New England Perinatal Society

48th Annual Scientific Meeting

March 7 – March 9, 2025

Hotel Viking

1 Bellevue Ave
Newport, Rhode Island

NEW ENGLAND PERINATAL SOCIETY
OFFICERS 2025

MaryAnn Volpe, MD (Mass), Program Chair
Michele Hacker, ScD (Mass)
Helen Christou, MD (Mass)
Ai-ris Collier, MD (Mass)
Andrea Edlow, MD, MSc (Mass)
James Hagadorn, MD, MS (Conn)
Michael House, MD (Mass)
Liza Konnikova, MD, PhD (Conn)
Liz McGowan, MD (RI)
Scott Shainker, DO, MS (Mass)
David Sink, MD (Conn)
Jennifer Traski, MD (Conn)
Elizabeth Yen, MD (Mass)

THE SOCIETY GRATEFULLY ACKNOWLEDGES SUPPORT FROM THE AMERICAN ACADEMY OF PEDIATRICS, ABBOTT NUTRITION, CHIESI, PREMIER AND MALLINCKRODT.

NEW ENGLAND PERINATAL SOCIETY
2025 SCIENTIFIC MEETING

March 7

6:30 - 8:00 PM	**Registration and Reception**
8:00 PM	**Program Committee Meeting**

March 8

7:30 AM	**Continental Breakfast**
8:00 - 9:00 AM	**Featured Speaker – Naima Joseph, MD** *Vaccines in Pregnancy*
9:00 - 12:00 PM	**Scientific Session – Abstract Presentations** Moderators: Ai-ris Collier, MD and Liz McGowan, MD
12:00 - 3:30 PM	**Free Time**
3:30 - 6:30 PM	**Scientific Session – Abstract Presentations** Moderators: Helen Christou, MD and Michael House, MD
6:45 - 7:30 PM	**Scientific Session** **Poster Walk A** Moderators: Liz Yen, MD and Michele Hacker, ScD **Poster Walk B** Moderators: Liz McGowan, MD and David Sink, MD
7:30 - 10:00 PM	**Buffet Dinner and Jeopardy**

March 9

7:30 AM	**Continental Breakfast**
8:00 - 9:00 AM	**Featured Speaker – Catherine Buck, MD** *Growth and Nutrition in the Forgotten Preemie*
9:00 - 12:00 PM	**Scientific Session – Abstract Presentations** Moderators: Liz Yen, MD and Michael House, MD
12:00 - 12:30 PM	**Meeting Wrap Up, Awards, and Announcements**

Saturday, March 8, 2025
First Scientific Session: Oral Presentations

Moderators: Ai-ris Collier, MD and Liz McGowan, MD

9:00 AM Parental status is associated with differences in Tdap vaccination rates among united states adults. M. Slater* WIHRI

9:12 AM Assessment of obstetric providers' practice surrounding vaccine counseling and administration for non-birthing partners. N. Passarelli * WIHRI

9:24 AM Serotonin gene expression in the gut during gestation and early life. I. Phan* Yale

9:36 AM Pasteurized donor human milk: assessing disparities in patient knowledge, perspectives and uptake. O. Iwuchukwu* WIHRI

9:48 AM Postpartum diabetes testing after pregnancies affected by diabetes. J. Patel* UMass

10:00 AM Trends in active management of periviable liveborn neonates in the United States, 2016-2023. S. Martinez* BIDMC

10:12 AM A novel simulation curriculum to improve physician assistant NRP skills. R. Satty* Tufts

10:24 AM Decisions around periviable neonatal resuscitation and cesarean delivery before and after hospital policy change. A. Asirwatham* UMass

10-MINUTE BREAK

10:34 AM Metabolic concentrations in early human milk differ with obesity and diabetes in pregnancy. C. Keeney* Yale and Quinnipiac

10:46 am Interplay between endogenous glycan fermentation and klebsiella pathogenicity in the intestinal lumen. S. Khasgiwala* CCMC and Uconn

10:58 am Extubation of extremely preterm infants using non-invasive positive pressure ventilation: A quality improvement project. S. Gnecco-Gonzalez* BIDMC

11:10 AM The molecular effects of maternal cannabis use on infant feeding regulation. N. Finton* Tufts

11:22 AM Differences in administration of antenatal corticosteroids in the late preterm period. K. Descartes* UConn

11:34 AM The association between co-occurring substance use and HIV-1 exposure on placental pathology and pregnancy outcomes. N. Chadha* BMC

11:46 AM Maternal perceived ethnic discrimination impacts stress-responsive placental mRNA and miRNA. F. Carasi-Schwartz* Tufts

*Denotes person in training

Parental status is associated with differences in Tdap vaccination rates among US adults

Maxine Slater, BA*[1], Brock Polnaszek, MD[1], Jaejoon Shin, MPH[2], Melissa Clark, PhD[3], Adam Lewkowitz, MD, MPHS[1], Siraj Amanullah MD, MPH[3,4,5], Annie Gjelsvik PhD[3], Laurie Griffin MD, PhD[1]
[1]Department of Obstetrics and Gynecology, Women and Infants Hospital; [2]Brown University School of Public Health; [3]Department of Health Services Policy and Practice, Brown University School of Public Health; [4]Department of Emergency Medicine, Warren Alpert Medical School at Brown University; [5]Department of Pediatrics, Warren Alpert Medical School at Brown University

Background: Professional societies recommend all caregivers of neonates be vaccinated to Tdap to prevent neonatal pertussis. Limited data exist as to whether parents, including female parents (i.e. mothers) and male parents (i.e. fathers), are compliant with Tdap recommendations.
Objective: This study aims to determine if parental status impacts Tdap vaccination rates.
Methods: We utilized individual-level self-reported parental and Tdap vaccination information from the national 2022 Behavioral Risk Factor Surveillance System. Participants were classified as "parent" or "non-parent" and "vaccinated" and "unvaccinated" based on responses regarding his/her relationship to children in the household and receipt of Tdap vaccination within the past 10 years, respectively. Age, insurance status, race, ethnicity, education, income, having a primary care provider, and influenza vaccine status were included in multiple logistic regression analysis as covariates as they have been associated with Tdap vaccination status in prior studies. The distribution of Tdap vaccination status and demographic characteristics by sex and parental status was performed using Pearson chi squared proportion tests. Logistic regression analyses were performed to determine unadjusted and adjusted odds of Tdap vaccination between female parents (reference group) and male parents, and female and male non-parents. Additional multiple logistic regression analysis compared the adjusted odds of Tdap vaccination between male parents to female and male non-parents and female non-parents and male non-parents.
Results: Among reproductive age individuals (19-49 years old) with known parental status, only 28% reported vaccination to Tdap vaccination: 38% of female parents, 29% of male parents, 30% of female non-parents, 22% of male non-parents. When compared to reproductive age female parents, the odds of Tdap vaccination were significantly lower for male parents (adjusted odds ratio (aOR) 0.65, 95% Confidence interval (CI) [0.58-0.72]), female non-parents (aOR) 0.61, 95% CI [0.56-0.66]), and male non-parents (aOR 0.45, 95% CI (0.41-0.48) after adjusting for age, race, ethnicity, education, insurance, income, primary care provider status, and influenza vaccine status. When compared to male parents, in adjusted models, male non-parents had lower odds of Tdap vaccination (aOR 0.69 (0.63-0.76)), while there was no difference in odds of Tdap vaccination for female non-parents (aOR 0.94 (0.86-1.04).
Conclusions: Differences in Tdap vaccination by parental status and sex exist and may be associated with parent-directed counseling by health care providers and routine Tdap vaccination during prenatal care for pregnant women. Efforts focused on education and vaccine administration for parents, particularly male parents, has the potential to improve vaccination rates and increase neonatal protection.

Assessment of obstetric providers' practice surrounding vaccine counseling and administration for non-birthing partners

Natalie Passarelli*, BA[1], Anna Whelan, MD[2], Melissa Russo, MD[1], Emily Zitek, PhD[1], Erica Hardy, MD, MMSc[1,3], Melissa A. Clark, PhD[4], Adam K. Lewkowitz, MD, MPHS[1], Laurie B. Griffin, MD, PhD[1]
[1]Department of Obstetrics and Gynecology, Warren Alpert Medical School of Brown University, Providence, RI, USA, [2]University of Massachusetts Chan Medical School, Department of Obstetric and Gynecology, Division of Maternal Fetal Medicine, Worcester, MA, USA, [3]Department of Medicine, Division of Infectious Disease, Warren Alpert Medical School of Brown University, Providence, RI, USA, [4]Department of Health Services Policy and Practice, Brown University School of Public Health, Providence, RI, USA

Background: Despite guidelines recommending all caregivers of neonates be up-to-date on tetanus-diphtheria-acellular pertussis (Tdap), COVID-19, and influenza vaccines prior to delivery to prevent primary transmission of vaccine-preventable disease to the infant, only 30% of reproductive-aged individuals are up to date on recommended vaccinations. While pregnant individuals often receive vaccines during prenatal care, limited research has investigated whether prenatal care can also be used to increase vaccination rates among the non-birthing partners.

Objective: This study aimed to assess prenatal care providers' practice patterns regarding vaccine counseling and in-office vaccination for the non-birthing partners of pregnant patients.

Methods: We designed, tested, and administered a cross-sectional, anonymous electronic survey to a diverse sample of 200 prenatal care providers in Rhode Island, including Obstetricians, Family Medicine physicians, certified nurse midwives, and nurse practitioners.

Results: Among 112 respondents (56%), 42% (n=77) reported that they counsel on non-birthing partner vaccine recommendations less than half the time. Only 4% (n=4) of respondents report vaccinating non-birthing partners in the office during prenatal care. All 4 of those providers identified as family medicine physicians. Forty-six percent (n=44) of participants who do not offer non-birthing partner vaccination had never considered the practice and 58% (n=55) of respondents desired more education on non-birthing partner vaccination. Respondents identified multiple implementation barriers to vaccinating non-birthing partners including inability to register the partner, inadequate staffing, and time constraints during visits. Importantly, 68% (n=65) of providers expressed willingness to incorporate non-birthing partner vaccination into their practice if barriers were addressed.

Conclusions: The results of this study demonstrate willingness of key stakeholders to incorporate vaccination of non-birthing partners into routine prenatal care, a unique mechanism to increase parental vaccination rates and protect neonates from vaccine-preventable illness.

Serotonin gene expression in the gut during gestation and early life

Long Phan[1]*, Lauren Smith[1], Kristin M. Milano[2], Weihong Gu[1], Harvey J. Kliman[2], Liza Konnikova[1-3]
[1]Department of Pediatrics, Yale University; [2]Department of Obstetrics, Gynecology and Reproductive Sciences, Yale University; [3]Department of Immunobiology, Yale University

Background Serotonin (5-HT) is best known for its critical roles as a neurotransmitter in the central nervous system. However, 95% of serotonin in the human body is produced in the gastrointestinal (GI) system, where it plays key roles in regulating bowel functions, digestion, and inflammation.
Objective The study aims to develop a comprehensive atlas of serotonin and serotonin-relate genes across gastrointestinal tract during gestation and early life.
Methods We constructed a single cell atlas of intestinal epithelial cells using previously published and unpublished single cell RNA sequencing (scRNA-seq) datasets, following up by validation performed using immunohistochemistry (IHC), immunofluorescence (IF) on human tissues across lifespan. **Results** Serotonin-synthesis gene tryptophan hydroxylases 1 (TPH-1) are enriched for in epithelial cells even during fetal development **(Fig. 1A)**. Within the epithelial compartment, TPH-1 is mostly expressed in large intestine (LI) and small intestine (SI) and restricted to enteroendocrine cells (EECs) only **(Fig. 1B)**. Although TPH-1 is present in both SI and LI, its expression increased significantly during the second trimester **(Fig. 1C)**. Among serotonin receptors, HTR1D, and HTR4 were generally expressed across many epithelial cell subtypes while HTR3A was limited to enteroendocrine cells and an additional enterocytes population**.** IF validation demonstrated that serotonin staining is restricted to the epithelial compartment and co-localizes with EECs **(Fig. 1D)**, and HTR4 expression can be found in the intestinal crypts where it co-localizes with stem cells marked by LGR5 expression **(Fig. 1E)**.

