MSPR Poster Symposium III - Maternal Factors; Miscellaneous

Friday, October 9 11:30 AM-12:50 PM CDT

Moderators
Lyndsay Harshman - The University of Iowa Stead Family Department of Pediatrics
David Gordon – University of Iowa
Maria Dizon - Ann and Robert H Lurie Children's Hospital of Chicago

CDT	Abstract	Title	Presenting Author
11:30 AM		Introduction & General Information	
11:35 AM	3476592	Leisure Turned Pathological: Internet Gaming Disorder and Alcohol Use Disorder in Young Adults	Ajay Singh
11:40 AM	3475662	Neonatal-Perinatal Medicine Fellowship training for prenatal consultations: a descriptive survey	Lindsey Beer
11:45 AM	3476550	Maternal lipids regulate neonatal dendritic cells during development of allergic disease	Jacquelyn Lajiness
11:50 AM	3476642	Resuscitation at the margin of viability: Does resource utilization have a role in the ethics of offering resuscitation during the 22nd week of gestation?	Samantha Millikan
11:55 AM	3475795	Preterm infants exposed to chorioamnionitis have decreased CCL2 expression through 34 weeks' gestation	Gretchen Stepanovich
12:00 PM	3475733	Smart technology and education for smart protection against the Flu: Impact of a multifaceted quality improvement (QI) intervention on pediatric influenza vaccination rates	Ashlesha Kaushik
12:05 PM	3476614	Acquisition of Symptomatic Cytomegalovirus (CMV) Infection in Breast Milk-Fed Very Low Birth Weight (VLBW) Infants is Independent of the Magnitude of Anti-CMV Antibody Titer in Infant Sera	Lulua Webo
12:10 PM	3475883	The Effect of Early Corticosteroid Therapy on Outcomes in Children with Septic Shock - A Propensity-Weighted Analysis	Nicole Kamps
12:15 PM	3475683	Determining the relationship between pre-pregnancy BMI and maternal serum carotenoid levels	Lauren Wegner
12:20 PM	3475950	An evaluation of the Naranjo scale in assessing adverse drug reactions at a free-standing children's hospital	Madhavi Murali
12:25 PM	3475729	Lactational Exposure to High-Fat Diet and Metformin Incites Myocardial Lipid Accumulation in Adult Male Offspring	Emelia Stille
12:30 PM	3476485	Fetal exposure to maternal inflammation plus intestinal dysbiosis results in intestinal injury equivalent to experimental necrotizing enterocolitis	Brian Juber

EDT	Abstract	Title	Presenting Author
12:35 PM	3474261	Maternal BMI and Fetal Iron Status are Predictors of Early Childhood Obesity	Christine Brichta
12:40 PM	3475349	Quantifying Breast Milk Retinol Inadequacy and the Impact on Neonatal Outcomes in a Midwestern United States Population of Postpartum Women	Julia Wickman
12:45 PM		Wrap Up	

Note: Schedule subject to change based on presenter availability.

CONTROL ID: 3476592
TITLE: Leisure Turned Pathological: Internet Gaming Disorder and Alcohol Use Disorder in Young Adults
DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 28
ABSTRACT STATUS: Sessioned
PRESENTER: Ajay Paul Singh
AUTHORS/INSTITUTIONS: A.P. Singh, M.C. Jenkins, M.A. Moreno, Pediatrics, University of Wisconsin-Madison School of Medicine and Public Health, Madison, Wisconsin, UNITED STATES|
CURRENT CATEGORY: Clinical Investigation
CURRENT SUBCATEGORY: None
ABSTRACT BODY:
Background: Internet gaming disorder (IGD) is a behavioral addiction introduced in the DSM5 that has been associated with significant psychosocial morbidity in young adults worldwide. A growing body of evidence has characterized IGD internationally; however, data for young adults in the USA is lacking.
Objective: The purpose of this study was to investigate the prevalence and demographic features of IGD in the US and test the relationship of IGD with alcohol use disorder (AUD).
Design/Methods: A nationally-representative group of US young adults, ages 18 – 25 years, was recruited using Qualtrics panels for an online cross-sectional survey that collected AUDIT-C scores, IGD scores, PHQ-9 depression scores, and GAD-7 anxiety scores. The group was then categorized based on AUDIT-C and IGD score cutoffs as follows: AUD only (+AUD, -IGD); IGD only (-AUD, +IGD); Comorbid (+AUD, +IGD); Control (-AUD, -IGD). Demographic data were compared between the subgroups using paired Pearson's chi-square test with Benjamini-Hochberg correction. Depression and anxiety scores were compared between the groups using Welch's ANOVA and post-hoc Games-Howell testing.
Results: 4713 participants completed the survey fully. Participants were 51.4% female, 34.5% younger than 21 years old, 17% in school, and 59.2% working. Categorization included 29.5% as AUD only, 11.9% as IGD only, 12.1% as comorbid for AUD and IGD, and 46.5% as negative for AUD and IGD. Of note, 51.4% of those with IGD had comorbidity with AUD, whereas only 29% of those with AUD had comorbidity with IGD. The AUD only group was 56.1% female, the IGD only group was 35.5% female, the Comorbid group was 41.4% female, and the Control group was 55% female ($p < 0.001$). A comparison of age distribution found no differences. The Comorbid group had the highest GAD-7 (mean = 11.76, $p < 0.001$) and PHQ-9 scores (mean = 14.25, $p < 0.001$).
Conclusion(s): Males were more likely to suffer from IGD and comorbidity. Individuals who met the criteria for IGD were more likely to suffer from more severe anxiety and depression, with comorbidity with AUD potentially further increasing the severity. These findings support previous international studies suggesting that young adults with IGD share demographic and clinical features globally.
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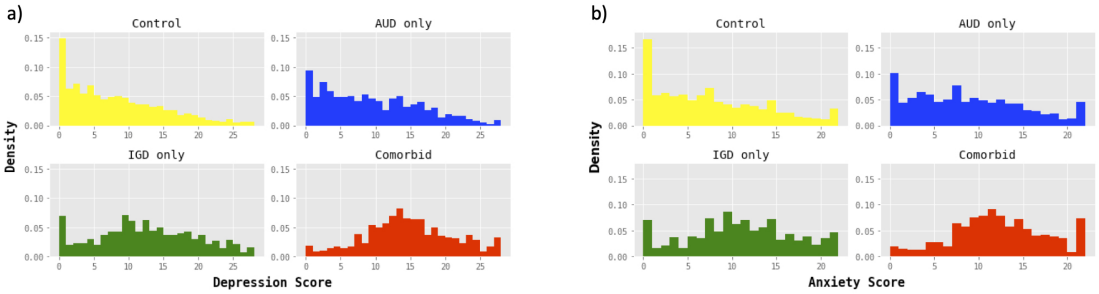
IMAGE CAPTION:

Table 1: Demographic information for total sample and subgroups

	Total sample (n=4713)	Control (n= 2190; 46.5%)	AUD only (n = 1392; 29.5%)	IGD only (n = 561; 11.9%)	Comorbid (n = 570; 12.1%)	P-value (Chi-square test of subgroups)
Gender [bcde]						
Female	2421 (51.4%)	1205 (55.0%)	781 (56.1%)	199 (35.5%)	236 (41.4%)	< 0.001
Male	2141 (45.4%)	909 (41.5%)	579 (41.0%)	342 (61.0%)	320 (56.1%)	
Other	151 (3.2%)	76 (3.5%)	41 (2.9%)	20 (3.5%)	14 (2.5%)	
Age						
< 21	1626 (34.5%)	781 (35.7%)	465 (33.4%)	188 (33.5%)	192 (33.7%)	0.48
≥ 21	3087 (65.5%)	1409 (64.3%)	927 (66.6%)	373 (66.5%)	378 (66.3%)	
Employment/ education status [abcdef]						
School	800 (17.0%)	442 (20.2%)	198 (14.2%)	110 (19.6%)	50 (8.8%)	< 0.001
Work	2788 (59.2%)	1141 (52.1%)	874 (62.8%)	329 (58.7%)	444 (77.9%)	
Both	533 (11.3%)	254 (11.6%)	170 (12.2%)	62 (11.0%)	47 (8.2%)	
Neither	592 (12.5%)	353 (16.1%)	150 (10.8%)	60 (10.7%)	29 (5.1%)	

