OBJECTIVE: To examine whether Src kinase mediates Ang II-dependent O₂⁻ activation and investigate whether this increased endothelial O₂⁻ regulates eNOS in bovine pulmonary artery endothelial cells (BPAECs).

DESIGN/METHODS: Western Blot Analysis was used to detect eNOS expression.

Endothelial superoxide generation was measured by nitro blue tetrazaline (NBT) method.

Statistical Analysis: Data were expressed as mean ± SEM. All statistical analysis was performed by a Student's t-test. Statistical significance was accepted at P<0.05.

RESULTS: In our previous study (Am J Res Cell Mol Biol 31:365-72, 2004), we demonstrated that Ang II stimulates Src kinase activity, which leads to an increased eNOS expression in BPAECs. In this study, stimulation of O₂⁻ occurred at 30 minutes after Ang II (2.05±0.22 n=7 p<0.01) and blocked by Src kinase inhibitor, PP2 (0.74±0.33 n=3 p>0.15). When Ang II receptor antagonists were present, O₂⁻ activation inhibited by AT₂ antagonist Candesartan (1.52±0.29 n=3 p>0.47), not by AT₁ antagonist PD123319 (2.94±0.88 n=3 p<0.02).

Previously we reported that the flavin oxidase inhibitor, diphenyleneiodonium; inhibited both basal and Ang II-stimulated eNOS protein expression. However, using additional inhibitors including the O₂⁻ scavenger, Tiron, and NAD(P)H oxidase inhibitor, apocynin, we have found that the oxidase does not appear to be involved in eNOS expression.

CONCLUSIONS: In BPAECs, Src kinase mediates Ang II-dependent activation of the O₂⁻ via AT₁ receptor. The oxidase does not appear to be involved in Ang II stimulated eNOS expression.

174 10:45am

Fellow in Training

Hyperoxia Translocates eNOS and Caveolin-1 from Endothelial Cell Surface to Cytoplasm

Antoni D'Souza, Jing Huang, Xiangmin Zhao, Susan Olsen, Lance A. Parton, Rajamma Mathew, Department of Pediatrics, Maria Fareri Children's Hospital/New York Medical College, Valhalla, NY.

BACKGROUND: Premature infants requiring oxygen treatment for RDS often develop Pulmonary Hypertension (PH). Our studies in an experimental model of PH show eNOS dysfunction, reduction in caveolin-1, a major caveolar protein and activation of PY-STAT3, a proproliferative transcription factor. Caveolin-1 has an inverse relationship with PY-STAT3 and it negatively regulates eNOS. Signaling molecules involved in eNOS activation reside in or are recruited to caveolae, and eNOS is targeted to caveolae for optimum activation. Hyperoxia perturbs endothelial cell membrane integrity. Based on these results we hypothesize that hyperoxia disturbs caveolin-1/eNOS relationship resulting in dysfunction of eNOS and caveolin-1 contributing to PH.

OBJECTIVE: To test whether hyperoxia altered eNOS/caveolin-1 relationship in bovine pulmonary artery endothelial cells (BPAECs).

DESIGN/METHODS: We exposed BPAECs to 85% oxygen/ room air for 24 hrs; protein was extracted and cells processed for immunofluorescence. The expression and localization of caveolin-1, eNOS, proliferating cell nuclear antigen (PCNA) and PY-STAT3 were examined.

RESULTS: 1. The level of expression of eNOS and caveolin-1 in the hyperoxia-exposed cells was not altered as compared with the controls. 2. Immunofluorescence studies in the controls revealed caveolin-1 and eNOS to be localized on the cell surface. In cells exposed to hyperoxia, caveolin-1 and eNOS were translocated intracellularly forming discrete complexes. 3. PCNA was present in the nuclei of control cells as well as the cells exposed to hyperoxia, indicative of replicating cells. 4. Activated PY-STAT3 was found only in the nuclei of hyperoxic cells.