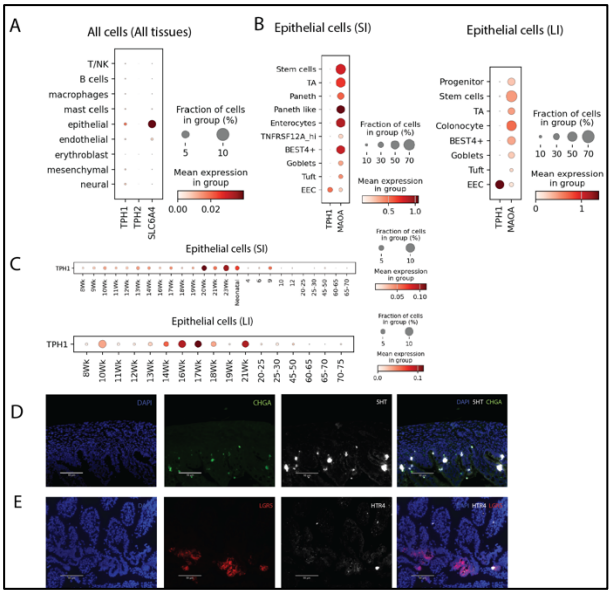


Figure 1. A) Serotonin genes expression across tissue samples. B) Serotonin genes expression across epithelial cells of small intestine and large intestine. C) TPH-1 expression in epithelial cells of small and large intestine across lifespan. D&E) Representation multiplex immunofluorescence images of fetal small intestine.

Conclusions To summarize, the study developed a comprehensive map of serotonin and its related gene across GI tract during gestation and early life. Serotonin is present early on around second trimester and continues to be present well into adulthood consistent with its important role in GI pathophysiology. Finally, we identify that one of the serotonin receptors HTR4 is expressed on intestinal stem cells, suggesting that it potentially plays a role in intestinal proliferations.

Pasteurized donor human milk: assessing disparities in patient knowledge, perspectives and uptake

Margaret M Thorsen MD[1*], Ogechukwu Iwuchukwu[2*], Martha C Moe MD[1], Shayla N Durfey MD[1*], Lynn Przystac RDN[1], Martha B Kole-White MD[1]
Institutions: [1]Women and Infants Hospital of Rhode Island/Alpert Medical School of Brown University, Providence, RI, [2]Brown University, Providence, Rhode Island

Introduction: As hospital systems' uptake of pasteurized donor human milk (PDHM) for preterm neonates has increased, families with term infants may be offered PDHM as a supplemental bridge. Little is known regarding equity of access and patient knowledge of PDHM.

Methods: We conducted an in-person survey on patient knowledge of PDHM in August 2024 of postpartum patients being discharged from a large Baby-Friendly Hospital in the Northeast where PDHM supplementation is universally available. Two-tailed t-tests via STATA assessed differences in rates of knowledge of PDHM as a feeding option by demographic variables.

Results: Response rate was 83.5% (n=71). Participants demographics: 52% White, 38% Hispanic or Latinx, 31% born outside of the US, 51% public insurance, 45% received public benefits, 11% spoke language other than English or Spanish at home. 75% (n= 53) of respondents had heard of PDHM.; 7% (n=5) used PDHM. Rates of knowledge of PDHM as a feeding option were significantly lower among those with high school education or less, Hispanic ethnicity, birth location outside of USA, public insurance and receipt of WIC or SNAP. There were no differences by race, parity, age, or prior breastfeeding experience. The majority of participants (61%, n=43) disagreed with "I would never use donor breast milk from a milk bank for my infant." Only 36% (n=25) agreed that their medical team fully informed them of risks and benefits of using PDHM.

Conclusions/Implications: Interventions to promote equitable access of PDHM should focus on multilingual, accessible education and reasons for refusal and mistrust.

Postpartum diabetes testing after pregnancies affected by gestational diabetes mellitus

Jenna Patel BA*, Sneha Karthikeyan BS, Devyani Arora BA, Karen Makhoul BS, Rahi Patel BS, Gianna Wilkie MD, MSCI.
University of Massachusetts Chan Medical School, Worcester, MA

Background: Diabetes screening for all patients with pregnancies complicated by gestational diabetes mellitus (GDM) is recommended in the postpartum period; however, testing rates are low.

Objective: The objective of this study aimed to assess postpartum diabetes testing frequency and identify risk factors for non-completion of testing.

Methods: We performed a retrospective cohort study of all patients with a pregnancy affected by GDM at a single academic center between October 1, 2017, and January 1, 2024. Demographics, clinical characteristics, perinatal outcomes, and details of postpartum diabetes screening were collected. All comparisons are made with Fisher's exact test, Chi-square, or Student's *t*-test. Logistic regression was performed adjusting for pre-gravid body mass index (BMI).

Results: A total of 426 patients with GDM and postpartum records for review were identified. Approximately 28.4% completed any postpartum diabetes screening after a GDM affected pregnancy with 21.9% of those who completed testing doing the recommended 2-hour glucose tolerance test. Of those who completed testing, approximately 8.8% were diagnosed with type 2 diabetes mellitus. There was a statistically significant difference among pre-gravid BMI and race between those who completed postpartum diabetes screening and those who did not. After adjusting for BMI, Asian patients were 3.17 times more likely (95% CI 1.52-6.60) to complete screening compared to White patients.

Conclusions: There is overall poor completion of recommended postpartum diabetes screening among patients with GDM affected pregnancies, and minimal identifiable risk factors associated with non-completion of testing. Our study showed a high rate of detection of overt diabetes on postpartum testing among a high-risk, diverse population. Innovative strategies to implement immediate in-hospital testing at all hospitals are crucial to identifying patients with continued abnormal glucose metabolism.

Trends in active management of periviable liveborn neonates in the United States, 2016 - 2023

Sarah Martinez, MD*; Avery Cox, MD; Nigel Madden, MD; Chloe Zera, MD MPH; Sarah Little, MD MPH
Beth Israel Deaconess Medical Center, Boston, MA; Harvard Medical School, Boston, MA

Background: The overall rate of active management in the periviable period has increased in the United States (US) in the last decade. There is limited data on whether this increase was experienced equally across various subgroups.

Objective: To assess changes in active treatment among live-born neonates in the periviable period in the US from 2016-2023 and determine if treatment trends were different across various subgroups.

Methods: This cross-sectional descriptive study included liveborn neonates born in the periviable period, 20 weeks 0 days to 25 weeks 6 days gestational age, in the US from 2016 to 2023. Data was obtained from the National Center for Health Statistics natality data. Overall trends were observed as well as trends by subgroup including week of gestation, receipt of infertility treatment, region of the US (Northeast, Midwest, West, and South) and state abortion legislation (ban prior to or after 20 weeks). Line plots were created across time for assisted ventilation, antenatal steroid use, mode of delivery, and NICU admission. Slopes were calculated for each line plot. Bivariate analysis was performed using Chi-square test and reported with *P*-values to compare slopes in different subgroups.

Results: 114,177 periviable births were examined. The overall rate of active management increased from 2016 to 2023. Neonates born at 22 weeks experienced a greater rise as compared to other gestations, with significantly different yearly trends for assisted ventilation (3.3% vs. 0.9%; p<0.001), antenatal steroid use (2.8% vs. 0.9%; p=0.003), mode of delivery (1.3% vs 0.6%; p=0.028), and NICU admission (3.6% vs 0.5%; p<0.001). For 22-week deliveries alone, patients undergoing infertility treatment had significantly different trends in assisted ventilation (4.6% vs 2.6%; p=0.009), antenatal steroid use (5.5% vs. 3.6%; p<0.001), and mode of delivery (2.7% vs 1.7%; p<0.001). No differences were observed in NICU admission rates. When comparing by region of the United States, there were differences in assisted ventilation (ranging from 2.6% per year for the West to 4.7% per year for the Midwest; p<0.001) and similar trend differences for antenatal steroid use, cesarean delivery and NICU admission. For states with different abortion legislation, significant differences were seen in the slopes for NICU admission (3.7% vs. 4.5%; p=0.048) though no differences were observed for assisted ventilation, antenatal steroid use, or mode of delivery.

Conclusions: Active management trends were not equal across subgroups, with the greatest rise for those born at 22 weeks, those born to mothers who received infertility treatment, born in Midwestern states or states with more restrictive abortion bans.

A novel simulation curriculum to improve physician assistant NRP skills

Maggie Vogel DO[1*], Rebecca Satty MD[1*], Brooke Krbec DO[1,2]
[1] Tufts Medicine Pediatrics - Boston Children's, Boston, MA
[2] Tufts University School of Medicine, Boston, MA

Background:

Simulation-based training is utilized to enhance learning and improve the quality of health care. There exists a large gap in standardized curriculum for subspecialty training for PAs. Simulation is an effective way for learners to participate in case-based experiences and high-risk scenarios in a non-judgmental setting. Previous case studies using high fidelity simulation have shown to significantly improve confidence amongst PAs of all experience levels.

Objective:

Implementing a recurring simulation curriculum for PAs will enhance both subjective and objective assessments of competency and confidence across delivery room (DR) and in unit scenarios, thereby advancing their proficiency in NRP skills.

Design/Methods:

An IRB exempt quality improvement project with NICU PAs voluntarily participating (N=16). A pre-implementation survey using a 5-point Likert scale was administered to assess confidence in providing frontline care in various DR scenarios and neonatal procedures. A tailored simulation curriculum was designed to target deficits in specific clinical competencies. An objective scoring system with emphasis on NRP skills, was used for each case. Following each case, a subjective survey assessing their perceived confidence levels on skills highlighted in that case was given. Five cases have been completed. After the third case, skills were reassessed using the same subjective and objective scoring mechanisms for comparison.

Results:

The pre-implementation survey showed self-perceived confidence in DR resuscitation with most PAs ranking ≤ 3 with mean score 2.25 (5=most confident). Subjectively, perceived confidence levels on various skills increased across simulations with Fig 1 showing the mean score on a 0 to 5 scale. Objectively, scores increased with repeat simulations as seen in Fig 2.

Conclusions:

In conclusion, simulation-based training offers a valuable solution to bridging the gap in standardized subspecialty curriculum for PAs. As demonstrated in this study, both subjective and objective scores improved over time, reflecting increased confidence in skills. One limitation of this study is the potential confounding factor of increased proficiency in real-life scenarios, which may have influenced the measured skills over time. Future plans include expanding the curriculum to further refine the scope of the scenarios to address gaps in NRP proficiency.