Superscript letters denote significant difference in pairwise comparison.
Key = a-Control vs. AUD only, b-Control vs. IGD only, c-Control vs. Comorbid, d-AUD only vs. IGD only, e-AUD only vs. Comorbid, f – IGD only vs. Comorbid

Figure 1



a) Normalized histograms of PHQ-9 Depression scores for each subgroup, b) normalized histograms of GAD-7 anxiety scores for each subgroup

CONTROL ID: 3475662
TITLE: Neonatal-Perinatal Medicine Fellowship training for prenatal consultations: a descriptive survey
DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 29
ABSTRACT STATUS: Sessioned
PRESENTER: Lindsey Beer
AUTHORS/INSTITUTIONS: L. Beer, B. Rivera, C. Backes, A. Schlegel, E. Bonachea, Nationwide Children's Hospital, Columbus, Ohio, UNITED STATES|
CURRENT CATEGORY: Clinical Investigation
CURRENT SUBCATEGORY: None
ABSTRACT BODY:
Background: Neonatologists regularly perform prenatal consultations for families experiencing impending preterm birth or prenatal diagnosis of fetal anomalies. The American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG) emphasize the importance of this counseling. The prenatal counseling session is of critical importance for ensuring that families develop an understanding of the expected delivery room and postnatal course, foster a trusting relationship with a neonatal provider, and have time to ask questions and share goals of care.
Despite the importance of prenatal consultations, education that fellows within the United States receive regarding prenatal counseling has not been described in the literature and there is not a standardized curriculum within Neonatal Perinatal Medicine (NPM) fellowships.
Objective: Describe the education that NPM fellows currently receive in leading prenatal consultations.
Design/Methods: A survey was distributed with IRB approval to fellows at NPM fellowships in the United States. The survey contains 4 sections: demographic information, experiences with prenatal consultations, training received in prenatal consultation, and perceived quality of training.
Results: Two hundred twenty-four fellows completed the survey for a 32% response rate. Respondents from all 3 years of fellowship and all regions of the United States were represented. All responding fellows reported being involved in consultations for prematurity.

Regarding consultation training, only 38% of respondents reported receiving training in how to perform a consultation prior to being involved with consultations. Moreover, only 44% report they have received training of this type at any point during fellowship while 62% report receiving training in communication skills during fellowship. 77% of respondents felt additional training would be beneficial. Self identified preparedness to perform a prenatal consultation increased with patient gestational age. Fellows are less comfortable providing consultations for neonates with palliative care concerns (24%) or multiple morbidities (32%).
Conclusion(s): From the perspective of NPM fellows, additional training in prenatal consultations would strengthen existing NPM fellowship curriculum. While all fellows are involved in prenatal consultations, the majority of fellows have not received education in performing prenatal consultations. To better prepare fellows for independent practice, fellowships should address this deficiency.
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CONTROL ID: 3476550
TITLE: Maternal lipids regulate neonatal dendritic cells during development of allergic disease
DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 30
ABSTRACT STATUS: Sessioned
PRESENTER: Jacquelyn Lajiness
AUTHORS/INSTITUTIONS: J. Lajiness, J. Cook-Mills, Pediatrics, Indiana University School of Medicine, Indianapolis, Indiana, UNITED STATES|I. Tat, Indiana University School of Medicine, Indianapolis, Indiana, UNITED STATES|
CURRENT CATEGORY: Basic Science
CURRENT SUBCATEGORY: None
ABSTRACT BODY:
Background: The incidence of allergic disease and asthma have increased rapidly over the past several decades. Our lab is interested in factors of allergic mothers that alter offspring responsiveness to allergen. Maternal lipids are of particular interest as lipids are altered during allergic inflammation, can regulate inflammation, and are transported across the placenta to the fetus. Previous studies have shown that dendritic cells (DCs) are sufficient to promote allergic predisposition in offspring of allergic mothers. We have identified glucosylceramide (GlcCer) as an important maternal lipid metabolite involved in the establishment of allergy in offspring of allergic mothers. This effect can be modulated by tocopherol isoforms present in the maternal diet. It is not known whether lipids of allergic mothers regulate dendritic cell maturation and phenotype directly.
Objective: We hypothesize that GlcCer increases the number of DCs with an inflammatory phenotype (infDCs). We further hypothesize that tocopherol isoforms modulate the effect of GlcCer.
Design/Methods: We treated bone marrow derived DC cultures with GlcCer and tocopherol isoforms. Resultant DC phenotypes were analyzed by immunolabeling and flow cytometry. RNAseq analysis was performed on fetal samples to determine the gene expression changes in our in vivo allergic model.
Results: We demonstrate in vitro that exposure to GlcCer and γ-tocopherol increases infDCs as identified by flow cytometry. Administration of α-tocopherol to DC culture decreased infDCs. Furthermore, α-tocopherol treatment mitigated the GlcCer-induced increase in inflammatory DCs. In contrast, γ-tocopherol exposure potentiated the already drastic increase in the number of infDCs observed with GlcCer treatment. RNAseq identified multiple targets of interest involved in DC differentiation which may contribute to the establishment of allergic predisposition in offspring of allergic mothers.
Conclusion(s): Our work identifies maternal lipids as important factors in modulating DC differentiation which is critical in establishing the allergic phenotype in offspring of allergic mothers. Moreover, these maternal effects are modifiable by supplementation with tocopherol isoforms. These data shed light on mechanistic effects of environmental factors including maternal lipids on DC populations and the development of allergic disease in offspring. Understanding these targets and how they exert their effects on DCs is critical to our understanding and management of allergic disease in our youngest patients.
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CONTROL ID: 3476642

TITLE: Resuscitation at the margin of viability: Does resource utilization have a role in the ethics of offering resuscitation during the 22nd week of gestation?

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 31

ABSTRACT STATUS: Sessioned

PRESENTER: Samantha Millikan

AUTHORS/INSTITUTIONS: S. Millikan, Pediatrics, UChicago Medicine, Chicago, Illinois, UNITED STATES|A. Schuh, C. Carlos, B. Andrews, Neonatology, UChicago Medicine, Chicago, Illinois, UNITED STATES|L. Thomas, University of Chicago Pritzker School of Medicine, Chicago, Illinois, UNITED STATES|D. Feltman, Neonatology, NorthShore University HealthSystem, Evanston, Illinois, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Neonatologists and obstetricians have faced complex ethical decisions surrounding neonatal resuscitation for births occurring at the margin of viability between the 22nd and 24th week of gestation. While resuscitation near the upper end of this gestational age (GA) range is widely offered, significant variation remains among the attitudes and practice of offering resuscitation to infants born at 22 weeks' GA. One facet of the ethical debate is the cost of providing care to those born at 22 weeks' GA.

Objective: Evaluate the relative cost of neonatal intensive care for infants born at 22, 23, and 24 weeks' GA.

Design/Methods: This is a retrospective cohort study conducted at six tertiary hospitals with both MFM and NICU services between 2011 and 2015. The cohort includes mothers with infants admitted between 22 0/7 and 24 6/7 weeks' GA, analyzed by completed weeks of GA. For infants admitted to the NICU, the length of stay (LOS) in days was calculated from time of birth to disposition, either death or NICU discharge.

Results: A total of 129 infants were born at 22 weeks' GA; 72 were liveborn, 25 were admitted to the NICU and 5 survived to discharge. Of 179 infants born at 23 weeks' GA, 153 were liveborn, 99 were admitted to the NICU and 43 survived to discharge. 261 infants were born at 24 weeks' GA; 253 were liveborn, 246 were admitted to the NICU and 145 survived to discharge. Overall, the mean LOS of all infants born at 22 weeks' GA that were admitted to the NICU was 32 days, which was significantly less than that of infants born at 23 weeks GA (80 days, p-value=0.01) and 24 weeks' GA (94 days, p-value<0.01). For infants surviving to discharge, mean LOS did not differ significantly between GA groups. Similarly, for non-survivors, there was also no significant difference in mean LOS between GA groups.