CONCLUSIONS: The hyperoxia induces translocation of caveolin-1 and eNOS from the cell membrane to intracellular region. The caveolin-1/eNOS complex and/or the eNOS translocation itself may make eNOS inaccessible to activating molecules present in caveolae, leading to impaired NO production. PY-STAT3 was translocated to nuclei during hyperoxia indicating the activation of cell proliferative pathway. The activation of PY-STAT3 in the presence of caveolin-1 protein indicates that hyperoxia renders caveolin-1 dysfunctional. We speculate that hyperoxia-induced translocation of caveolin-1/eNOS initiates a cascade of events that lead to PH.

175 11:15am

Fellow in Training

Hypoxia Induces Lung Heme Oxygenase-1 in Neonatal Mice

Karen A. Szczepanski, Qing Lin, Guang Yang, Phyllis A. Dennery, Neonatology, Children's Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Perinatal hypoxia leads to persistent pulmonary hypertension (PPHN) in neonates. Heme oxygenase-1 (HO-1), an inducible enzyme that degrades heme to biliverdin, is induced in hypoxia exposed adult rats. Also, lung tissue from hypoxic neonates with PPHN have decreased HO-1 immunoreactive signal compared to controls. Lastly, HO-1 is developmentally regulated and neonatal rats have higher baseline HO-1 expression than adults.

OBJECTIVE: We wanted to understand whether hypoxia resulted in HO-1 induction in the neonates and whether this induction serves to protect against PPHN.

DESIGN/METHODS: Transgenic neonatal mice, which systemically over express the 15 kb mouse HO-1 promoter driving the luciferase gene were subjected to hypoxia (15% FiO₂) for 7 days. Control animals were kept at 21% FiO₂. At 24 hours, 48 hours, and 7 days, the HO-1 promoter activation was determined by evaluating photon emission after injection of intraperitoneal luciferin and imaging with the In Vivo Imaging system (Xenogen, Alameda, CA). The pseudo images were recorded for light intensity and compared to basal photon emission in the same animal. At each time point animals were sacrificed for lung histology and immunohistochemistry as well as HO-1 mRNA using RT-PCR, HO-1 protein using Western blotting, and total HO activity as measured by carbon monoxide using gas chromatography.

RESULTS: The fold increase in HO-1 promoter activation for each condition is shown (table). There was a significant fold induction under hypoxia for each time point as compared to normoxia. Neonatal lung HO-1 protein was also increased after hypoxic exposure. Additionally, the smooth muscle was thickened and HO-1 immunosignal was enhanced in the pulmonary vasculature.

CONCLUSIONS: We conclude that hypoxia increases HO-1 promoter activity and protein in neonatal mice. It will be important to determine if hypoxic induction of HO-1 in neonates is a consequence or a mechanism that serves to protect against PPHN.

Fold Increase in HO-1 Promoter Activation

Condition	24 Hours	48 Hours	7 Days
Normoxia	1.6± 0.4 (n=10)	1.2± 0.2 (n=8)	0.4± 0.3 (n=6)
Hypoxia	14.4± 4.5 (n=19) *	27.3± 10.9 (n=16) #	23± 16.9 (n=9) #

* p<0.05, # p<0.01

176 11:30am

Fellow in Training

Differential Effects of Antenatal Corticosteroids and Brain Ischemia on Tight Junction Protein Expression in the Cerebral Cortex of Ovine Fetuses

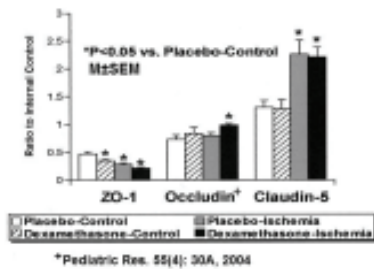
Shadi N. Malaeb, Grazyna B. Sadowska, Edward G. Stopa, Halit Pinar, Barbara S. Stonestreet, Pediatrics, Women & Infants' Hospital of Rhode Island, Providence, RI; Pathology, Women & Infants' Hospital of Rhode Island, Providence, RI; Pathology & Cytopathology, Rhode Island Hospital, Providence, RI.