Decisions around periviable neonatal resuscitation and cesarean delivery before and after hospital policy change

Alison Asirwatham MD*, Jessica Kloppenburg MD*, Edesiri Igbuya MD*, Jessica Moszkowicz*, Yiming Zhang*, Hannah Caldwell MD*, Katherine Leung MPH, Katherine M. Johnson MD
UMass Chan Medical School, University of Massachusetts

Background: Historically, 24 weeks gestational age (GA) was considered the beginning of neonatal viability, however obstetric and postnatal interventions are increasingly offered as early as 22 weeks GA. Families can opt for either resuscitation or comfort care should their babies deliver in the periviable period due to uncertain short and long term outcomes. Patients also have choices about obstetric management, particularly cesarean delivery, when faced with periviable delivery, since this procedure has significant maternal morbidity with uncertain effect on neonatal outcomes. It's unknown how the change in practice to offer interventions at 22 weeks GA affected decisions during the periviable period. **Objective:** We sought to determine if a change in our hospital policy in September 2020, when both neonatal resuscitation and cesarean began to be offered beginning at 22 weeks GA, affected whether patients opted for these interventions when <24 weeks and ≥24 weeks GA at our tertiary care center. **Methods:** We identified all pregnant people admitted to our institution between 21 weeks and 0 days and 24 weeks and 6 days from January 2018 to May 2024 who received periviability counseling. We then identified those who were < 24 weeks GA and those who were in their 24th week of gestation at time of periviability consultation. We compared the groups before and after September 2020 by their documented plans for neonatal resuscitation or cesarean for fetal distress or malpresentation. **Results:** Out of 266 patients admitted in the relevant gestational period, 136 (51%) received periviability counseling, with 118 counseled < 24 weeks and only 18 counseled in the 24th week. While there were 76 people admitted in the 24th week who had obstetric interventions, most did not have counseling about options related to periviability. Among those that received counseling at <24 weeks, when comparing before versus after policy change, there was no significant difference in documented plan for resuscitation (n=38 (67%) vs. n=44 (72%), p=0.5), or plan for cesarean delivery (n=27 (47%) vs. n=37 (61%), p=0.15), although in both cases, proportions of patients opting for these interventions increased. Among those patients in their 24th week, there was no significant difference in documented plan for resuscitation before and after policy change (n=7 (100%) vs. n=10 (91%), p = 0.99). There was a significant increase in documented plan for cesarean (n=3 (43%) vs. n=11 (100%), p=0.011). **Conclusion:** Among patients who received periviability counseling, offering resuscitation and cesarean as early as 22 weeks GA may have led to increased obstetric and neonatal interventions in the 22nd and 23rd weeks, although the current study is limited by small numbers. The policy change does not appear to have altered decisions in the 24th week, except for an increased plan for cesarean delivery for fetal indications. Additionally, we found that periviability counseling occurred much less often at 24 weeks GA.

Metabolic concentrations in early human milk differ with obesity and diabetes in pregnancy

Clare Keeney*[1], Veronika Shabanova PhD[2], Catherine O. Buck MD[2]
1: Frank H. Netter MD School of Medicine, Quinnipiac University; 2: Department of Pediatrics, Yale School of Medicine

Background: Human milk contains bioactive components which support infant growth. Examining the impact of metabolic health in pregnancy on these components may provide insight into the mechanisms of adverse growth outcomes in infants exposed to diabetes (DM) and obesity (OB) in pregnancy. **Objective:** To examine differences in leptin, adiponectin, and insulin concentrations in early human milk samples with DM and OB in pregnancy, and the relationship of milk hormones with infant adiposity. **Methods:** In a cohort of term (37+ wks') and preterm (30-36 wks') infants, leptin, adiponectin, and insulin concentrations were measured in early milk samples. DM (type 1, type 2 or gestational) or OB (body mass index > 30 kg/m^2) in pregnancy was obtained from the medical record. Infant anthropometry and skin fold thicknesses were obtained prior to hospital discharge. Unadjusted differences in each hormone were compared across DM, OB, and preterm exposure groups, and linear regression was used to examine associations of hormones with infant adiposity.

Results: 38 infants with milk samples were included (N=13 DM group, N=14 OB group, and N=26 preterm group). Covariates were overall similar between groups. The median postnatal day of milk collection was 3.4 days, and was not different across DM, OB, or preterm groups. Insulin was higher in the DM group (median difference 41.2 mU/L [95%CI: 23.5, 59.1]) and leptin was higher in the OB group (median 621.6 pg/mL [95%CI: 167.3, 1076.0]). A 10-fold increase in leptin was associated with increased infant weight Z-score (0.88 units [95%CI: 0.17, 1.60]) and abdominal circumference (1.84 cm [95%CI: .14, 3.54]), and a 10-fold increase in insulin was associated with an increase in abdominal (1.85 cm [95%CI: .08, 3.63]) and mid arm (1.05 cm [95%CI: .10, 1.99]) circumference.

Conclusions: In this cohort of term and preterm infants, there were differences in human milk leptin and insulin with metabolic health diagnoses in pregnancy, and these components were associated with infant growth outcomes at the time of hospital discharge.

Table 1: Regression estimates of (1) human milk energy metabolism hormones by diabetes (DM), obesity (OB), and preterm birth, and (2) near discharge adiposity outcomes by hormone concentration

	Leptin (pg/mL)	Adiponectin (ng/mL)	Insulin (mU/L)
1) Group differences; B (95% CI) from quantile regression			
DM vs. non-DM	409.8 (-152.5, 972.1)	16.0 (-38.1, 70.1)	41.3 (23.5, 59.1) *
OB vs. non-OB	621.6 (167.3, 1076.0) *	18.45 (-97.3, 134.2)	5.5 (-21.6, 32.7)
Preterm vs. term	-36.8 (-825.0, 752.0)	9.1 (-49.4, 67.6)	11.1 (-47.3, 25.0)
2) Near discharge adiposity; B (95% CI) from linear regression**			
Weight Z-score	0.88 (.17, 1.60) *	0.25 (-.51, 1.01)	0.55 (-0.17, 1.27)
AC (cm)	1.84 (.14, 3.54) *	.008 (-1.77, 1.79)	1.85 (0.08, 3.63) *
MUAC (cm)	0.50 (-.45, 1.44)	-0.23 (-1.16, 0.71)	1.05 (0.10, 1.99) *

Legend: * indicates p-value < 0.01; ** indicates change in adiposity outcome with every 10-fold increase of hormone concentration. AC (abdominal circumference); MUAC (mid-upper arm circumference).

Interplay between endogenous glycan fermentation and *klebsiella* pathogenicity in the intestinal lumen

*Surabhi Khasgiwala, MD[1,2], Katrin Unterhauser, PhD[2], Karim Rezaul, PhD[2] Sonam Tamrakar, PhD[3], Jeremy Balsbaugh PhD[3], Anthony Provatas, PhD[4], Adam P. Matson, MD, MSc[1,2,5]
[1] Division of Neonatology, Connecticut Children's Medical Center, Hartford, CT, [2] Department of Pediatrics, University of Connecticut School of Medicine,[3] Proteomics and Metabolomics Facility, University of Connecticut, Storrs, CT,[4] Center for Environmental Sciences and Engineering, University of Connecticut, Storrs, CT,[5] Department of Immunology, University of Connecticut School of Medicine

BACKGROUND: Cytotoxin (tilimycin)-producing members of *Klebsiella oxytoca* species complex (KoSC) are the causative agent of antibiotic-associated hemorrhagic colitis (AAHC) and have been linked to necrotizing enterocolitis (NEC) in premature infants; however, they are also found in the gut of subjects that do not develop intestinal disease. The contextual basis for KoSC to produce tilimycin and transition from commensal to pathogen remains poorly understood. **OBJECTIVE:** To determine if endogenous glycans induce tilimycin synthesis and define host exposures that increase luminal glycans for KoSC consumption. **METHODS:** *K. oxytoca* AAHC isolate (AHC-6) and *K. grimontii* NEC isolate (UCH-1) were cultured in lysogeny broth (LB) +/- glucose, fucose, or sialic acid. Growth was measured by optical density at 600 nm (OD_{600}). Cytotoxin production was assessed using bacterial culture supernatants applied to T84 intestinal epithelial cells and via mass spectrometry (MS). UCH-1 Δ*fucI* and Δ*nanT* mutants were generated, which lack genes required for fucose and sialic acid metabolism, and growth and cytotoxin production were similarly assessed. C57BL6/J mice were treated or not with amoxicillin and/or indomethacin, and levels of free fucose and sialic acid were quantified in cecal contents by liquid chromatography MS. Kruskal-Wallis tests with Dunn's multiple comparisons assessed differences between groups. **RESULTS**: All three sugars enhanced tilimycin production and cytotoxicity compared to when the isolates were cultured in LB alone. Fucose and sialic acid supported KoSC growth and induced tilimycin production to an equivalent or greater level as glucose. UCH-1 Δ*fucI* and Δ*nanT* mutants failed to make tilimycin in LB + fucose or sialic acid respectively. Free sialic acid increased in murine cecal contents 24 – 72 hours following the initiation of amoxicillin and/or indomethacin treatment (**Figure**), whereas fucose remained below the limit of detection. **CONCLUSION**: Sialic acid and fucose induce *in vitro* tilimycin production by KoSC. Treatment with antibiotics and/or indomethacin increases luminal sialic acid availability potentially driving KoSC pathogenicity *in vivo*. Future studies will assess luminal tili damage in mi Δ*nanT* and tre

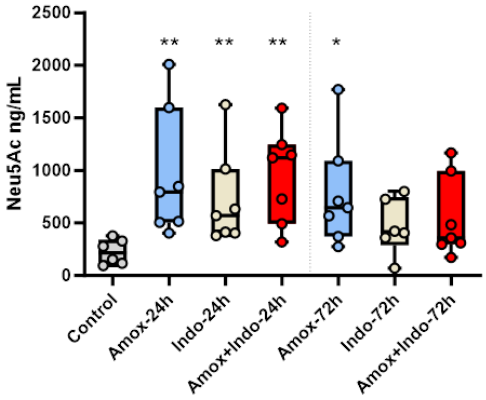


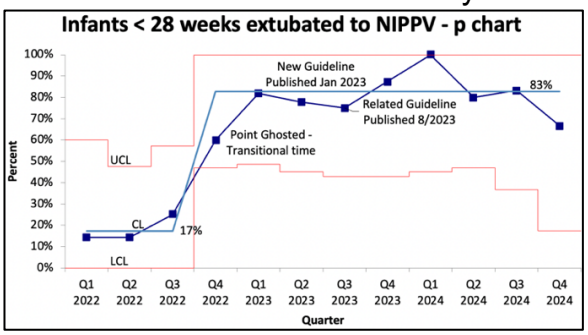
Figure. Concentrations of free sialic acid (Neu5Ac) in murine cecal contents at 24- and 72-hours following treatment with amoxicillin (100 mg/kg) twice daily by intraperitoneal injection and/or indomethacin (2.5 mg/kg) once daily by subcutaneous injection. *$P \leq 0.05$; **$P \leq 0.01$.