Conclusion(s): When using LOS as a proxy for NICU care costs, these results provide early data that the cost of allowing parental choice for infants born in the 22nd week of gestation at tertiary care centers is actually less costly than caring for their 23, 24 week counterparts. Resuscitation of 22 weeks' GA infants in these circumstances did not present a disproportionate resource burden and this argument should be reconsidered as a deterrent to offering resuscitation.

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IMAGE CAPTION:

Table 1. Clinical Characteristics

	22 weeks (moms n=108) (infants n=129)	**23 weeks** (moms n=155) (infants n=179)	**24 weeks** (moms n=234) (infants n=261)
Chorionicity			
Singleton	84	123	201
Twin	22	29	30
Triplet	2	2	3
Quadruplet	0	1	0
Mean maternal age (years)	27.6	27.4	27.1
Reasons for delivery			
Cervical insufficiency	27	46	43
Preterm labor	61	97	114
PPROM	48	62	102
Pre-eclampsia/ Eclampsia/HELLP	10	15	47
Placenta previa	3	2	5
Other maternal health	4	8	17
Poor fetal growth	1	4	6
Nonreassuring UD	0	5	14
NRFHT	0	10	12
Suspected abruption	3	10	14
Other	23	24	33
Antibiotics given for GBS prophylaxis	18	60	104
Magnesium given for neuroprotection	13	72	183
Antenatal steroids			
No antenatal steroids given	94	63	31
Antenatal steroids given (1 dose)	9	40	48
Antenatal steroids given (2 doses)	5	52	155
Vaginal delivery	105	118	90
Mean birth weight (grams)	468	552*	652**
Liveborn infants	72	153	253
Mean Apgar, 1 min†	1.7	2.2	3.1
Mean Apgar, 5 min‡	1.9	3.2	5.3

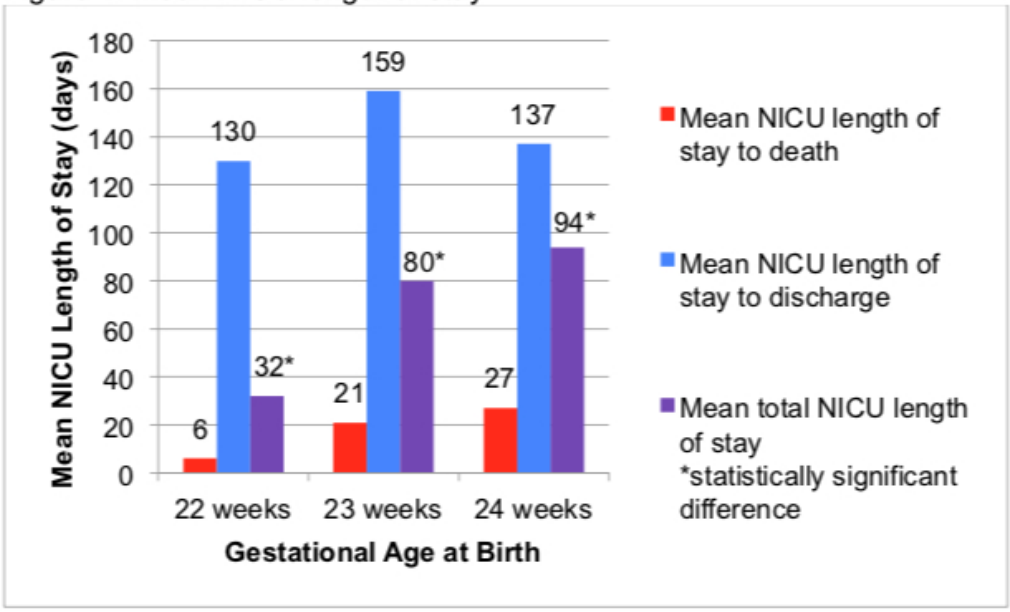
*Missing birth weight on 7 infants

**Missing birth weight on 3 infants

† Missing Apgar on 8 22 wks' GA infants, 6 23 wks' GA infants, and 2 24 wks' GA infants

‡ Missing Apgar on 7 22 wks' GA infants, 6 23 wks' GA infants, and 2 24 wks' GA infants

Figure 1. Mean NICU length of stay



CONTROL ID: 3475795

TITLE: Preterm infants exposed to chorioamnionitis have decreased CCL2 expression through 34 weeks' gestation

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 32

ABSTRACT STATUS: Sessioned

PRESENTER: Gretchen Stepanovich

AUTHORS/INSTITUTIONS: G. Stepanovich, L. Ellsworth, J.R. Bermick, Neonatal-Perinatal Medicine, University of Michigan, Ann Arbor, Michigan, UNITED STATES|C.A. Chapman, N. Lukacs, R. Bailey, University of Michigan, Ann Arbor, Michigan, UNITED STATES|

CURRENT CATEGORY: Basic Science

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Exposure to maternal chorioamnionitis, which is associated with the development of early-onset sepsis, results in an initial pro-inflammatory fetal cytokine response. This response alters the developing immune system and results in decreased pro-inflammatory cytokine expression when a secondary infectious stimulus is encountered. This is particularly relevant in preterm infants exposed to maternal chorioamnionitis as they already have a heightened infection risk related to baseline immaturity of their immune system. It is unknown how long chorioamnionitis-induced dampened immune responses persist.

Objective: Determine how long chorioamnionitis-induced suppressed pro-inflammatory cytokine expression persists by performing longitudinal cytokine profiling on preterm neonates from birth through NICU discharge

Design/Methods: After institutional IRB approval and informed parental consent was obtained, residual serum was collected from routine lab draws in 18 chorioamnionitis-exposed and 29 non-exposed preterm neonates born at <32 weeks gestational age from birth through NICU discharge. Seven cytokines known to be important for immune function, including IL1-b, IL-6, IL-10, IL-8, TNF-a, CCL2 and CCL3, were quantified in the serum using a multiplexed assay involving a silicon photonic microring resonator. Cytokine values were compared between chorioamnionitis-exposed and non-exposed neonates at pre-selected corrected gestational age intervals using 2way ANOVA with Sidak's multiple comparison test. Cytokine values were excluded from neonates who were actively being treated for an infection

Results: The chemokine CCL2 was significantly decreased at corrected gestational ages 29-31 weeks (130 ± 214 pg/mL vs 472 ± 750 pg/mL, $p<0.05$) and 32-34 weeks (182 ± 305 pg/mL vs 1669 ± 3069 pg/mL, $p<0.05$) in chorioamnionitis-exposed preterm neonates compared to non-exposed neonates. No other significant differences were detected.

Conclusion(s): In utero exposure to chorioamnionitis results in persistently decreased CCL2 expression in preterm neonates until 34 weeks corrected gestational age. CCL2 is a chemokine that recruits monocytes and memory T cells to sites of infection/inflammation. These findings indicate that exposure to chorioamnionitis has long-lasting immune consequences for preterm neonates, which may alter their ability to respond to infections. Chorioamnionitis exposure likely increases a preterm neonate's infection risk beyond the immediate neonatal period and warrants further study.

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CONTROL ID: 3475733

TITLE: Smart technology and education for smart protection against the Flu: Impact of a multifaceted quality improvement (QI) intervention on pediatric influenza vaccination rates

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 33

ABSTRACT STATUS: Sessioned

PRESENTER: Ashlesha Kaushik

AUTHORS/INSTITUTIONS: A. Kaushik, Pediatric Infectious Diseases, UnityPoint Health and University of Iowa Carver College of Medicine, Sioux City, Iowa, UNITED STATES|S. Gupta, Division of Pulmonary and Critical Care, Unity Point Health at St. Luke's Regional Medical Center, Sioux City, Iowa, UNITED STATES|K. Beal, Infection Prevention, Unity Point Health at St. Luke's Regional Medical Center, Sioux City, Iowa, UNITED STATES|R. Malley, Division of Infectious Diseases, Boston Children’s Hospital, Harvard Medical School, Boston, Massachusetts, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Low influenza vaccination rates are a public health challenge in the United States and globally. It is imperative that innovative measures to promote influenza immunization are studied.