BACKGROUND: Steroids may act on intercellular tight junctions (TJ) of endothelial cells in the blood-brain barrier (BBB). Antenatal steroids reduce BBB permeability, but do not attenuate pathological ischemic brain injury in the ovine fetus. The effects of antenatal steroids and ischemia on TJ proteins have not been examined in the fetal brain.

OBJECTIVE: To study the effects of antenatal steroids on TJ proteins in cerebral cortex of ovine fetuses with and without exposure to *in utero* brain ischemia (Isch).

DESIGN/METHODS: Catheterized ovine fetuses at 80% of gestation were studied 12 h after the last of four 4-6 mg dexamethasone (Dex) or placebo (PL) injections were given over 48 h to ewes. Groups (gps) were PL-Control (PL-C), Dex-C, PL-Isch, and Dex-Isch (n=5-8). Ischemia consisted

of 30 min of fetal bilateral carotid artery occlusion and 72 h of reperfusion. Cerebral cortex was snap frozen and scored for lesions. Ischemia scores did not differ between PL-Isch and Dex-Isch gps. ZO-1, Occludin, Claudin-5 and Claudin-1 protein expression were examined by Western blot. RESULTS: ZO-1 protein expression was lower in Dex-C than PL-C gp, and lower in Isch gps than C gps; Dex-Isch gp had the lowest expression ($p < 0.01$, Fig). Occludin protein expression was higher in Dex-Isch than the PL-C gp ($p = 0.02$). Claudin-5 protein expression was higher in Isch gps than C gps ($p < 0.01$). Patterns of Claudin-1 were similar among groups (NS). CONCLUSIONS: Maternal corticosteroid pretreatment differentially modulates tight junction protein expression in the cerebral cortex of ovine fetuses after ischemia-reperfusion injury. NIH R01-HD34618



Pulmonary Platform Session

Sunday, March 19, 2006

9:45am-11:45pm

177

9:45am

Childhood Asthma and Extreme Values of Body Mass Index: The Harlem Children's Zone Asthma Initiative

B. Ortiz, H. L. Kwon, K. Shoemaker, B. Jean-Louis, M. Northridge, R. Vaughan, R. Swaner, T. Marx, A. Goodman, L. Borrell, S. Nicholas, Department of Pediatrics, Columbia University-Harlem Hospital Center, NY, NY; Columbia University Mailman School of Public Health, NY, NY; Harlem Children's Zone, Inc, NY, NY; NYC Dept of Education, NY, NY; NYC Dept of Health & Mental Hygiene, NY, NY.

BACKGROUND: Asthma and overweight are chronic conditions that have increased substantially among U.S. children during the past several decades. In Central Harlem, nearly one-third of children < 12 years old have asthma and nearly half are overweight or at risk of obesity. The inter-relationship between asthma and obesity has not been well-defined.

OBJECTIVE: Assess the association between body mass index (BMI) percentile and parent/guardian-reported diagnosis of asthma and asthma-related symptoms or emergency care in the previous 12 months.

DESIGN/METHODS: A cross-sectional analysis was performed from a cohort of 853 children, 2-11 years old, whose heights and weights were measured, body mass index (BMI) calculated, and who had asthma, as screened by the HCZAI, a home-based asthma services program.

RESULTS: Asthma prevalence in girls increased linearly with increasing BMI percentile, from 12.0% in underweight girls (BMI $\leq 5^{\text{th}}$ percentile) to 33.3% in girls at risk for overweight (BMI 85^{th} - 94^{th} percentile). Asthma prevalence in boys was 36.4% in underweight boys, 19.1% among normal weight boys (BMI 6^{th} - 84^{th} percentile), and 34.8% among overweight boys ($\geq 95^{\text{th}}$ percentile), creating a U-shaped curve. Adjustment was made for age, race/ethnicity, and household smoking. In girls, having asthma was associated with being at risk for overweight (odds ratio [OR], 2.6; 95% confidence interval [CI], 1.4-5.0) and overweight (OR, 2.1; 95% CI, 1.2-3.8) compared to being normal weight. In boys, having asthma was associated both with being overweight (OR, 2.4; 95% CI, 1.4-4.3) and with underweight (OR, 2.9; 95% CI, 1.1-7.7).