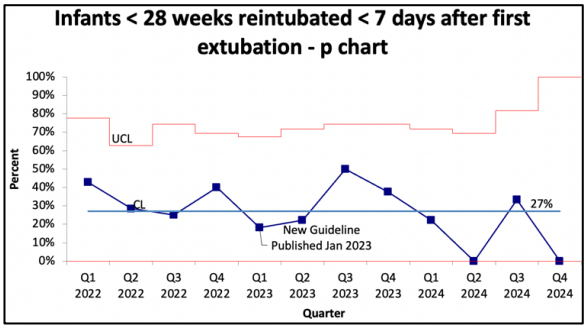
Supporting successful first extubation of extremely preterm infants using non-invasive positive pressure ventilation (NIPPV): A quality improvement project

Sofia Gnecco-González*,[1] Emily Whitesel,[1,2] John Zupancic,[1,2] Munish Gupta,[1,2] Dewayne M Pursley,[1,2] Helen Healy[1,2]

[1]Department of Neonatology, Beth Israel Deaconess Medical Center, Boston, Massachusetts, USA. [2]Department of Pediatrics, Harvard Medical School, Boston, Massachusetts, USA

Background Bronchopulmonary dysplasia (BPD) is a chronic lung condition that increased morbidity and mortality among preterm infants. Minimizing total days of invasive ventilation is crucial in reducing BPD risk. Failed extubation attempts and subsequent reintubations in extremely preterm infants may contribute to loss of pulmonary reserve and overall destabilization. Evidence from meta-analyses suggest that non-invasive positive airway pressure (NIPPV) may be more effective than nasal continuous positive airway pressure (nCPAP) in reducing need for reintubation within 7 days of extubation. **Objective** To study reintubation rates before 7 days of first extubation in infants born <28 weeks' gestational age at Beth Israel Deaconess Medical Center (BIDMC) Neonatal Intensive Care Unit (NICU), before and after implementing a practice guideline based on literature review, local data, and NICU staff preferences measured via Neonatology Survey of Interdisciplinary Groups in Healthcare Tool (NSIGHT). **Design/Methods** The Chronic Lung Disease Working Group of BIDMC NICU created a driver diagram to reduce BPD, including primary drivers to reduce ventilation time and reintubation after extubation. The 2017 and 2019 NSIGHT surveys measured NICU staff preferences and evolving opinions of non-invasive respiratory support. In January 2023, a practice guideline for NIPPV use post-extubation in infants <28 weeks' GA was introduced at BIDMC Level III NICU. Yearly rates of reintubation <7 days. after first extubation and extubation to NIPPV were calculated from 2022 to 2024 to assess guideline impact.





Results A total of 103 infants born <28 weeks' GA underwent ventilation and extubation between 2022 and 2024**.** We present statistical process control charts showing successful guideline implementation with a shift of 17% to 83% extubation to NIPPV from 2022 - 2024. While a statistically significant shift in reintubation within 7 days has not been observed yet, there has been a drop in rates of reintubation from 33% to 14% from 2022 to 2024 and 23% combining 2023 and 2024.

Conclusions Following the implementation of a practice guideline informed by data review and measured practice preference, the practice of extubation to NIPPV for infants <28 weeks' GA was successfully adopted and an overall decrease in reintubation rates before 7 days.

The molecular effects of maternal cannabis use on infant feeding regulation

Natalie Finton,*#[1] Marissa Chow,#[2] Kiran Singh,[2] Mario Cordova,[3,4] Elizabeth Yen[2,3,4] (*in training; #co-first authors). [1]Tufts University, Medford, MA; [2]Mother Infant Research Institute, Boston, MA; [3]Tufts University School of Medicine, Boston, MA; [4]Tufts Medicine Pediatrics, Boston, MA

Background: Cannabis use in pregnancy has increased in recent years. Its active ingredient, delta-9-tetrahydrocannabinol (THC), binds to cannabinoid receptors and regulates appetite through its effect on the hypothalamic genes. Our group showed that opioid use in pregnant mothers dysregulates infant feeding by modulating the anorexigenic (leptin receptor/*LEPR*) and reward (dopamine receptor type 2/*DRD2*) signaling. The impact of maternal THC use on infant feeding regulation is understudied.

Objective: To determine the effects of maternal THC use (alone [THC-only] or with opioids [THC+OPI]) on the hypothalamic/reward gene regulation and feeding behavior in neonates.

Methods: Saliva samples of THC-exposed (THC-only and THC+OPI) and sex- and gestational age (GA)-matched non-exposed neonates underwent RT-qPCR analysis of select genes: cannabinoid receptors (*CNR1, CNR2*) and hypothalamic/reward genes studied previously (*NPY2R, DRD2, LEPR,* and *POMC*). Threshold cycle (Ct) values for these genes were normalized against *GADPH* and *YWHAZ*. Gene expression was stratified by exposure. Demographic and feeding data were compared across groups. Continuous data were analyzed using t-test and categorical data using a chi-squared test. Significance was set at $p<0.05$.

Results: THC-exposed neonates were born smaller than non-exposed neonates. The expression of *CNR1* was greater in the exposed than in non-exposed neonates, with significance noted in the THC-only cohort. A trend of greater expression of *DRD2* (reward) and *POMC* (anorexigenic) genes was seen in the exposed than non-exposed neonates. Within the THC-exposed cohort, the expression of *DRD2* and *POMC* was greater in those with THC+OPI exposure than with THC-only exposure. THC-only exposed neonates took more volume in the first couple days of life compared to neonates with no drug or with THC+OPI exposure. More formula and mix feedings were observed in the THC-exposed than non-exposed group.

Conclusion: Maternal THC use affects the hypothalamic/reward genes through its action on the cannabinoid receptor, specifically by upregulating *both* the reward (*DRD2*) and anorexigenic (*POMC*) signaling. The greater milk intake in the THC-exposed cohort suggests that maternal THC use may create a hypothalamic imbalance that favors reward signaling. Opioids may have a synergistic effect with THC, evidenced by the differential *DRD2* and *POMC* expression in the THC-only and THC+OPI groups. Although limited by its small sample size, our study is the first to show the molecular and behavioral effects of maternal THC use on the offspring's reward and feeding regulation. Future data will include a larger sample size and more comprehensive feeding data.

Differences in administration of antenatal corticosteroids in the late preterm period

*Kachenta Descartes, MD, MBS[a,b]; Sarah F Lindsay, MD[a,b]; David M. O'Sullivan, PhD[c]; Elizabeth A Suschana[a]; Sahana Chinthak[b], Jennifer Hill, MD[a,b]
Institutions: University of Connecticut School of Medicine, Farmington, CT[a], Hartford Hospital, Hartford, CT[b], Hartford HealthCare, Hartford, CT[c]

Background: Administration of antenatal corticosteroids is recommended for patients at risk of preterm delivery within 7 days. A prior study found racial and ethnic disparities in the administration of antenatal corticosteroids for early preterm births, prior to 34 weeks gestation. There are limited data available investigating disparities in the administration corticosteroids during the late preterm period.

Objective(s): The aims of this study are to describe the rate of administration of antenatal corticosteroids for patients in the late preterm period and identify differences in rates of administration by race and other demographic factors. We hypothesized that there would be a difference in the administration of antenatal corticosteroids during the late preterm period based on race.

Methods: This retrospective cohort study included 800 randomly selected records of patients experiencing late preterm delivery from January 1, 2017 through December 31, 2022 at Hartford Hospital or Hospital of Central Connecticut. We collected demographic and obstetric outcome data and compared the rate of steroid administration prior to delivery for patients meeting inclusion criteria. Statistically significant differences were declared at $p<0.05$.

Results: Our sample comprised 337 records (42% of all selected), of which 151 (45%) received antenatal steroids. We found no difference in steroid administration by race (42.4% White, 50% Black, 22.2% Asian, 0% Native/Hawaiian/Pacific Islander; $p=0.289$). We found no differences by hospital, patient age, or provider type (private vs. clinic). Significantly more patients who received steroids had public insurance compared to those with private insurance (61.6% vs. 38.4%, resp.; $p=0.042$). Patients who received steroids had an earlier gestational age compared to those who did not (35w4d vs. 36w1d, resp.; $p<0.001$).

Conclusion: There was no difference in the rate of antenatal steroid administration by race for patients experiencing late preterm delivery. Future research should investigate any significant neonatal health implications for those who receive or did not receive corticosteroids in the late preterm period.

The association between co-occurring substance use and HIV-1 exposure on placental pathology and pregnancy outcomes

Noor Chadha, MD, MS (1)*, Julia Glace (2); Annie Johnson (2); ; Sorraya Jaiprasert, MPH (3); Elizabeth Taglauer, MD, PhD (2, 3); Elijah Paintsil, MD (3); Elisha M. Wachman, MD (2,3); Naima T. Joseph, MD, MPH (1,2)

[1]Department of Obstetrics and Gynecology, Boston Medical Center, Boston MA; [2]Boston University Chobanian and Avedisian School of Medicine, Boston MA; [3]Department of Pediatrics, Boston Medical Center, Boston MA

Background - Co-occurring substance use disorders (SUDs) and HIV are increasingly prevalent, and individually associated with increased risk of adverse pregnancy outcomes. There is increasing recognition of the role of the placenta in mediating healthy pregnancy outcomes, and that aberrant placentation drives adverse outcomes. However, the combined effects of SUD and HIV on placental dysregulation and perinatal outcomes have been underexplored.

Objective - We sought to examine the combined impacts of SUD and HIV exposure on perinatal outcomes and placental histopathology

Methods - This retrospective cohort study identified pregnancies affected by HIV alone and those affected by concurrent HIV and SUD from one institution between 2015-2023. Demographics, pregnancy outcomes, placental efficiency scores (infant weight divided by placental weight), and placental pathology in pregnancies with HIV were compared to those affected by HIV and SUD.

Results - There were 141 pregnancies included in the final analysis (HIV alone n=122 ; HIV + SUD, n=19). Those with HIV and SUD were more likely to identify as White (42.1% vs 4.1%, p <0.0001) and to have Hepatitis C virus co-infection (55.6% vs 3.3%, p <0.0001), and less likely to be on any antiretroviral therapy (ART) at delivery (76.5% vs 97.5%, p 0.004). Co-occurring HIV and SUD was associated with earlier gestational age at delivery (36.0 (standard deviation (SD) 5.2) vs 38.7 (1.8) weeks, p 0.01), lower infant birth weight (2468 (953) grams vs 3097 (607) grams, p 0.002), higher rate of NICU admission (52.6% vs 13.9%, p 0.0002), and lower rate of pregnancy induced hypertension (5.6% vs 10.7%, 0.02) compared to HIV alone. In a linear regression model adjusted for ART exposure, pre-eclampsia, and Hepatitis C, those with HIV and SUD had lower placental efficiency scores [5.7 (1.4) vs 7.4 (1.8); adjusted mean difference -1.73 (95% CI (-2.979) - (-0.472)); p 0.008]. There were no significant differences in placental histopathology.

Conclusions - Concurrent HIV and SUD during pregnancy were associated with a higher risk for preterm birth, NICU admission, low birthweight, and lower placental efficiency scores when compared to HIV alone. These findings suggest that SUD in HIV-affected pregnancies increases the risk for adverse pregnancy outcomes and poorer placental health. However, our study suggests this increased risk is not mediated by pregnancy induced hypertension.

Maternal perceived ethnic discrimination impacts stress-responsive placental mRNA and miRNA

Francesca Carasi-Schwartz*[1], Tomoko Kaneko-Tarui[1], Taysir Mahmoud[1], Sebastian Z. Ramos[1], Larry Feig[2], Perrie O'Tierney-Ginn[1]
[1]Mother Infant Research Institute Tufts Medical Center, Boston, MA, [2]Tufts University School of Medicine, Boston, MA

Background: Maternal stress negatively impacts pregnancy outcomes, fetal development, and offspring health, though underlying mechanisms are poorly understood. Placental micro RNAs (miRNAs) targeting cellular stress-response pathways (miR-34c-5p, miR-181d-5p, miR-192-5p) are differentially expressed in non-Hispanic Black and non-Hispanic White patients.