Objective: To study the impact of a multifaceted QI intervention on influenza vaccination rates in children evaluated at outpatient clinics, urgent care (UC) and emergency departments (ED) at UnityPoint Health tertiary care centers (UPH) in Northwestern (NW) and Northcentral (NC) Iowa (IA), United States.

Design/Methods: Patients aged 6 months-18 years evaluated at UPH in NW and NC IA (at Sioux City, Sergeant Bluff and Fort Dodge encompassing 5 outpatient clinics, 2 UC, 2 ED) were included. A multifaceted QI intervention was implemented on 9/1/2018 consisting of all of the following concomitantly: 1. Patient/family education: Posters about flu vaccination displayed at entrance, in waiting rooms and patient rooms throughout the clinics, UC, ED as well as patient/family handouts emphasizing importance of influenza immunization. 2. Information Technology: “Health maintenance" reminder in outpatient electronic medical record (EMR- EPIC) that appears as soon as a patient’s chart is accessed to remind nurses/providers that influenza vaccine is due. 3. Provider Education flyers at study sites about debunking flu myths. We compared pre-intervention period (P1, 09/01/2017– 05/31/2018) with intervention period (P2, 09/01/2018 – 05/31/2019) for influenza vaccination rates.

Results: A total of 10050 and 9889 patients were evaluated during P1 and P2 respectively. Influenza vaccination rate increased significantly from 56.1% (5642) in P1 to 73.3% (7252) in P2 ($p<0.0001$). Patients were 1.43 times more likely to get vaccinated during P2 than P1 (95% CI= 1.32-1.46). Regionally during P2, influenza vaccination rate was higher than the national (62.6%; $p<0.0001$) and Iowa state averages (65.8%; $p<0.0001$) respectively. Proportion of children aged <9 years receiving second dose of influenza vaccine increased from 43% to 69% ($p<0.001$). Influenza vaccination rates among children aged <3 years increased significantly [40% (1078/2671) in P1 to 47.2% (1287/2723) in P2; $p<0.01$].

Conclusion(s): With the combined educational and technologic intervention, pediatric influenza vaccination rates increased significantly across NW and NC IA, including proportion of patients receiving second dose of the vaccine.

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CONTROL ID: 3476614

TITLE: Acquisition of Symptomatic Cytomegalovirus (CMV) Infection in Breast Milk-Fed Very Low Birth Weight (VLBW) Infants is Independent of the Magnitude of Anti-CMV Antibody Titer in Infant Sera

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 34

ABSTRACT STATUS: Sessioned

PRESENTER: Lulua Webo

AUTHORS/INSTITUTIONS: L. Webo, N. Hernandez-Alvarado, K. Bodin, M.R. Schleiss, Division of Pediatric Infectious Diseases and Immunology, University of Minnesota Medical School Twin Cities, Minneapolis, Minnesota, UNITED STATES|J. Wassenaar, J.R. Ericksen, E.A. Osterholm, Division of Neonatology Masonic Children's Hospital, University of Minnesota Medical School Twin Cities, Minneapolis, Minnesota, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Cytomegalovirus (CMV) can be transmitted postnatally from mother-to-infant through breast milk consumption. While healthy, full-term infants with acquired CMV are often asymptomatic, breastmilk-fed VLBW infants are at a greater risk for symptomatic CMV disease.

Objective: We examined the prevalence of CMV viremia in breast-milk fed VLBW infants admitted to the Neonatal Intensive Care Unit (NICU) at the University of Minnesota Masonic Children's Hospital, with the goal of exploring serological correlates of transmission associated with establishment of, or protection against, infant viremia.

Design/Methods: Breast milk samples were available from 150 mothers, representing 184 infants (including twins). Prevalence of DNAlactia was determined by real-time PCR for lactating mothers. Paired mother's milk/infant serum samples were analyzed to identify for CMV DNAemia. We compared total IgG and IgM antibody in serum from infants receiving breast milk from seropositive mothers with no apparent CMV transmission, with infants for whom symptomatic CMV disease (viremia) was observed.

Results: The prevalence of DNAlactia in the breast milk was 65/150 (43%), with the peak magnitude of virolactia noted at week 6 post-partum. There were 49 mothers for whom CMV was present in breast milk, for which we also had infant whole blood samples (58 infants; 40 singletons and 9 twin pairs). We identified 8 infants, exposed to CMV in the breast milk, that developed CMV viremia (8/58=13%). Interestingly, clinicians were unaware and had not tested for CMV in 5/8 cases. We compared CMV IgM titer (Gold Standard Diagnostics Corp, CA) and CMV IgG titer (Diamedix®, FL) in non-viremic infants from which we had available serum (n=48 infants) and the eight transmitting infants with DNAemia. Anti-CMV IgM antibodies were detected in 6/8 (75%) viremic infants. Mean anti-CMV IgG antibody titer was 60 ± 44 ELISA units (EU) in non-viremic infants compared to 75 ± 31 EU in viremic infants (P=NS).

Conclusion(s): CMV exposure in VLBW in the NICU setting is common and under-recognized. The factors that predict whether an infant develops breast milk-acquired CMV do not seem to include the magnitude of the CMV-specific IgG ELISA antibody titer. Research examining other viral and/or immunological parameters associated with an increased risk of breast milk-acquired infection is needed, in order to identify and intervene for high-risk infants.

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IMAGE CAPTION: ***Figure 1****. Comparison of serum anti-CMV IgG antibody titer in infants with symptomatic CMV disease (viremia) compared to non-viremic infants. The mean antibody titer is 75 ± 31 in viremic infants and 60 ± 44 Diamedix ELISA units (EU) in non-viremic (P=NS).* ***Figure 2****. Serum anti-CMV IgM antibody titer timepoint in infants with symptomatic CMV disease (viremia).*