CONCLUSIONS: The relationship between weight and asthma was linear in girls but U-shaped in boys. Underweight boys are at increased risk of asthma; we were unable to test any possible relationship with birthweight. The high rates of asthma and obesity in Central Harlem must be addressed through multi-level community-based interventions that concomitantly address asthma and weight gain in both pre-school and school-aged children.

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10:00am

Medical Student

Asthmatic Children's Perception of Their Symptoms Is Related to Clinical Measures of Asthma Severity but Not to Pulmonary Function Testing

Jong Ho Park, Samuel Evans, Jessica Stewart, Elana Altzman, Eugene Dinkevich, Madu Rao, Pediatrics, Children's Hospital at Downstate/SUNY Downstate College of Medicine, Brooklyn, NY.

BACKGROUND: Patients' and parents' perception of asthma severity may be based on how it affects their daily activities and on how they feel. This perception may affect compliance with appointments and medications. Physicians tend to rely on symptom history as well as pulmonary function testing to determine asthma severity in accordance with the NIH guidelines. An objective measure of how asthma affects daily activities and quality of life may help physicians better tailor their treatment plan.

OBJECTIVE: To determine whether objective measure of quality of life (QOL) correlates with asthma severity and pulmonary function testing (PFT).

DESIGN/METHODS: We conducted a cross-sectional study in which a validated measure of QOL was administered to a convenience sample of patients 7-17 years of age attending our hospital's asthma specialty center serving inner-city Brooklyn, NY. The questionnaire consisted of 23 questions measuring the physical, emotional, and social impact on the child's well-being. Seven point Likert scale was used. PFTs were obtained from each patient, and included peak expiratory flow and forced vital capacity as measures of effort, FEV1 as measure of large airway impairment, and FEF 25-75 as measure of small airway impairment. Asthma severity was obtained from clinical records based on the frequency of symptoms per week during the previous month. Pearson product moment was used to test for correlations between variables.

RESULTS: Sixty seven patients were enrolled in the study. The mean age (SD) was 11.1 (2.8) years, 39% were female, 94% were African-American. 68% were on inhaled corticosteroids and 7% were oral steroid dependent. The QOL scores showed significant correlation with total asthma severity score ($r = 0.287$, $p < 0.04$), symptom scores including day-time symptoms ($r = 0.431$, $p < 0.002$), night-time symptoms ($r = 0.357$, $p < 0.008$), and activity limitation ($r = 0.379$, $p < 0.005$). There were no significant correlations between the QOL scores and any component of the PFTs.

CONCLUSIONS: The QOL score correlates significantly with objective measures of asthma severity based on NIH guidelines but not with PFTs. Future research needs to focus on long term relationship between asthma severity and PFTs and effect of QOL on compliance with visits and medications.

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10:15am

House Officer

Defining Exercise Induced Bronchospasm . . . Asthma or a Separate Entity?

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BACKGROUND: Exercise induced bronchospasm (EIB) and asthma have similar clinical pictures. EIB has been noted in children with asthma and also in otherwise healthy children without a diagnosis of asthma, yet the GINA management strategy of 2002 does not recognize EIB as a separate entity. The apparent conflict in opinion has lead to the treatment of EIB as an entity separate from asthma.

OBJECTIVE: Our questions in this study are: 1) Are the criteria for asthma met in EIB? 2) What percentage of patients visiting a pulmonologist office with exercise induced respiratory symptoms have true asthma? 3) Is there a way to differentiate, by history, physical or testing, which of those will have asthma?

DESIGN/METHODS: This study is a retrospective chart review of 62 patients who visited a pulmonologist office with exercise induced respiratory symptoms as their chief complaint. Data regarding those patients' age, sex, height, weight, initial spirometry, family history, patient history, and pertinent social/environmental risk factors was collected. The data was then analyzed for similarities. Asthma was defined by spirometry results and/or a positive methacholine challenge.