Objective: To analyze the relationship between placental expression of stress miRNAs and maternal stress measures since we hypothesize that chronic stress, such as experiences of racism, play a role in their expression.

Methods: Stress was assessed in 41 healthy pregnant patients using the Perceived Stress Scale (PSS), Perceived Ethnic Discrimination Questionnaire (PEDQ), and salivary cortisol awakening response (CAR) in early (12-16 weeks) and late (34-36 weeks) pregnancy. Maternal cortisol was measured by ELISA in saliva samples collected 0, 30, and 60 min after waking with CAR calculated as area under the curve. At delivery, villous samples were collected from the placenta and snap frozen. RNA was extracted and placental stress-responsive mRNA (*OGT, AOC1, CEBPB, CCL27*) and miRNA expression were evaluated using RT-qPCR. Spearman's rank correlation tested for association with stress measures with $p<0.05$ considered statistically significant.

Results: PEDQ was positively related to miR-34c-5p and miR-181d-5p during early (r=0.45, p=0.002, r=0.31, p=0.04,) and late pregnancy (r=0.32, p=0.03, r=0.31, p=0.04,). PEDQ was also positively associated with multiple placental mRNAs: *OGT* during early (r=0.44, p=0.003) and late pregnancy (r=0.34, p=0.02), along with *CEBPB* (r= 0.42, p= 0.01) and *CCL27* (r= 0.31, p= 0.04) only during early pregnancy. Early (r=-0.32, p=0.04) and late (r= -0.34, p=0.03) pregnancy CAR was negatively associated with *CEBPB*. Placental miR-34c-5p was positively associated with *OGT* (r=0.33, p=0.03) and *AOC1* (r=0.35, p=0.02). Early pregnancy PSS was positively correlated with placental *AOC1* (r=0.31, p=0.04). There was no significant relationship between miR-192-5p and any stress measure.

Conclusion: Placental miRNA that target stress-response pathways previously found to be differentially expressed in Black patients correlated with maternal experiences of ethnic discrimination and dampened CAR, an indicator of chronic stress. These results indicate that the placenta is highly sensitive to maternal stress, as measured by experiences of racial discrimination. Future studies should focus on elucidating how these pathways impact pregnancy outcomes. In particular, the relationships between miR-34c-5p and mRNAs *OGT* and *AOC1* suggest potential placental target pathways of this miRNA but must be experimentally confirmed.

Saturday, March 8, 2025
Second Scientific Session: Oral Presentations

Moderators: Helen Christou, MD and Michael House, MD

3:30 pm	Association of weight stigma with postpartum depression: a multi-state prams analysis. A. Wayne* UMass
3:42 pm	Redefining bowel wall thickness benchmarks for preterm infants. M. Vogel* Tufts
3:54 pm	Association of periviable birth and postpartum psychiatric morbidity in the Medicaid population. A. Trochtenberg* Tufts
4:06 pm	Can a remote blood pressure monitoring program reduce racial disparities in healthcare utilization and severe maternal morbidity among postpartum patients with hypertension. S. Talbot* UConn
4:18 pm	Randomized controlled trial of traxi panniculus retractor use for improving surgical time and patient and provider reported outcomes. E. Stonestreet* BIDMC
4:30 pm	Developmental outcomes at 18 to 36 months corrected age of very preterm or very low birth weight infants with older siblings. N. Rahman* UConn
4:42 pm	Factors associated with exclusive formula feeding in individuals with hypertensive disorders. J. S. Agudugo* BIDMC
4:54 pm	Neonatal acute kidney injury: Incidence, risk factors, and outcomes in multiple tele-NICU sites in India. S. Mathias* BCH

10-MINUTE BREAK

5:05 pm	Geographic variations in clinical outcomes in the placenta accreta spectrum. R. Martin* BIDMC
5:17 pm	Implementation of universal screening for syphilis in pregnant patients presenting for birth hospitalization. T. Lueck* BIDMC
5:29 pm	Lung ultrasound score and left ventricular eccentricity index in preterm infants with respiratory distress syndrome. J. Kelner* CCMC
5:41 pm	Characterization of funding sources and reported significance in neonatal randomized trials. R. Johnstone*, BIDMC
5:53 pm	Adequacy of chorionic villus sampling in one vs two pass procedures. D. Febres-Cordero* BIDMC
6:05pm	Human neonatal CD8 t cells exhibit rapid, short-lived, effector responses and a unique transcription factor landscape. M. Chakder * Yale

*Denotes person in training

Association of weight stigma with postpartum depression: A multi-state PRAMS analysis

Wayne AE*, Fredericks C, and AR Whelan
University of Massachusetts Chan Medical School

Background: Weight stigma, the systematic devaluing of individuals in bodies which do not conform to societal standards of size/weight, is prevalent in healthcare and is associated with adverse mental health outcomes (i.e. anxiety and depression) in the general population. Pregnancy is a time of high weight-focus and pregnant individuals in larger bodies can experience weight stigma. Pregnant people with a BMI >30 kg/m^2 have an increased risk for postpartum depression (PPD) compared to people with a BMI <30 kg/m^2, and we hypothesize that weight stigma may contribute to this increased risk.

Objective: To evaluate the association between weight stigma and PPD in individuals with a pre-pregnancy BMI ≥30 kg/m^2.

Methods: Secondary analysis of the Pregnancy Risk Assessment Monitoring System (PRAMS) for states that included questions on discrimination (MN, NH, VT, VA, and WA) from 2016-2022. Participants who had a pre-pregnancy BMI ≥30 kg/m^2 and answered 'yes' to having experienced discrimination based on weight or having experienced unfair treatment based on weight were included in the weight stigma group. The weight stigma group was compared to participants with a BMI ≥ 30kg/m^2 who did not experience weight stigma, as well as participants with a BMI <30 kg/m^2. The primary outcome was PPD. Stata v18 was used for all analyses using complex survey weighting.

Results: Of 26,574 participants, 695 (2.6%) had a BMI ≥30 and experienced weight stigma. 6,817 (25.7%) participants had a BMI ≥30 and did not experience weight stigma, and 19,062 (71.7 %) participants had a BMI <30. Individuals who experienced weight stigma had higher rates of PPD than individuals in the other groups (Table 1). Even after adjusting for demographic and pregnancy factors, individuals with a BMI ≥30 who experienced weight stigma were 1.83 times more likely to have experienced PPD than the other groups (95% CI 1.30, 2.56).

Conclusion: Individuals who experienced weight stigma were significantly more likely to have PPD. Future research focusing on evaluating weight bias in perinatal care and on developing weight-inclusive care initiatives during pregnancy is critical to improve perinatal mental health outcomes.

Table 1. Prevalence and odds of postpartum depression by BMI and experience of weight stigma.

	BMI ≥30 and weight stigma (n=695)	**BMI ≥30 and no weight stigma** (n=6817)	**BMI <30** (n=19,062)	**p-value**
Postpartum Depression	24.4%	12.0%	11.6%	<0.001
OR for Postpartum Depression (95% CI)	2.46 (1.82-3.32)	1.04 (0.90-1.21)	*comparison*	-
Adjusted OR for Postpartum Depression*	1.83 (1.30-2.56)	0.89 (0.76-1.06)	*comparison*	

*Adjusted for Hispanic ethnicity, non-white race, marital status, maternal education level, income level, depression before pregnancy

Redefining bowel wall thickness benchmarks for preterm infants

Maggie M. Vogel DO[1*], Michael T. Dolinger MD[3], Indrani Bhattacharjee MD[1,2]
[1] Tufts Medicine Pediatrics - Boston Children's, Boston, MA
[2] Tufts University School of Medicine, Boston, MA
[3] Icahn school of Medicine at Mount Sinai, Kravis Children's Hospital, New York, NY

Background: Diagnosing gut pathology in premature infants is critical yet challenging, with early intervention essential for improved outcomes. Ultrasound is emerging as a promising tool for earlier detection of gastrointestinal abnormalities compared to radiographs. Necrotizing Enterocolitis (NEC) remains a severe threat, progressing rapidly from inflammation to ischemia. Current bowel wall thickness (BWT) standards (1-2.6 mm) are derived from pediatric data, lacking neonatal-specific validation. Neonatal BWT benchmarks could transform early diagnosis and management of critical GI pathologies in this vulnerable population.

Objective: Using serial bowel ultrasound to longitudinally assess bowel wall thickness and inter-quadrant variation to create gestational age-based normative values.

Methods: An IRB-approved prospective cohort study was conducted at Tufts NICU in preterm infants under 34 weeks with an expected stay of more than two weeks. Weekly bedside abdominal ultrasounds were obtained within the first 7-10 days of life until eight weeks postnatal age or discharge, whichever came first. Abdominal quadrants were assessed systematically with a focus on identifying BWT in each of the four quadrants. All images were reviewed by a pediatric radiologist.

Results: In this study, 14 infants, with a mean gestational age (GA) of 29.7 ± 2.9 weeks and a mean birth weight of 1371g ± 571g. BWT increased with GA across all quadrants, with no significant inter-quadrant variation (ANOVA $p=0.102$). Mixed- effects models confirmed GA as a significant BWT predictor ($p<0.001$). Average BWT in preterm infants was 0.18-0.26 mm, much below normative pediatric values.

Conclusions: This study presents gestational age-based BWT standards for preterm neonates facilitating precise GI health monitoring. The uniform BWT growth across quadrants supports a streamlined measurement approach underscoring the need for neonatal-specific standards. This study establishes neonatal-specific BWT benchmarks to aid early detection of bowel injury in preterm infants. Future research should focus on validating these BWT benchmarks across diverse neonatal populations and exploring the integration of ultrasound-derived BWT metrics with other clinical indicators of preterm bowel injury.

Association of periviable birth and postpartum psychiatric morbidity in the Medicaid population

Alyssa L. Trochtenberg MD*, Sebastian Z. Ramos MD, Benjamin C. Koethe MPH, Mohak Mhatre MD
Division of Maternal Fetal Medicine, Department of Obstetrics and Gynecology, Tufts University School of Medicine

Objective: Publicly insured patients have increased risk of adverse obstetric outcomes and perinatal psychiatric morbidity. Although periviable birth is a significantly stressful obstetric event, its association with postpartum psychiatric outcomes has not been studied in this high-risk population.

Methods: Singleton liveborn periviable births (22 0/7 to 25 6/7 weeks) vs non-periviable births (≥26 0/7 weeks) were identified using claims data in the Merative MarketScan Medicaid database from 2020-2022. The primary outcome was a composite of psychiatric morbidity, defined as one or more of the following within 12 months postpartum: emergency department (ED) or outpatient encounters associated with depression, anxiety, psychosis, posttraumatic stress disorder, adjustment disorder, self-harm, or suicide attempt; new psychotropic medication prescription; or inpatient psychiatry admission. Analysis was adjusted for maternal age, cesarean delivery (CD), severe maternal morbidity (SMM), maternal comorbidity index, and history of mental health disorder.