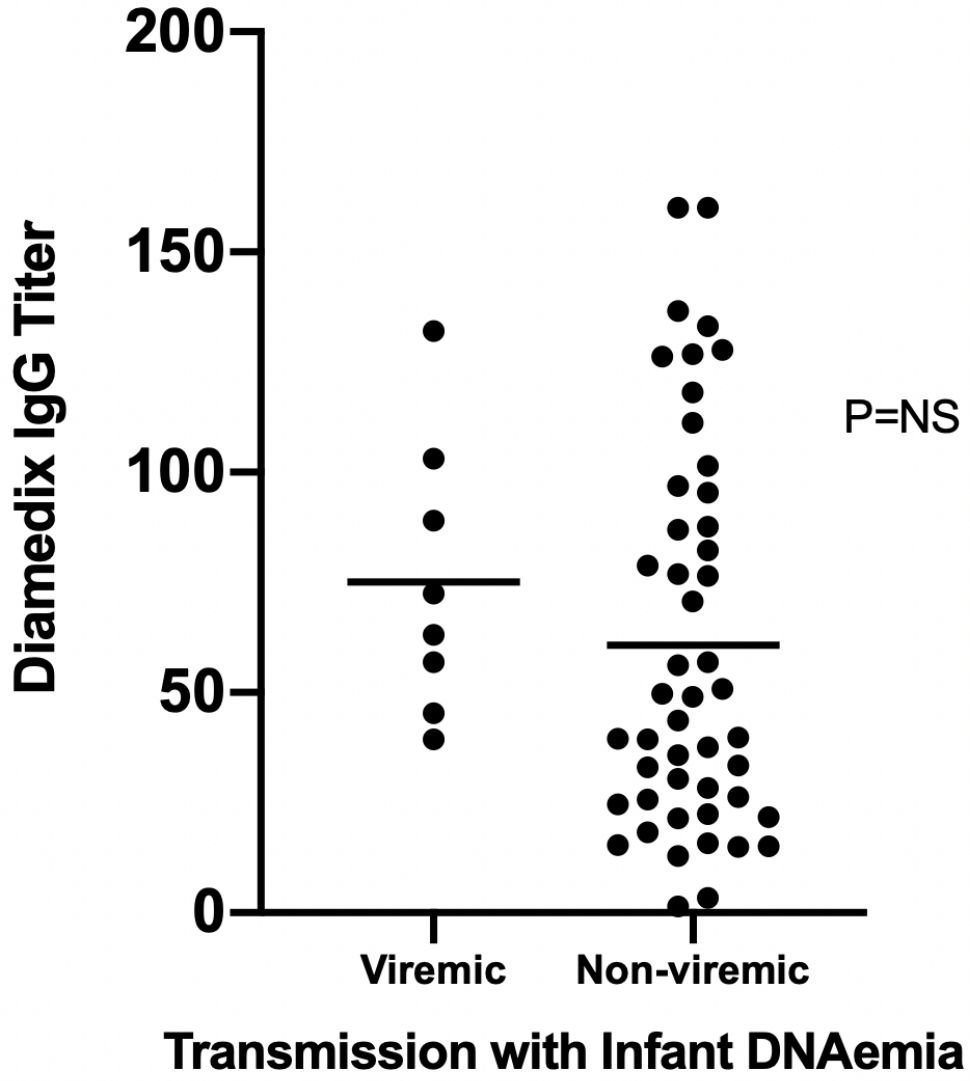

Figure 1*. Comparison of serum anti-CMV IgG antibody titer in infants with symptomatic CMV disease (viremia) compared to non-viremic infants. The mean antibody titer is 75 ± 31 in viremic infants and 60 ± 44 Diamedix ELISA units (EU) in non-viremic (P=NS).*

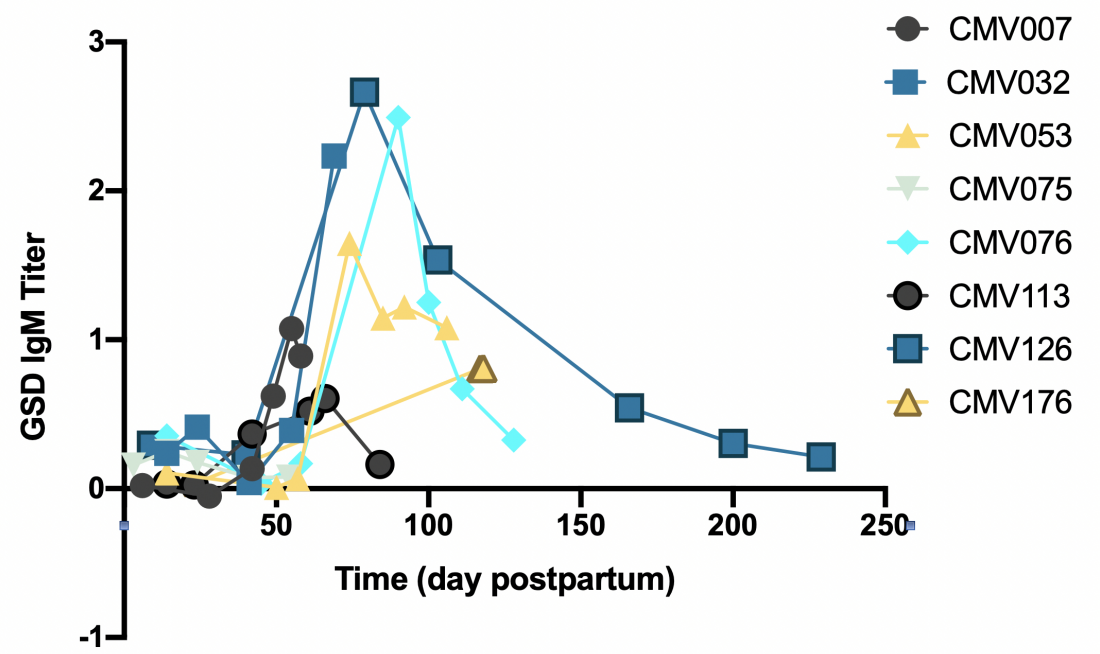

***Figure 2**. Serum anti-CMV IgM antibody titer timepoint in infants with symptomatic CMV disease (viremia).*

CONTROL ID: 3475883

TITLE: The Effect of Early Corticosteroid Therapy on Outcomes in Children with Septic Shock - A Propensity-Weighted Analysis

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 35

ABSTRACT STATUS: Sessioned

PRESENTER: Nicole Nina Kamps

AUTHORS/INSTITUTIONS: N.N. Kamps, P. Cengiz, Pediatrics, Division of Critical Care, University of Wisconsin-Madison, Madison, Wisconsin, UNITED STATES|R. Banks, R.W. Reeder, University of Utah, Salt Lake City, Utah, UNITED STATES|J. Zimmerman, Seattle Children's Hospital, Seattle, Washington, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Corticosteroids are commonly used in the treatment of pediatric septic shock without clear evidence of the impact on mortality and morbidity.

Objective: This study examined the effect of early corticosteroid therapy on the following outcomes in children hospitalized for septic shock: duration of vasoactive-inotropic support (VIS), survival (short-term, without new morbidity), health-related quality of life at month 1, ventilator, hospital and PICU-free days, and severity and duration of organ failure in the PICU.

Design/Methods: This was a retrospective cohort analysis of data obtained from the prospective, descriptive Life After Pediatric Sepsis Evaluation (LAPSE) study that was conducted 2013-2017 across 12 US academic PICUs and included children with community-acquired septic shock requiring VIS and PICU admission. Patients were excluded if they were immunocompromised due to chronic corticosteroid use or if there was no reasonable chance that they would or would not receive corticosteroid therapy (institution standard of care, first day PELOD-2 score of 0, or first day VIS score >60). Outcomes in those who received either hydrocortisone or methylprednisolone on study days 0-3 were compared to those who did not using a propensity score-weighted analysis that controlled for age, sex, study site, and first day PRISM-IV, PELOD-2, and VIS scores.

Results: 323/392 children met inclusion criteria. 150/323 received early corticosteroid therapy. The two groups were successfully balanced based on subjects' propensity scores with an absolute standardized difference of <0.10 for the potentially confounding variables detailed above (Table 1). No statistically significant differences between the groups were detected for any of the outcome measures (Tables 2 and 3).

Conclusion(s): This is the first study to examine the effect of early corticosteroid therapy on mortality and morbidity among children with septic shock. After adjusting for variables with the potential to confound the relationship between early corticosteroid therapy and clinically meaningful endpoints, there was no improvement in outcomes with this therapy. Results from this propensity analysis justify clinical equipoise regarding corticosteroids for pediatric septic shock, and ascertain the need for a well-designed clinical trial to rigorously examine benefit/risk for this intervention.

(no table selected)

IMAGE CAPTION:

Table 1. Baseline Characteristics Determined to be Potentially Confounding Factors Associated with Both Early Corticosteroid Therapy and Outcome

	Cohort Before ITP Weighting			Cohort After ITP Weighting[1]		
	No Early Therapy (N = 173)	Early Therapy (N = 150)	Absolute Standardized Difference	No Early Therapy (N = 173)	Early Therapy (N = 150)	Absolute Standardized Difference
Female	76 (43.9%)	75 (50%)	0.12	78 (45.2%)	67 (44.6%)	0.01
Clinical Institution						
Site A	37 (21.4%)	41 (27.3%)	0.14	44 (25.4%)	37 (25%)	0.01
Site B	9 (5.2%)	4 (2.7%)	0.13	7 (3.8%)	6 (3.7%)	0.00
Site C	11 (6.4%)	7 (4.7%)	0.07	9 (5.2%)	7 (4.8%)	0.02
Site D	5 (2.9%)	20 (13.3%)	0.39	16 (9.2%)	12 (7.7%)	0.06
Site E	29 (16.8%)	11 (7.3%)	0.29	22 (12.9%)	19 (12.4%)	0.02
Site F	8 (4.6%)	12 (8%)	0.14	10 (5.5%)	9 (6.2%)	0.03
Site G	17 (9.8%)	19 (12.7%)	0.09	17 (9.6%)	16 (10.4%)	0.02
Site H	15 (8.7%)	11 (7.3%)	0.05	13 (7.4%)	11 (7.4%)	0.00
Site I	21 (12.1%)	10 (6.7%)	0.19	17 (9.6%)	17 (11.4%)	0.06
Site J	10 (5.8%)	9 (6%)	0.01	10 (5.8%)	8 (5.7%)	0.01
Site K	--	--	--	--	--	--
Site L	11 (6.4%)	6 (4%)	0.11	10 (5.6%)	8 (5.4%)	0.01
Age			0.13			0.04
0-24 months	56 (32.4%)	40 (26.7%)		57 (33.1%)	47 (31.1%)	
2-17 years	117 (67.6%)	110 (73.3%)		116 (67.1%)	103 (68.7%)	
PRISM	10.5 ± 7.2	13.2 ± 8.7	0.34	11.1 ± 7.3	11.5 ± 8.1	0.05
Highest VIS, First Day[2]	8.8 ± 8.6	14.0 ± 13.8	0.45	10.4 ± 10.1	10.8 ± 11.9	0.04
PELOD, First day[2]	8.3 ± 3.31	9.5 ± 3.8	0.35	8.9 ± 3.71	8.9 ± 3.7	0.00