RESULTS: Out of 62 patients 39 were female and 24 were male. They were predominantly Caucasian (96%). The patients were divided into two groups: those who met the diagnostic criteria for asthma (group A) and those who did not (group B). Forty-five patients met the diagnostic criteria for asthma (72%). The groups were similar in age and sex distribution. Of the patients 16% in group A were exposed to environmental cigarette smoke vs. 22% in group B, 81% in group A had a family history of atopy vs. 100% in group B, 80% of group A had exposure to pets vs. 72% of group B, and 15.5% of group A patients were obese vs. 11% of group B.

CONCLUSIONS: A significant percentage of patients referred to a pulmonologist office with only exercise induced respiratory symptoms have true asthma by spirometry and/or methacholine challenge. Therefore, the patients who present with exercise induced respiratory symptoms should have spirometry testing and possibly methacholine challenge as part of their workup to diagnose asthma. They should also be medically treated as such. The classic history of atopy and environmental exposure to smoke and pets were not significantly different between the two groups. Neither was age or sex.

180

10:45am

Fellow in Training

Recurrent Wheezing in VLBW Infants Without Bronchopulmonary Dysplasia (BPD)

I. D. Panthagani, T. P. Stevens, K. Lynch, K. M. Conn, J. S. Halterman, Neonatology; General Pediatrics, Univ. of Rochester, NY.

BACKGROUND: While VLBW infants with BPD are known to be at high risk for recurrent wheezing, less is known about the incidence and etiology of recurrent wheezing in VLBW infants without BPD.

OBJECTIVE: To determine the incidence, severity and predictors of recurrent wheezing in VLBW infants without BPD.

DESIGN/METHODS: 113 VLBW (<1500g BW) infants were enrolled at NICU discharge into a prospective cohort study; 85/113 did not have BPD (no oxygen requirement at 36 weeks CGA) and are presented here. Data on neonatal illness and respiratory support were collected from the NICU medical database. Parent reports of respiratory outcomes were collected by detailed in-person respiratory interview performed at 6-9 months adjusted age. Primary outcomes were parent report of symptomatic airway dysfunction (SAD, defined as daytime or nighttime wheezing or cough over 2 wks) and need for outpatient or inpatient treatment of respiratory symptoms since NICU discharge (need for health services). Symptom severity was defined per the 2002 National Asthma Panel Guidelines.

RESULTS: Twenty-three (28%) infants experienced SAD within 2 wks prior to parent interview and thirty-five (41%) used health services for airway dysfunction at the 6-9 mo. follow-up interview. The prevalence of SAD was significantly higher among infants with home tobacco exposure compared to those without (48% vs. 19%, $p < 0.01$). Additionally, children with SAD had longer exposure to > 30% oxygen (mean 3.1 vs. 1.1d, $p < 0.05$) and longer exposure to mean airway pressure > 6cm H₂O (mean 0.8 vs. 0.6d, $p < 0.05$) in the NICU. Infants requiring > 30% oxygen for > 1 day (50% vs. 29%, $p < .05$) and infants exposed to mean airway pressure of > 6cm H₂O for > 1 day (48% vs 26%, $p = .05$) were more likely to require health services for respiratory symptoms compared to infants with less exposure. In multivariate analysis controlling for birth wt and mean airway pressure on mechanical ventilation, tobacco exposure (OR 9.8; CI, 1.1-78) and neonatal oxygen exposure of >30% for >1 day (OR 1.4; CI, 1.0-1.9) were independently associated with greater symptom severity.

CONCLUSIONS: A significant proportion of VLBW infants without BPD experience SAD and need health services for respiratory diseases within the first year of life. Both neonatal oxygen exposure and post-natal tobacco exposure are potentially modifiable factors that significantly increase the risk of SAD among these infants.

181 11:00am

Effect of Short Course of Oral Steroids on Outcome of Premature Babies with Bronchopulmonary Dysplasia

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BACKGROUND: Inflammation is thought to play a prominent role in the etiopathogenesis of BPD. Dexamethasone has been found to be effective in weaning babies off mechanical ventilation but ineffective in reducing the duration of oxygen therapy or length hospitalization. Little is known about the effect of oral prednisone (OP) in infants with oxygen dependent BPD.