Results: Out of 639,971 deliveries, there were 3,518 (0.5%) periviable births (PB) and 636,453 non-periviable births (NPB) included for analysis. Baseline prevalence of mental health disorders was similar between groups. The incidence of SMM, hypertensive disorders of pregnancy, and CD was higher among individuals with PB. Compared to NPB, PB was associated with greater incidence of composite psychiatric morbidity (27.3% vs 22.5%, aOR 1.32 [95% CI 1.22-1.42]) and increased ED utilization for mental health disorders (5.1% vs 3.9%, aOR 1.37 [95% CI 1.17-1.60]); furthermore, patients with PB were more than twice as likely to have postpartum inpatient psychiatric admission (5.8% vs 2.8%, aOR 2.26 [95% CI 1.95-2.62]). PB was associated with increased incidence of new psychotropic medication prescriptions and outpatient behavioral health visits.

Table 1. Primary and secondary psychiatric outcomes within 12 months postpartum among publicly insured patients in MarketScan with and without a periviable birth, 2020-2022.

Outcome	PB (n = 3,518)	NPB (n = 636,453)	Adjusted OR (95% CI)
Composite of psychiatric morbidity	**960 (27.3)**	**142,962 (22.5)**	**1.32 (1.22, 1.42)**
ED visit	181 (5.1)	24,704 (3.9)	1.37 (1.17, 1.60)
New psychotropic medication	645 (18.3)	100,532 (15.8)	1.20 (1.10, 1.31)
New behavioral health visit	382 (10.9)	60,693 (9.5)	1.18 (1.06, 1.32)
Inpatient psychiatry admission	208 (5.9)	18,058 (2.8)	2.26 (1.95, 2.62

Data presented as number (percentage). Analysis was adjusted for maternal age, cesarean delivery, severe maternal morbidity (SMM), maternal comorbidity index, and history of mental health disorder.

Conclusion: Despite increased outpatient behavioral healthcare utilization, publicly insured patients who experience periviable birth are at high risk for psychiatric morbidity requiring emergency or inpatient-level of care.

Can a remote blood pressure monitoring program reduce racial disparities in healthcare utilization and severe maternal morbidity among postpartum patients with hypertension?

Shana Talbot, MD*; Tracy L Jackson, PhD; Scott Machado; Nicole Konecke, William Hunt; Maria Mejia Castillo; Danielle Simmons, MSN FNP-C; Heather Smith, MD, MPH; Nina K Ayala, MD, ScM; William Grobman, MD, MBA; Adam K Lewkowitz, MD, MPHS; Methodius G. Tuuli, MD, MPH, MBA.

Objective: Remote self-measured blood pressure (SMBP) monitoring programs have been shown to reduce racial inequity in postpartum blood pressure ascertainment. However, their effect on disparities in healthcare utilization and severe maternal morbidity (SMM) is less clear. We aimed to compare outcomes between participants in our remote SMBP program who self-identified as Black versus non-Hispanic White.

Study Design: Postpartum individuals with hypertension (HTN) at our tertiary hospital are offered enrollment in our remote SMBP program. For this analysis, participants who did not self-identify as Black or non-Hispanic White were excluded. The primary outcome was a composite of HTN-related postpartum readmission or ED visit within 30 days of delivery. Secondary outcomes were individual components of the primary composite, HTN-related SMM, and anti-hypertension medication initiation or titration. A log-link binomial generalized linear model was used to estimate relative risks (aRR) adjusting for potential confounders.

Results: Among 2003 participants in the SMBP program from 2022 – 2024, 1363 met inclusion criteria. Of these, 988 (49.3%) self-identified as non-Hispanic White and 375 (18.7%) as Black. Compared to non-Hispanic White participants, Black participants were younger, and more likely to have public insurance and gestational HTN (**Table 1**). After adjusting for these factors, there was no significant difference in the composite of HTN-related postpartum readmission or ED visit between Black and non-Hispanic White participants (19.2% vs 16.7%; aRR 1.29, 95% CI 0.98, 1.69). Risk of HTN-related readmission alone was significantly higher among Black participants (12.2% vs 9.9%; aRR 1.48, 95% CI 1.03, 2.11). There was no significant difference In HTN-related SMM (12.5% vs 11.7%; aRR 1.00, 95% CI 0.72, 1.42). There was also no difference in anti-hypertensive medication initiation or titration (**Table 2**).

Conclusions: Our remote SMBP program for postpartum patients with HTN eliminated racial disparities in overall HTN-related healthcare utilization and HTN-related SMM.

Randomized controlled trial of Traxi panniculus retractor use for improving surgical time and patient and provider reported outcomes.

Emily Stonestreet,*[1] Tina Yi Jin Hsieh,*[1] Audrey Mutoni,*[1] Tyler Lueck,*[1] Anna M. Modest,[1] Tooba Anwer,[2] Airis Y. Collier[1]

1. Department of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, Boston, MA; 2. Department of Obstetrics and Gynecology, Brigham and Women's Hospital, Boston, MA

Background: Twenty-nine percent of pregnant individuals have pre-pregnancy obesity according to the 2019 CDC National Vital Statistics. Persons living with obesity are at higher risk for cesarean delivery and higher risk for birth complications. Evidence-based methods to improve outcomes are needed.

Objective: The objective of our study is to determine whether use of self-retaining panniculus retraction device (Traxi) in patients with obesity will improve operative time or patient and provider experience for non-emergent cesarean delivery.

Methods: Pregnant patients with body mass index (BMI) ≥40 kg/m^2 undergoing non-emergent cesarean delivery were recruited from two academic hospitals (NCT03651076) and randomized to Traxi panniculus retraction or standard of care. Computer generated block randomization, stratified by prior abdominal surgery, was used to randomize participants in a 1:1 ratio to the Traxi or standard care. Demographic information was collected by self-report. Surgical time from skin incision to closure and clinical data was collected by review of electronic health record. Participants and providers were asked to respond to surveys administered through REDCap data. Intention to treat analysis was performed using a Wilcoxon rank-sum test and Chi-squared test for continuous and dichotomous variables, respectively.

Results: We enrolled 135 participants from 2018 to 2024 at two academic hospitals; 67 were randomized to Traxi and 68 were randomized to standard care. Of these, 43 (31.9%) reported no prior abdominal surgery (including prior cesarean or other laparotomy) and median BMI was 48.9 (interquartile range (IQR) 45.0, 52.5). Baseline characteristics of the Traxi and standard care groups were similar. Median surgical time was 65.0 min (IQR 55.0, 81.0) in the Traxi group and was 70.0 min (IQR 57.0, 86.0) in the standard care group, but this difference was not statistically significant (p=0.31). Providers were more likely to report they were very satisfied with effectiveness of panniculus retraction in Traxi group (74.4%) compared to standard care (37.9%, p<0.001). Patients more frequently reported that they would choose the retraction method in future cesarean delivery in the Traxi arm (70%) compared to standard care (45.5%), though this response was not statistically significant (p=0.06).

Conclusions: Traxi panniculus retraction did not significantly improve surgical time but was associated with improved provider and patient-reported satisfaction.

Developmental outcomes at 18 to 36 months corrected age of very premature or very low birth weight infants with older siblings

*Nazifa Rahman, MD, Emily Gritz MD, Amirul Anuar MS, Naveed Hussain MD, Shabnam Lainwala MBBS PHD, University of Connecticut

Background: Preterm birth is a known risk factor for adverse neurodevelopmental outcomes. The effect of an older sibling on developmental outcomes in the preterm population remains unclear.

Objective: This study investigates the effects of an older sibling on developmental outcomes at 18 to 36 months corrected age (CA) of very low birth weight (VLBW, <1500 g) or very premature (VP, <32 weeks) infants.

Methods: A retrospective study including VLBW or VP infants admitted at two tertiary care Neonatal Intensive Care Units (NICUs) from 1/01/2015 to 12/31/2020, seen at 18 to 36 months CA in our institution's Neonatal Neurodevelopmental Follow-Up Program. Infants transferred to an outside hospital, expired, or discharged to foster care were excluded. Maternal and infant characteristics, neonatal morbidities and the Bayley Scales of Infant and Toddler Development (BSID, Ed III/IV) scores were compared between infants with and without older siblings using univariate and multivariate analyses with propensity score matching.

Results: Of 1031 VLBW or VP infants admitted, 819 met inclusion criteria and 590 (72%) were seen in follow-up at 18-36 months CA; 362 with older siblings and 228 without older siblings. Compared with infants without siblings, those with siblings were more likely to be born via c-section to older mothers with public insurance, have higher birth growth parameters, and lower ventilator days and length of NICU stay ($p<0.04$). After adjusting for known confounders, having an older sibling was associated with lower cognition, motor, and language BSID composite scores ($p\leq0.004$) and an increased likelihood of having language scores <85 (OR:1.8, CI:1.04-3.17, $p=0.036$) at 18-36 months CA.

Conclusions: This observational study showed a significantly lower BSID developmental scores at 18-36 months amongst preterm infants with older siblings. Also, our findings suggest a higher likelihood of language delay in preterm infants with older siblings. This may reinforce the importance of parental caregiver attention towards preterm children development and its impact on long term outcomes.

Factors associated with exclusive formula feeding in individuals with diabetes in pregnancy

J. Sroda Agudogo MD[1,2]*, Krysten North MD[2,3], Chloe Zera MD[1,2], Stephen Wagner MD[1,2], Anna Modest PhD[1,2]

1. Beth Israel Deaconess Medical Center, Boston, USA, 2. Harvard Medical School, Boston, USA, 3. Brigham and Women's Hospital, Boston, USA

Background: Diabetes affects 10% of pregnancies in the USA. Preexisting diabetes (PGDM) and gestational diabetes (GDM) are associated with significant maternal and neonatal morbidity and mortality. Breastfeeding is beneficial to the mother-neonate dyad, especially in the context of history of maternal diabetes, with reduced risk of long-term obesity and diabetes. **Methods:** The United States Vital Statistics Birth Certificate data was used in this retrospective cohort study. Singleton pregnancies complicated by diabetes from 2016-2022 were included. We evaluated the risk of EFF at time of hospital discharge across multiple maternal and neonatal characteristics and morbidities. **Results:** Of the 1,796,752 births included, 227,948 (12.7%) had PGDM and 1,568,804 (87.3%) had GDM. Racial minorities, education less than college level, lack of prenatal care, underweight, overweight and obesity were associated with EFF (Table 1). EFF was more likely after caesarean delivery compared to vaginal delivery (Table 2). Composite maternal morbidity, ICU admission and transfusion were associated with increased EFF (Table 2). EFF was more likely within the setting of composite neonatal morbidity or preterm delivery (Table 2). **Conclusions:** This study demonstrates that several maternal peripartum and demographic characteristics (such as education level and adequacy of prenatal care), and multiple neonatal risk factors are associated with EFF among those with diabetes in pregnancy. There is a need for enhanced breastfeeding support in this vulnerable population.