[1] Counts may not sum to expected totals and percentages may not total 100 due to rounding.
[2] First day was defined as day of admission if admission time was before 12:00 pm or following day if admission was after 12:00 pm.
* Continuous variables are represented as mean ± standard deviation, while dichotomous variables are represented as n (percentage).

Table 2. Estimated Effect of Early Corticosteroid Therapy on Primary Outcomes			
	Adjusted odds ratio (95% CI)	Adjusted effect (95% CI)	P-value
Outcomes (N=323)			
VIS-free days		0.51 (-1.12, 2.14)	0.53817
Duration of VIS (among Month 1 survivors)		-0.68 (-1.81, 0.45)	0.23791
Survival to Month 1 without new morbidity[1]	1.33 (0.79, 2.25)		0.28202
Survival to Month 1	0.80 (0.34, 1.88)		0.60455
New morbidity (among Month 1 survivors)	0.70 (0.39, 1.26)		0.23444
Outcomes (HRQL cohort, N=213)			
PSD[2] of HRQL or mortality at Month 1	0.76 (0.43, 1.34)		0.34271
Mortality at Month 1	0.96 (0.38, 2.40)		0.93280
PSD (among Month 1 survivors)	0.69 (0.35, 1.32)		0.25975

* Models were weighted using stabilized inverse probability of treatment weights. Additionally, all models control for PRISM IV and PELOD, First Day.

[1] There were four subjects missing FSS at Day 28 or hospital discharge.

[2] PSD, persistent, severe deterioration of HRQL below baseline, specifically, HRQL scores (PedsQL™ or FSII-R) persisting > 25% below the baseline HRQL.

Table 3. Estimated Effect of Early Corticosteroid Therapy on Secondary Outcomes		
	Adjusted effect (95% CI)	P-value
Outcomes (N=323)		
PICU-free days	-0.98 (-2.71, 0.75)	0.26462
Hospital-free days	-1.93 (-3.87, 0.02)	0.05183
Sum of PELOD	-5.80 (-17.73, 6.13)	0.33926
Ventilator-free days	0.54 (-1.33, 2.41)	0.57345

* Models were weighted using stabilized inverse probability of treatment weights. Additionally, all models control for PRISM IV and PELOD, First Day.

CONTROL ID: 3475683

TITLE: Determining the relationship between pre-pregnancy BMI and maternal serum carotenoid levels

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 36

ABSTRACT STATUS: Sessioned

PRESENTER: Lauren Wegner

AUTHORS/INSTITUTIONS: L. Wegner, A. Anderson Berry, M. VanOrmer, M. Thompson, J.L. Hattery, J. Wickman, R.A. Slotkowski, A. Zetterman, Pediatrics, University of Nebraska Medical Center, Omaha, Nebraska, UNITED STATES|C. Hanson, Medical Nutrition Education, University of Nebraska Medical Center College of Allied Health Professions, Omaha, Nebraska, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Pre-pregnancy BMI (ppBMI) is an independent determinant for pregnancy outcomes and longer-term effects on child health. Literature shows that the risk of adverse outcomes increases across the range of maternal ppBMI, but less is known about how to mediate the increasing risk. Diet may be one method. Dietary carotenoids promote child development and higher levels may decrease the risk of adverse pregnancy outcomes. Understanding the relationship between ppBMI and serum carotenoids will help inform recommendations to promote healthy pregnancies for mother and child.

Objective: To determine the relationship between ppBMI and maternal serum carotenoid levels in a cohort of mothers who delivered at a Midwestern academic medical center.

Design/Methods: Following IRB approval, maternal and cord blood samples were collected in mother-infant pairs. Serum nutrient levels were measured using High Performance Liquid Chromatography. Maternal serum carotenoid (including lutein + zeaxanthin; beta-cryptoxanthin; cis, trans and total lycopene; alpha-carotene; cis, trans, and total beta-carotene; and retinol) and ppBMI data were available for 229 mothers. Guided by literature, BMIs recorded up to 10 weeks into pregnancy were deemed appropriate for designation of ppBMI. Spearman's correlation coefficients assessed relationships between maternal serum carotenoid levels and ppBMI. Linear regression models assessed these relationships with adjustment for gestational age, dichotomized race (white vs. non-white) and smoking status. A p-value of <0.05 was considered statistically significant.

Results: Median ppBMI was 26. Preceding pregnancy, 1.3% (n=3), 40.2% (n=92), 27.5% (n=63), and 31.0% (n=71) of the mothers were underweight, normal weight, overweight, and obese, respectively. Maternal serum concentrations and ppBMI were negatively correlated for lutein + zeaxanthin ($r = -.22$, $p = .001$), beta-cryptoxanthin ($r = -.14$, $p = .039$), alpha carotene ($r = -.27$, $p < .0001$), and cis-, trans-, and total beta-carotene (all $r = -.26$, all $p < .0001$). After adjustment for relevant confounders, negative correlations remained significant.

Conclusion(s): In this cohort, ppBMI was negatively correlated with several maternal carotenoid concentrations after adjusting for relevant confounders. To our knowledge, no previous studies have explored this relationship. Further research is needed to determine the potential for specific nutrients, particularly carotenoids, to mediate associations between ppBMI and pregnancy outcomes.

(no table selected)

IMAGE CAPTION:

Results of multivariate analysis after adjustment for gestational age, dichotomized race, and smoking status

Carotenoid	**β**	***p*-Value**
Lutein + zeaxanthin	-3.5	.0003
Beta-cryptoxanthin	-2.2	.02
Alpha carotene	-2.3	.02
Cis beta-carotene	-.06	< .0001
Trans beta-carotene	-7.4	< .0001
Total beta-carotene	-8.0	< .0001

CONTROL ID: 3475950

TITLE: An evaluation of the Naranjo scale in assessing adverse drug reactions at a free-standing children's hospital

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 37

ABSTRACT STATUS: Sessioned

PRESENTER: Madhavi Murali

AUTHORS/INSTITUTIONS: M. Murali, J. Goldman, University of Missouri Kansas City School of Medicine, Kansas City, Missouri, UNITED STATES|S. Suppes, K. Feldman, Department of Clinical Pharmacology, Children's Mercy Hospitals and Clinics, Kansas City, Missouri, UNITED STATES|J. Goldman, Department of Pediatrics, Children's Mercy Hospitals and Clinics, Kansas City, Missouri, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Adverse drug reactions (ADRs) are an unwanted and unintended response to a drug following its administration at normal doses. Since there are few diagnostic tools to confirm that a drug caused a reaction, clinicians often use causality assessment tools to standardize the approach in determining the likelihood of a drug causing a reaction. While ADRs are commonly encountered within the pediatric population, the majority of causality tools have not been evaluated in these patients. The Naranjo scaling system is historically the most well-known causality assessment tool.

Objective: The primary outcome of this study was to characterize Naranjo probability scores with the ADR implicated drug class, ADR type and severity. The secondary outcomes were to identify specific clinical factors associated with a probable or definite Naranjo score and evaluate which questions of the Naranjo scale were most and least frequently answered. The study was able to address these goals ofassessing if the Naranjo provides clinically interpretable information about pediatric ADRs.