OBJECTIVE: The purpose of our study was to determine whether OP is effective in weaning premature babies with BPD greater than 36 weeks corrected age, off supplemental oxygen therapy (O2).

DESIGN/METHODS: Retrospective data analysis.

RESULTS: Data on 385 patients with BPD admitted to University of Connecticut Health Center NICU (2000-04) were analyzed. OP was administered to 131 patients for the purpose of weaning off O2. A comparison was done between babies that received OP and those that did not. There was no difference in GA at birth, birth weight, race and gender between the two groups. However, the group that received OP had longer length of stay (107 d ± 35 mean ± sd vs 80.6 d ± 28 p < .0001), higher prior use of dexamethasone for acute lung disease (52% vs 34%; p = 0.0008), longer duration of mechanical ventilation (mean ± sd, 18 d vs 13 d; p = 0.01) and a greater likelihood of discharge on O2 (37% vs 15%; p < 0.05) as compared to the group that did not receive OP. When multiple logistic regression incorporating GA at birth, birth weight, prior use of dexamethasone and duration of mechanical ventilation was applied the use of OP was significantly associated only with increased length of stay. The use of OP was not effective in weaning babies off O2, as only 73% of babies in the OP group went home without O2 vs. 85% in the group that was not treated (p < 0.01). In addition, use of multiple courses of OP was not effective in weaning off O2.

CONCLUSIONS: We conclude that the use of OP for weaning O2 in premature babies greater than 36 weeks corrected age, with oxygen dependent BPD is questionable. There may be other clinical markers which may help identify a subset of babies that are likely to respond to this therapy.

182 11:15am

Fellow in Training

Effect of Bias Flow on Work of Breathing (WOB) During Bubble Nasal Continuous Positive Airway Pressure (BNCPAP): A Pilot Study

Doron J. Kahn, Robert H. Habib, Michael D. Weisner, Andrew M. Steele, Rachana Singh, Sherry E. Courtney, Neonatal Perinatal Medicine, Schneider Children's Hospital, New Hyde Park, NY; Mercy Children's Hospital, Medical University of Ohio, Toledo, OH; Equilibrated Biosystems Inc., Smithtown, NY.

BACKGROUND: BNCPAP is a popular mode of respiratory support for preterm infants. However, flow settings for provision of BNCPAP are not standardized. We have shown in a lung model that the flow of gas through a BNCPAP system will affect delivered NCPAP. The effects of changes in gas flow on WOB and respiratory mechanics are not known.

OBJECTIVE: To compare inspiratory WOB and lung compliance (CL) in preterm infants at increasing bias flow rates during BNCPAP.

DESIGN/METHODS: We studied 10 preterm infants, birth weight 979±251g, gestational age 26.7±1.7wks, age at study 19±10d (mean±SD), who required CPAP for mild respiratory distress (FiO2 0.21-0.35). Infants were studied at BNCPAP of 4 and 6cmH2O, at increasing flows (increments of 2 L/min). Tidal volumes (Vt) were obtained by calibrated respiratory inductance plethysmography. Pleural pressure was estimated via an esophageal balloon catheter. WOB was calculated from pressure volume data.

RESULTS: Breathing pattern (respiratory rate [RR] and Vt), WOB, and CL at all BNCPAP and flows are summarized in the Table. Multiple linear regression analyses indicated that WOB (p=0.029), and elastic WOB (p=0.01) were increased by flow. Resistive WOB (RWOB) increased with increasing RR and decreased with increasing postnatal age (P<0.001). CL increased with increasing age (P=0.04).

CONCLUSIONS: Both WOB and its elastic component were increased at higher bias flow rates. We speculate that these results reflect lung overdistention at greater than desired NCPAP provision when using higher flows during BNCPAP. Delivered BNCPAP should be measured to assure its equivalence to the intended pressure.