Table 1: Risk of EFF by patient demographics

Characteristic	Risk ratio (95% confidence interval)	
	PGDM (n=227,948)	GDM (n=1,568,804)
Maternal age > 35 years	0.9 (0.9 – 0.9)	0.9 (0.9 – 0.9)
Maternal Race/Ethnicity		
Non-Hispanic White	Reference	Reference
Non-Hispanic Black	1.4 (1.4 – 1.4)	1.4 (1.4 – 1.4)
Non-Hispanic AIAN*	1.2 (1.1 – 1.2)	1.1 (1.1 – 1.2)
Non-Hispanic Asian	0.6 (0.6 – 0.6)	0.6 (0.6 – 0.6)
Hispanic	0.8 (0.8 – 0.8)	0.8 (0.8 – 0.8)
Maternal education		
Less than high school	2.6 (2.5 – 2.6)	2.8 (2.8 – 2.9)
High school or GED	2.5 (2.5 – 2.6)	2.8 (2.7 – 2.8)
College or more	Reference	Reference
No Prenatal Care	1.9 (1.8-2.0)	1.6 (1.5-1.6)
Smoking in pregnancy	2.0 (2.0 – 2.0)	2.4 (2.4 – 2.4)
Pre-pregnancy BMI		
Underweight (<18.5)	1.2 (1.1 – 1.3)	1.3 (1.3 – 1.4)
Normal (18.5-24.9)	Reference	Reference
Overweight (25-29.9)	1.0 (1.0 – 1.1)	1.1 (1.1 – 1.1)
Obesity I (30.0-34.9)	1.2 (1.1 – 1.2)	1.3 (1.3 – 1.3)
Obesity II (35.0-39.9)	1.3 (1.3 – 1.3)	1.5 (1.5 – 1.5)
Obesity III (≥40.0)	1.5 (1.4 – 1.5)	1.8 (1.8 – 1.8)

*American Indian and Alaska Native (AIAN)

Table 2: Risk of EFF by mode of delivery, and morbidity

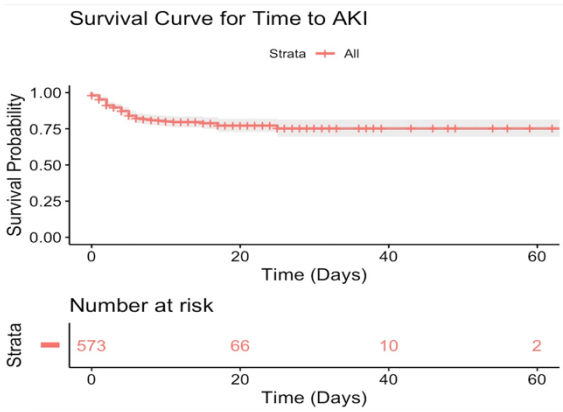
Characteristic	Relative Risk (95% Confidence Interval)	
	PGDM (n=227,948)	GDM (n=1,568,804)
Mode of Delivery & Morbidity		
Vaginal delivery	Reference	Reference
Caesarean Delivery	1.2 (1.2 – 1.2)	1.2 (1.2 – 1.2)
Composite maternal postpartum morbidity*	1.2 (1.2 – 1.3)	1.0 (1.0 – 1.1)
ICU Admission	2.0 (1.9 – 2.1)	2.4 (2.3 – 2.5)
Blood transfusion	1.6 (1.5 – 1.7)	1.6 (1.6 – 1.7)
Gestational Age at Delivery		
< 32w0d	1.7 (1.6 – 1.7)	1.8 (1.8 – 1.8)
32w0d - 33w6d	1.5 (1.4 – 1.5)	1.6 (1.5 – 1.6)
34w0d - 36w6d	1.3 (1.3 – 1.3)	1.4 (1.4 – 1.4)
37w0d - 41w6d	Reference	Reference
> 41w6d	1.1 (1.1 – 1.1)	1.1 (1.1 – 1.1)
Fetal/Neonatal Characteristics		
Composite neonatal morbidity*	1.5 (1.5 – 1.5)	1.5 (1.6 – 1.6)
Steroids for fetal lung maturity	1.2 (1.2 – 1.3)	1.4 (1.4 – 1.4)
Admission to NICU	1.4 (1.4 – 1.5)	1.6 (1.6 – 1.6)
Apgar score <5 at 5 min	2.1 (2.0 – 2.2)	2.3 (2.3 – 2.4)
Assisted ventilation >6 h	1.5 (1.4 – 1.5)	1.7 (1.7 – 1.8)

*Composite maternal morbidity: ICU admission, blood transfusion, clinical chorioamnionitis/fever, uterine rupture, unplanned hysterectomy, and perineal laceration. Composite neonatal morbidity: NICU admission , APGAR score < 5, assisted ventilation, seizure

Neonatal acute kidney injury: Incidence, risk factors and outcomes in multiple tele-NICU sites in India

Sitarah Mathias[1]*, Prashantha YN[2], Eva Robinson[3], Ryan Brewster[4], Carl Britto[1], Geethanjali Srivasthava[5], Michael Monuteaux,[3] Ankana Daga[1], Lakshmi Ganapathi[1,6]
1.Boston Children's Hospital, Harvard Medical School, Boston, USA; 2. Bangalore Baptist Hospital, Bangalore, India; 3. Biostatistics and Research Design Center, Boston Children's Hospital, Boston, USA.; 4. Beth Israel Deaconess Medical Centre and Ariadne Labs, Boston, USA; 5. Cloudphysician Pvt Ltd, Bangalore, India; 6. Massachusetts General Hospital, Harvard Medical School, Boston, USA

BACKGROUND: Neonatal Acute Kidney Injury (AKI) is independently associated with increased mortality and adverse outcomes. Cloudphysician is a tele-ICU and NICU (neonatal intensive care unit) company that provides remote critical care and neonatology expertise to low-resource and/or inaccessible regions in India. **OBJECTIVES**: To measure AKI incidence, time to AKI and its risk factors, and AKI outcomes among neonates admitted to multiple low-resource tele-NICUs in India. **METHODS**: Anonymized data of neonates ≤ 28 days post-natal age at admission, with ≥ 2 serum creatinine values after the first 48 hours of life admitted to 18 tele-NICUs within the Cloudphysician network (June 2022- May 2024) in India were collected from their electronic database. The modified KDIGO definition was used to identify cases of neonatal AKI. AKI incidence per 100 patient-days, and prevalence of risk factors were reported using descriptive statistics. Cox proportional hazards regression was used to evaluate predictors of time to AKI. The association between AKI and clinical outcomes was evaluated with the chi square test. **RESULTS:** During the 2-year study period, 573 admitted neonates met our eligibility criteria (mean gestational age (GA) 35.14 weeks). AKI incidence was 9.11 cases per 100 patient-days. Among 102 (18%) neonates diagnosed with ≥1 AKI episodes during admission, 32% had sepsis, 72% required vasopressors, 75% were mechanically ventilated and 52% had nephrotoxin exposure. Median time to AKI was 3 days (IQR:1-5) from admission. The cumulative incidence of AKI at admission is 2% (95% CI: [3%, 1%]) and increases to 25% (95% CI: [31%, 19%]) at day 30. Neonates that were mechanically ventilated appeared to have a higher risk of AKI over time (HR 1.94 [95%CI: 1.07, 3.52]). Compared to those without AKI, neonates with AKI had significantly higher rates of in-hospital mortality (6% vs. 20%, respectively, p<0.001]) but no significant difference in rates of discharge against medical advice (27% vs 35% respectively, p=0.11). **CONCLUSION:** Increased risk of AKI with mechanical ventilation indicates higher risk among critically ill neonates. Early development of AKI after admission indicates a high-risk time-frame to target future AKI-reduction interventions. Poorer outcomes among those with AKI highlight need for standardized testing, early diagnosis and risk-based prevention strategies, particularly in low-resource settings.



Geographic variations in clinical outcomes in the placenta accreta spectrum

Rafael R. H. Martin*[1], Rafaela Germano Toledo[1], Bridget Donovan[2], Michele R. Hacker[1], Scott Shainker[1], Anna M. Modest[1]

1. Beth Israel Deaconess Medical Center, Boston, MA; 2. University of Virginia Health

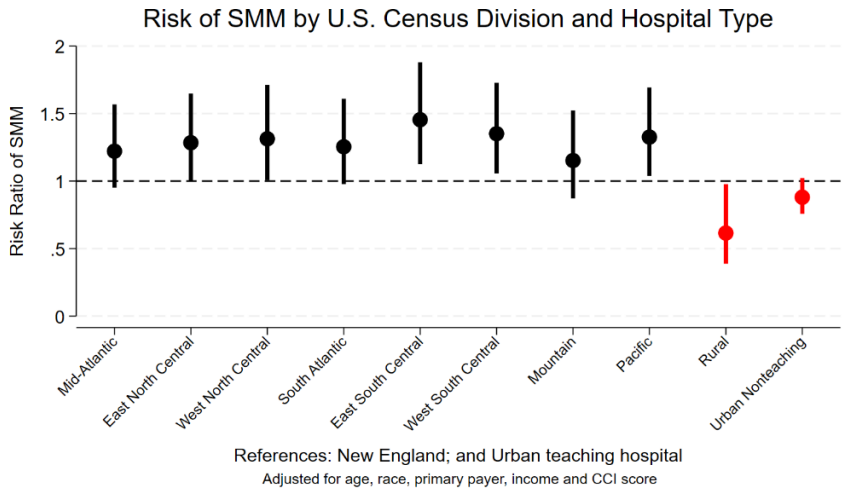
Background: Placenta Accreta Spectrum (PAS) is becoming increasingly more prevalent and is associated with severe maternal morbidity (SMM). The majority of the literature investigating risk factors for SMM in patients with PAS comes from single-center studies. The National Inpatient Sample (NIS) represents a 20-percent stratified sample of discharges from hospitals in the United States.

Objective: Compare the incidence of SMM among patients diagnosed with PAS across all hospital types and regions of the United States.

Methods: Patients with a diagnosis of PAS (accreta, increta or percreta), placenta previa, and prior caesarean delivery from 2016-2019 in the NIS were included. SMM was defined based on the Centers for Disease Control and Prevention criteria. Diagnosis codes were used for all comorbidities. Poisson regression models were used to estimate risk ratios (RR) and 95% confidence intervals (CI) for the association between the U.S. Census Bureau division of the hospital and SMM, hospital teaching type and SMM. All models were adjusted for maternal age, race, primary payer, income, and Charlson Comorbidity Index (CCI).

Results: We identified 1,188 patients with a mean maternal age at delivery of 31.1 years. Placenta accreta, opposed to increta or percreta, was the predominant diagnosis (70%). The Pacific (17%) and Mid-Atlantic (15%) were the regions with the largest proportion of PAS cases. The vast majority of cases were treated in urban teaching hospitals (89%). Rural hospitals had a higher proportion of percreta compared to urban teaching (22% compared to 18%). Most patients had a CCI score of 0 (83%). The incidence of SMM was 70%. Compared to PAS patients treated in New England, the East South-Central region had the highest risk of SMM (RR 1.45; 95% CI 1.12 – 1.88). Rural and urban non-teaching hospitals had a lower risk of SMM compared to urban teaching hospitals (RR 0.61; 95% CI 0.38 – 0.97 and RR 0.88; 95% CI 0.75 – 1.02, respectively) (Figure).

Conclusion: There are geographic and hospital factors associated with risk of SMM even when adjusting for patient-level factors. Further research is needed to better evaluate reasons for these differences.