Design/Methods: This study took place at Children's Mercy Hospital and utilized a pharmacovigilance program to collect data—this program consists of a dedicated pediatric pharmacist monitoring and documenting ADRs. We performed a retrospective review of 3,005 pediatric ADRs documented at our hospital from 2014-2018. We evaluated patient demographics, implicated medication, ADR severity, calculated Naranjo score, associated symptoms, and location within the hospital in which the ADR was documented.

Results: The Naranjo scaling system does not clearly distinguish between mild, moderate, and severe reactions. Naranjo classifications are also closely dependent on how and when the reaction was documented. Finally, different classifications of medications involved in ADRs have different likelihoods of receiving higher Naranjo scores—the use of the Naranjo scaling system provides different results depending on which drug class is analyzed.

Conclusion(s): Active pharmacovigilance programs are vital to accurately identifying and assessing ADRs in the clinical setting within pediatrics. The use of the Naranjo scaling system may not offer meaningful information that can be applied to clinical decision making, and this brings the use of other causality assessment tools in the analysis of pediatric ADRs as alternatives into question. Moving forward, the development of a pediatric specific ADR assessment tool may be warranted.

(no table selected)

IMAGE CAPTION: Demographics table General drug classification by Naranjo score interpretation

Characteristics of Pediatric Patients with ADRs	
Clinical Characteristics at the time of recording ADR	**(N = 3005)**
Age, y, median (IQR)	11 (6-15)
Male, N (%)	1461 (49)
Race or ethnicity, N (%)	
White	2351 (78)
Black or African American	212 (7.1)
Multiracial	189 (6.3)
Hispanic	168 (5.6)
Other	52 (1.7)
Asian	33 (1.1)
Final reaction type classified, N (%)	
Hypersensitivity	1854 (62)
Side effect	1151 (38)
Most common ADR clinical symptoms, N (%)	
Cutaneous symptoms	2058 (68)
Neurological symptoms	533 (18)
Gastrointestinal symptoms	456 (15)
Respiratory symptoms	296 (9.9)
Cardiovascular symptoms	101 (3.4)
Naranjo score, N (%)	
Definite (≥9)	64 (2.1)
Probable (5-8)	1527 (51)
Possible (1-4)	1409 (47)
Doubtful (0)	5 (0.2)
ADR, adverse drug reaction; IQR, interquartile range	

Demographics table

General drug classification by Naranjo score interpretation					
Drug class	**N (%)**	**Doubtful (%)**	**Possible (%)**	**Probable (%)**	**Definite (%)**
Systemic antimicrobial agents	1757 (58.47)	.06	48.26	49.63	2.04
CNS agents	623 (20.73)	.32	47.03	51.04	1.61
Respiratory agents	140 (4.66)	0.0	58.57	40.00	1.43
Other drug classes	139 (4.63)	1.44	32.37	61.87	4.32
Oncological and immunologic agents	123 (4.09)	0.0	26.02	69.11	4.88
Musculoskeletal agents	62 (2.06)	0.0	61.29	38.71	0.0
Gastrointestinal agents	56 (1.86)	0.0	50.00	50.00	0.0
Cardiovascular agents	39 (1.30)	0.0	30.77	61.54	7.69
Hormone-modifying agents	37 (1.23)	0.0	54.05	43.24	2.70
Dietary supplements and related products	20 (0.67)	0.0	40.00	60.00	0.0
Hematologic agents	9 (0.30)	0.0	33.33	66.67	0.0

General drug classification by Naranjo score interpretation

CONTROL ID: 3475729

TITLE: Lactational Exposure to High-Fat Diet and Metformin Incites Myocardial Lipid Accumulation in Adult Male Offspring

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 38

ABSTRACT STATUS: Sessioned

PRESENTER: Emelia Stille

AUTHORS/INSTITUTIONS: E. Stille, E.J. Louwagie, T. Larsen, M. Baack, Department of Pediatrics, University of South Dakota Sanford School of Medicine, Sioux Falls, South Dakota, UNITED STATES|E.J. Louwagie, T. Larsen, M. Baack, Environmental Influences on Health and Disease Group, Sanford Research, Sioux Falls, South Dakota, UNITED STATES|H. Hafner, B. Gregg, Division of Pediatric Endocrinology, Diabetes, and Metabolism, Department of Pediatrics, University of Michigan, Ann Arbor, Michigan, UNITED STATES|

CURRENT CATEGORY: Basic Science

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Infants born to obese mothers are at higher risk of cardiovascular disease as adults and excess fuel exposure during critical periods of development are implicated. Maternal diet influences breast milk fatty acid composition and, in turn infant health. Our previous work shows, lactational exposure to maternal high-fat diet (HFD) causes insulin resistance, glucose intolerance, and increased adiposity in adult male mice and metformin during lactation partially mitigates the effect.

Objective: This study was to determine the developmental consequences of lactational HFD alone and with metformin on adult offspring myocardium.

Design/Methods: During lactation, C57Bl/6J dams were fed control (13%) or HFD (60%) +/- metformin (Met; 3mg/mL in drinking water). Offspring (n=8; 4 males, 4 females/group) were weaned to control diet. At six months, cardiac glucose uptake was quantified, right ventricles were stained for myocardial lipid and glycogen accumulation, and left ventricles were used to compare expression of lipid processing and mitochondrial proteins and mtDNA copy number. Groups were compared by ANOVA for exposure-related and T-test for sex-specific differences with significance set at $p \leq 0.05$.

Results: Male, but not female offspring exposed to maternal HFD and Met (HFD+Met) trend towards more myocardial lipid accumulation by droplet count ($p=0.055$), area ($p=0.060$) and adipocyte differentiation-related protein (ADRP) expression ($p=0.066$), but lower glucose uptake and glycogen stores. HFD+Met females have more CD36 fatty acid transporter ($p<0.05$), but males do not; this suggests impaired utilization rather than increased uptake causes lipid accumulation. mtDNA copy number is not different, but HFD+Met offspring have higher PGC-1α, PPPARα and TOMM20 ($p<0.05$), alongside lower PPARγ expression in HFD and HFD+Met exposed males ($p<0.01$). HFD-exposed females have higher expression of complex I proteins that is negated by Met; both sexes have higher complex III expression. Together, findings suggest HFD+Met exposed males have decreased myocardial FA oxidation with compensatory biogenesis or turnover from mitochondrial dysfunction.

Conclusion(s): Maternal HFD during lactation increases myocardial lipid accumulation in adult male mice that is worsened by maternal Met treatment. As lipid accumulation is linked to cardiac dysfunction, future studies should examine Met therapy in adult HFD-exposed offspring, rather than during lactation.

(no table selected)

(No Image Selected)

CONTROL ID: 3476485

TITLE: Fetal exposure to maternal inflammation plus intestinal dysbiosis results in intestinal injury equivalent to experimental necrotizing enterocolitis

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 39

ABSTRACT STATUS: Sessioned

PRESENTER: Brian Alan Juber

AUTHORS/INSTITUTIONS: B.A. Juber, H. Gong, S.R. Lueschow, S.J. McElroy, Pediatrics, University of Iowa, Iowa City, Iowa, UNITED STATES|

CURRENT CATEGORY: Basic Science

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Acute chorioamnionitis results in fetal exposure to maternal inflammation (FEMI) and is a common precipitant of preterm birth. The leading cause of gastrointestinal morbidity in preterm infants is necrotizing enterocolitis (NEC). Recent data show a significant correlation between acute chorioamnionitis and later development of NEC but mechanisms behind this association are unclear. Our previous data have shown that animals with FEMI have fewer Paneth cells, which provide critical antimicrobial peptide regulated host defense, compared to controls.

Objective: To determine if FEMI-induced alterations of Paneth cell biology impact the development of intestinal injury in a well characterized Paneth cell disruption model of experimental NEC.