Flow (L/min)	Set BNCPAP = 4			Set BNCPAP = 6		
	4	5	6	4	5	6
Mean (SD)	40 (7.0)	46 (9.6)	53 (7.5)	37 (7.7)	47 (9.6)	56 (9.6)
Mean (SD) (n=10)	7.9 (2.0)	8.8 (2.9)	9.4 (2.4)	9.2 (2.1)	9.7 (2.6)	10.2 (2.6)
Tidal Volume (ml/kg)	1.0 (0.4)	0.99 (0.37)	1.38 (0.46)	0.82 (0.27)	1.39 (0.50)	1.12 (0.37)
WOB (cmH2O/L)	1.0 (0.4)	1.03 (0.37)	1.43 (1.03)	1.32 (0.88)	1.25 (0.74)	1.39 (0.85)
Compliance (ml/cmH2O)	1.8 (0.6)	1.28 (0.41)	0.83 (0.40)	1.39 (0.72)	1.17 (0.37)	2.07 (0.78)
Resist. (cmH2O/L/s)						

183 11:30am

Effect of Nitric Oxide Synthase (NOS) Inhibition on Ovine Bronchial Derived Relaxing Factor (BrDRF): Changes with Development and Hyperoxic Ventilation

Satyan Lakshminrusimha, Frederick C. Morin III, Robin H. Steinhorn, Rita M. Ryan, Sylvia F. Gugino, Vasanth H. Kumar, James A. Russell, Pediatrics, Physiology & Biophysics, SUNY, Buffalo; Pediatrics, Northwestern Univ., Chicago.

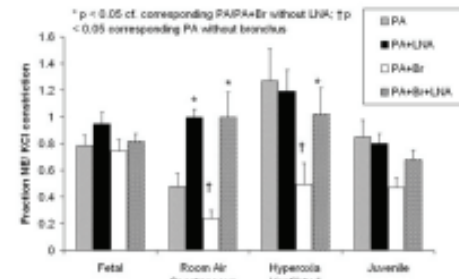
BACKGROUND: Recent studies have suggested that a bronchial derived relaxing factor (BrDRF) decreases the contractility of newborn, but not fetal, rat pulmonary arteries (PA) by a nitric oxide (NO)-mediated mechanism.

OBJECTIVE: We studied the effect of an adjacent bronchus on PA contractility to norepinephrine (NE) in late gestation fetal (n=5), spontaneously room air breathing neonatal (1day old, n=4), ventilated hyperoxic neonatal (24h ventilation with 100% oxygen, n=5), and 6 week old juvenile lambs (n=7) in the presence and absence of the NO synthase inhibitor, LNA.

DESIGN/METHODS: Sheep were anesthetized, sacrificed and 5th generation PA rings with and without an attached adjacent bronchus (PA+Br) were contracted in standard tissue baths using NE (10⁻⁶ M) with and without 10⁻³ M LNA. At the end of the experiment, all PAs were washed and contracted by 118mM KCl. NE contractions were expressed as a fraction of KCl contraction.

RESULTS: Contraction generated by NE was significantly impaired by an attached bronchus in the neonatal, ventilated neonatal and juvenile but not fetal lambs. Hyperoxic ventilation markedly increased contractions to NE in PA but not in PA+Br. LNA enhanced the contractile response to NE in PA+Br in postnatal lambs but not in fetal lambs. LNA also enhanced the contractile response in PA from spontaneously room air breathing neonatal lambs but not from fetal lambs or ventilated hyperoxic lambs.

CONCLUSIONS: We conclude that BrDRF is produced by the bronchus, is developmentally regulated, dependent on NO production and is effective postnatally and following exposure to hyperoxia. We speculate that this factor may have an important role in postnatal reduction of pulmonary vascular resistance.



THINGS TO DO WHILE IN GREENWICH



Bush-Holley Historic Site

Home of Connecticut's first art colony, the Historical Society's facilities include the circa 1730 National Historic Landmark Bush-Holley House; the circa 1805 visitor center, housed in a former village post office; the Hugh and Claire Vanderbilt Education Center, set in a mid-19th century barn and artists' studio. The grounds and gardens have been restored to their appearance during the Cos Cob Impressionist art colony that thrived between 1890 and 1920.