Design/Methods: On gestation day e15.5, gravid C57Bl/6J dams were given a single intraperitoneal (IP) injection of lipopolysaccharide (100 µg/kg) to induce FEMI, then allowed to deliver normally. Pups were raised under standard conditions with their dams. On P14 pups were given a single IP injection of dithizone (40 mg/kg) for Paneth cell ablation, followed 8 hours later by enteral gavage of $1x10^8$ CFU/g of Klebsiella pneumoniae to induce NEC. Intestinal tissue was harvested for quantification of mRNA and histologic injury. Serum was collected for cytokine analysis. Intestinal injury was scored on a 5-point injury scale by a blinded investigator with scores ≥2 consistent with NEC. N=3-4 animals per group in all studies.

Results: Pups with FEMI developed NEC in a similar fashion to sham controls. However, while sham animals require both Paneth ablation and bacterial dysbiosis to simulate NEC, our data show that FEMI prior to birth removed the need for Paneth cell ablation as there was equivalent intestinal injury in the NEC and FEMI-Klebsiella groups (average intestinal injury score 1.4 vs 1.3; p=0.91). This trend was also seen in patterns of gene regulation of IL-1b, IL-6, and IL-23.

Conclusion(s): Our data show that animals with FEMI, an inflammation similar to what is experienced during chorioamnionitis, equally develop NEC-like injury following Paneth cell disruption and bacterial dysbiosis. Importantly, however, these data also show that dysbiosis alone following FEMI can induce the same amount of inflammation and injury. This may help explain why infants exposed to chorioamnionitis are at increased risk for developing NEC.

(no table selected)

(No Image Selected)

CONTROL ID: 3474261

TITLE: Maternal BMI and Fetal Iron Status are Predictors of Early Childhood Obesity

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 40

ABSTRACT STATUS: Sessioned

PRESENTER: Christine Brichta

AUTHORS/INSTITUTIONS: C. Brichta, D.B. Allen, J. Gannon, Pediatrics, University of Wisconsin School of Medicine & Public Health, Madison, Wisconsin, UNITED STATES|P.J. Kling, Pediatrics, University of Wisconsin-Madison, Madison, Wisconsin, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: One-third of American children are overweight or obese. Both maternal and early childhood obesity are risk factors for developing obesity later in childhood and adolescence. Maternal obesity is also a risk factor for being born with poor iron endowment, i.e., congenital iron deficiency (ID). We hypothesized that in addition to maternal obesity, cord blood iron status predicts the development of obesity in early childhood.

Objective: To determine the association of maternal obesity and congenital ID on the development of early childhood obesity in a healthy prospective birth cohort.

Design/Methods: A prospective birth cohort of 311 healthy mother-infant pairs at >35 weeks were recruited for having at least one risk factor for the infant developing iron deficiency as toddlers (i.e., small or large for gestation, maternal anemia, maternal diabetes, Medicaid insurance, and/or minority status). Maternal obesity was defined by BMI >35 kg/m^2 at delivery. zBMI value and childhood obesity (zBMI>2) were defined by sex and age-specific CDC curves. We measured cord blood ferritin levels at birth and collected clinical growth data from the health records through the 5^{th} year of life. Congenital ID was defined by cord blood ferritin levels <40 ng/mL (<5^{th}%).

Results: At 2 years, the percentage of children with obesity was higher in those with a history of congenital ID compared to normal cord blood ferritin levels (44% vs. 14%, $p<0.033$), with growth data available for 65% of the cohort. In the 5^{th} year, similarly, the percentage of children with obesity was higher in those with congenital ID (43% vs. 8%, $p<0.02$), and data was available for 55% of the cohort. By logistic regression analysis, maternal obesity ($p<0.001$ and $p<0.002$) and congenital ID ($p<0.025$ and $p<0.02$) both independently predicted childhood obesity at 2 and 5 years respectively.

Conclusion(s): When measured in toddlers and school-age children, being born with congenital ID may be a novel risk factor associated with developing childhood obesity. It is known that maternal obesity during gestation can upregulate cytokine pathways that restrict placental iron transport. In animal models, congenital ID can program chronic inflammatory pathways that may in turn predispose to childhood obesity. Further analyses of larger populations will reveal whether these findings persist and are important for public health.

(no table selected)

IMAGE CAPTION:

		Cord blood ferritin <40 ng/mL	Cord blood ferritin >40 ng/mL	p-value
% of children with obesity	2 years	44%	14%	0.0325
	3 years	29%	10%	0.1706
	4 years	25%	9%	0.1897
	5 years	43%	8%	0.0188

Table 1. Percentage of children with obesity at follow-up among those with congenital iron deficiency and normal iron stores

		Maternal obesity	Congenital iron deficiency
p-value	2 years	0.0008	0.0244
	3 years	0.0679	0.1071
	4 years	0.0016	0.1478
	5 years	0.0021	0.0191

Table 2. Maternal obesity and a history of congenital iron deficiency as independent predictors for children with obesity

CONTROL ID: 3475349

TITLE: Quantifying Breast Milk Retinol Inadequacy and the Impact on Neonatal Outcomes in a Midwestern United States Population of Postpartum Women

DIGITAL OBJECT IDENTIFIER (DOI): Poster#: 41

ABSTRACT STATUS: Sessioned

PRESENTER: Julia Wickman

AUTHORS/INSTITUTIONS: J. Wickman, A. Zetterman, L. Wegner, J.L. Hattery, R.A. Slotkowski, M. VanOrmer, M. Thoene, M. Thompson, A. Anderson Berry, Pediatrics, University of Nebraska Medical Center, Omaha, Nebraska, UNITED STATES|C. Hanson, Medical Nutrition Education, University of Nebraska Medical Center College of Allied Health Professions, Omaha, Nebraska, UNITED STATES|

CURRENT CATEGORY: Clinical Investigation

CURRENT SUBCATEGORY: None

ABSTRACT BODY:

Background: Low retinol levels can cause night blindness and impaired immune system function. Retinol inadequacy is a well-documented nutritional issue in developing countries. According to WHO, low Vitamin A serum levels (<300 mcg/L) impact more than 15% of pregnant woman in at-risk populations. However, there is a lack of understanding about the prevalence of breast milk retinol inadequacy in developed countries. To constitute a moderate public health problem, population retinol deficiency must reach between 10-25% for breast milk or 10-20% for maternal serum.

Objective: The purpose of this study is to quantify the prevalence of breast milk retinol adequacy (>300 mcg/L), insufficiency (200–300 mcg/L), and deficiency (<200 mcg/L) in a Midwestern United States population of postpartum women. A secondary aim is to identify the relationship amongst breast milk retinol and birth outcome.

Design/Methods: An IRB approved study enrolled 24 mothers. Data analysis was performed on subjects with breast milk nutrient analyses. Descriptive statistics were run for all variables, including maternal retinol activity equivalents. Spearman correlation coefficients were used to assess the relationship between maternal serum retinol and breast milk retinol, as well as breast milk retinol and birth outcome. Median breast milk retinol was compared amongst maternal serum retinol groups.

Results: Only 56% of participants had breast milk retinol adequacy, with 36.4% of participants reaching maternal serum retinol adequacy. Retinol category results are summed in Table 1. Median maternal retinol activity equivalents was 1740 mcg/L (range=651-3436mcg/L). There was no significant correlation between maternal serum retinol and breast milk retinol (R=.24, p=.915), or maternal retinol activity equivalents and breast milk retinol (R=-.192, p=.381). There was a significant negative correlation between breast milk retinol and the number of oxygen therapy days during infant admission (R=-.483, p=.017).

Conclusion(s): Breast milk and maternal serum retinol inadequacies may constitute a moderate public health concern for postpartum women in the Midwestern United States. These results suggest that breast milk retinol adequacy promotes healthy neonatal lung development. Further, breast milk retinol levels may be independent of maternal serum retinol levels and maternal retinol activity equivalents. Limitations of this study include a small sample size of mothers whose preterm skewed infants were all admitted to the NICU.

(no table selected)

IMAGE CAPTION:

Table 1: Retinol Categories

Category	Adequacy	Insufficiency	Deficiency
Breast Milk Retinol	56%	28%	16%
Maternal Serum Retinol	36.4%	54.5%	9.1%