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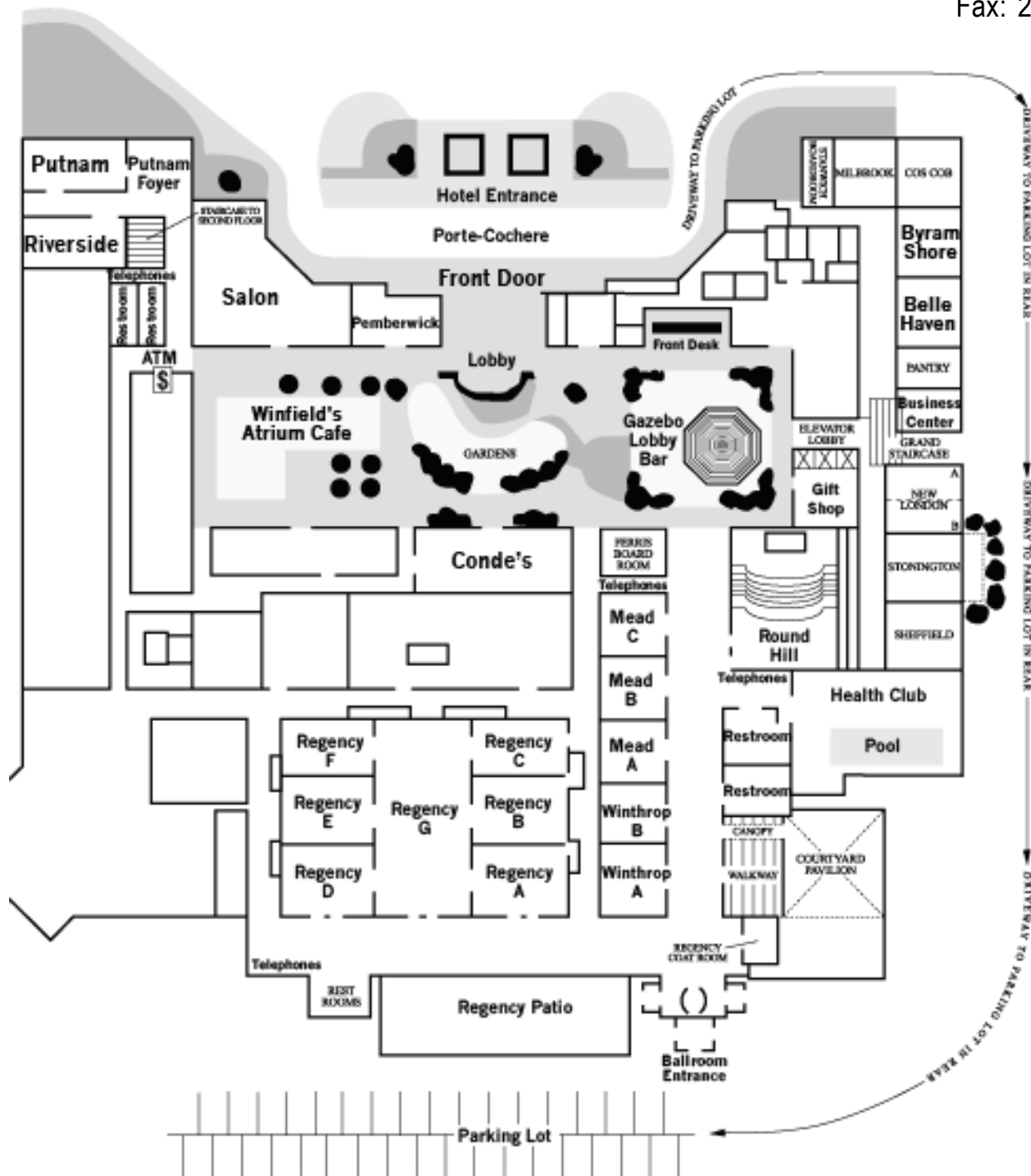


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