Implementation of universal screening for syphilis in pregnant patients presenting for birth hospitalization

Tyler Lueck*, Kathleen Clarke, Taylor Freret, Rebecca Zash, Ai-ris Y. Collier
Dept. of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, Boston, MA

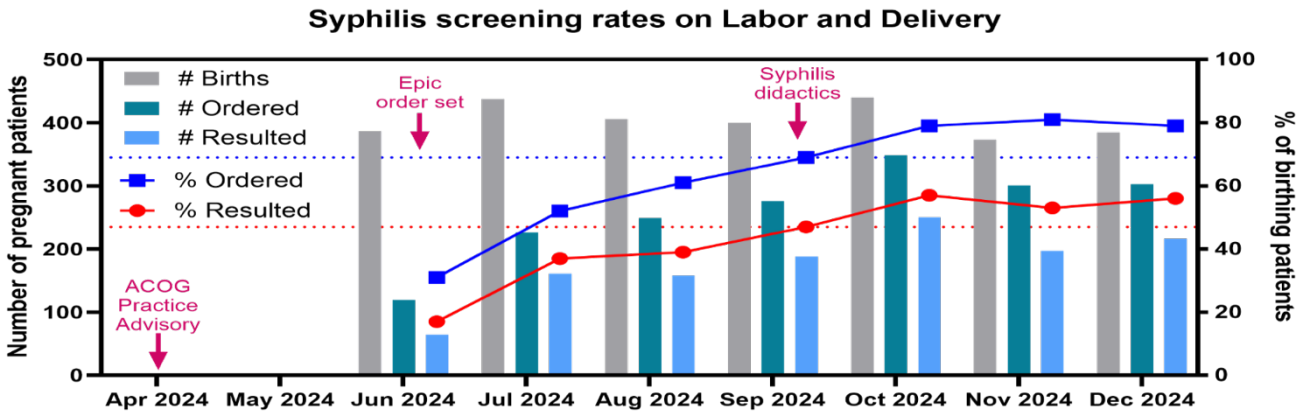
Background: Congenital syphilis is a severe and often deadly disease that fortunately can be prevented with appropriate screening and treatment of pregnant individuals. The Center for Disease Control and Prevention reports an almost 800% increase in congenital syphilis cases since 2012. In April 2024, the American College of Obstetricians and Gynecologists made a recommendation for universal screening for syphilis during pregnancy, including at the time of delivery.

Objective: The objective of this study is to describe the rates of universal syphilis screening at birth hospitalization after implementation of operational and educational interventions.

Methods: We included a cohort of patients admitted for birth hospitalization at a single academic hospital from June 1 to Dec 31, 2024. Number of births, order entry for syphilis screening (treponemal antibody [TP Ab] with reflex to RPR), and TP Ab result were collected from the electronic health record. Process measures included rate of birthing patients that had a TP Ab ordered and TP Ab result within 3 days of birth per month. Interventions included inclusion of TP Ab test in the standard admission order set in June 2024 (with electronic health record transition to Epic) and a lecture about syphilis in pregnancy for residents and fellows in Sept 2024.

Results: 2829 pregnant patients presented for admission for birth from June 1 to Dec 31, 2024. Median rates of TP Ab test order and result were 69% and 47%, respectively. The rates of TP Ab test order and result increased above the median following the trainee education to 79-81% and 52-57%, respectively.

Conclusions: Both rates of TP Ab ordering and test resulting within 3 days from birth improved following our interventions. More exploration is needed to investigate the discordance between TP Ab test ordering and resulting rates. Further efforts are required to increase screening for syphilis in pregnant patients presenting for birth hospitalization, including provider education, reminders, and audit and feedback.



Lung ultrasound score and left ventricular eccentricity index in preterm infants with respiratory distress syndrome

Jacob Kelner DO*, Naveed Hussain MBBS, Henry Chicaiza MD, Shalin Parekh MD
Connecticut Children's, Hartford, CT

Background: Left ventricular eccentricity index at the end of systole (LVEI-s) and end of diastole (LVEI-d) obtained during cardiac echography positively correlate with pulmonary hypertension and right ventricular (RV) volume overload, respectively. Hypoxic respiratory failure in premature infants with respiratory distress syndrome (RDS) can lead to pulmonary vasoconstriction and, therefore, should result in a higher LVEI-s. Overall, increased total fluid status in these neonates can increase pulmonary edema and lung ultrasound scores (LUS); it will likely also cause an increased RV volume overload with a higher LVEI-d.

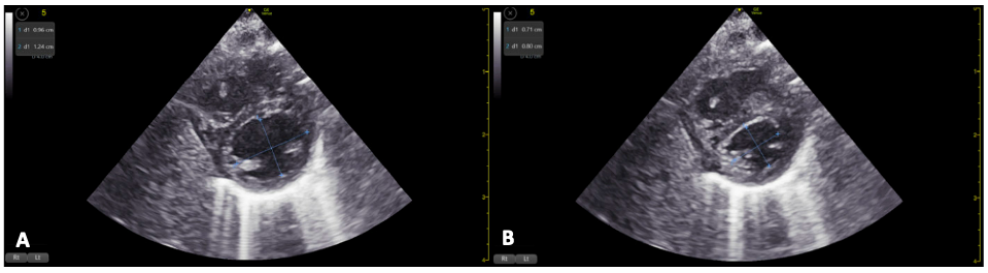
Objective: To investigate the association between LUS and LVEI in preterm infants with RDS.

Methods: This prospective pilot study included 30 ultrasounds on 16 infants born at <37 weeks gestational age (GA) with RDS requiring continuous positive airway pressure. LUS, LVEI-s, and LVEI-d were obtained daily for the first 72 hours of life. Linear regression analysis was performed to determine correlation.

Results: Median completed GA was 34.5 weeks (IQR 33-35), and birth weight was 2.28 kg (IQR 2.03-2.45). LUS positively correlated with both LVEI-s (r=0.57, *p*=<0.01) and LVEI-d (r=0.61, *p*=<0.01) during the 72-hour study period. This correlation increased over the first 24 hours of life (LVEI-s: r=0.75, *p*=<0.01; LVEI-d: r=0.63, *p*=<0.01) and first 6 hours (LVEI-s: r=0.96, *p*=<0.01; LVEI-d: r=0.81, *p*=<0.01).

Conclusion: The findings from this study may improve our understanding of the cardiopulmonary interactions in the setting of RDS.

Figure 1: Example ultrasound measurements for (A) LVEI-d and (B) LVEI-s.



Characterization of funding sources and reported significance in neonatal randomized trials

Rhys Johnstone[1*], Susanne Hay[1,2], Adrian Baca[1], Marianna Castellanos[1], Maria Mourao [1], Ivan Aivasovsky[3], Brian King [1,2], Haresh Kirpalani [4] and John A. F. Zupancic[1,2]

[1]Department of Neonatology, Beth Israel Deaconess Medical Center, Boston, Massachusetts; [2] Harvard Medical School, Boston, Massachusetts; [3]Department of Cardiovascular Medicine, Beth Israel Deaconess Medical Center, Boston, Massachusetts; [4]Emeritus, Department of Pediatrics, University of Pennsylvania, Philadelphia, PA, and Emeritus Department Pediatrics, McMaster University, Hamilton, ON, Canada

Background: Industry funding has been associated with potential bias in biomedical studies; however, this has not been adequately addressed in the context of neonatal randomized controlled trials (RCTs).

Objective: To analyze trends in funding sources for neonatal RCTs and correlate these sources with data reporting and measures of quality.

Methods: We analyzed RCTs between 2003 and 2017 from NeoCanon, a validated, hand-curated, and comprehensive database of all neonatal RCTs that includes information on study design, sample size, interventions tested, and funding, as reported in the text of the publications. We tested for trends in the rates of funding over time using the Mann-Kendall test. We then correlated funding source with whether any statistically significant results were reported in the publication abstract, using a chi-square analysis.

Results: Of the 2,665 trials, 1686 (63%) RCTs reported a funding source; 27% reported exclusively federal funding, 15% exclusively industry funding, 14% exclusively foundation funding, 13% other, 19% any combination of these, and 13% no funding. There was no change over time in the proportion of trials reporting industry (p=.24), foundation (p=.14), or combined (p=.92) sources. There was a positive change over time in the proportion of trials reporting a funding source (p<.01), the proportion reporting no funding (p<.01), the proportion funded by other (p=.04), and a negative change over time in the proportion funded by federal (p=.01). 70% of RCTs reported a statistically significant result in the abstract; this was more common in studies that did not report a funding source than those that did (73% unreported and 68% reported, p=.02). The median sample size of studies that reported on funding was significantly greater than the median sample size of studies that did not report.

Conclusions: More than one third of neonatal RCTs did not report funding status, and these studies were smaller and more likely to report statistically significant results in their abstracts. However, the rate of reporting funding sources in neonatal RCTs has increased over time. Our findings of differences in inclusion of positive results in abstracts of studies not reporting source may be attributable to publication bias, selection bias, or preferential placement of secondary outcomes in the abstract. Contrary to prior studies, our analysis did not identify an association between industry funding and the reporting of positive results; we speculate that these more-monitored studies may be at lower risk of reporting bias compared to those that do not disclose funding.

Adequacy of chorionic villus samples in one- vs. two-pass procedures

Febres-Cordero, Daniela *, Rafaela Germano Toledo, Julia Sroda Agudogo, Annliz Machada, Anna Modest, Yinka Oyelese, Barbara O'Brien. Dept. of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, Boston, MA

Background: Chorionic villus sampling (CVS) is a diagnostic genetic test performed in the first trimester. At our center, when CVS is performed, the initial pass sample adequacy is assessed immediately by an on-site cytogenetic lab. If the initial sample is inadequate, a second pass is done. Thus, a two-pass CVS procedure is a surrogate for specimen adequacy. CVS adequacy may be affected by patient, pregnancy, procedural and provider factors. **Objective**: This study assesses risk factors for inadequate samples by comparing one-pass and two-pass CVS procedures. **Methods**: Retrospective cohort study of patients who underwent CVS at a single tertiary center in 2019-2023. Data was obtained via medical record review. Cases with an unknown number of placental entries were excluded. Comparisons were made between two groups: adequate villi (one-pass) and initially inadequate villi (two-pass). Factors compared were body mass index (BMI), gestational age (GA), genetic abnormality presence, placental location, route, needle size, and provider experience. Analysis were done with Chi-square and Fisher's test for categorical data, and Wilcoxon rank sum for continuous data. **Results**: Of the 408 CVS procedures that met inclusion criteria, 84% were successful after one pass. Maternal BMI was significantly higher in the two-pass than in the one-pass group (27.9 and 25.4, respectively, *P*=0.02). There was no difference in other patient or pregnancy characteristics (Table 1). Fellow years of experience was lower in the two-pass group (median 2.0 years, IQR 1.0-2.0) than the one-pass one (IQR 2.0-3.0). There were no differences in other procedure or provider characteristics (Table 2). **Conclusions**: Higher maternal BMI and fewer years of fellow experience were associated with a two-pass procedure, indicating sample inadequacy. Route of procedure, placental location, and genetic abnormalities were not associated with requiring a second pass. This suggests that when on-site cytogenetics is unavailable, two-pass procedures should be considered for high maternal BMI and inexperienced operators.

Table 1. Patient and pregnancy characteristics with one-pass vs two-pass CVS procedure

Characteristics	One-Pass N = 342	Two-Pass N = 66	*P- Value*
Maternal BMI	25 (22–29)	28 (23–32)	*0.02*
Gestational age (weeks)	13 (12–13)	13 (12–13)	*0.52*
Placental Location			*0.75*
Anterior	48%	50%	
Posterior	42%	46%	
Fundal	3%	2%	
Previa	0.3%	0 %	
Too early to assess	3%	0 %	
Missing	4%	3%	
Number of fetuses			*0.42*
Singleton	85%	91%	
Twins	12%	8%	
>2 Multiples	3%	2%	
Genetic abnormality present	56%	47%	*0.17*

Data presented as % or median (IQR)

Table 2. Procedure and provider characteristics with one-pass vs two-pass CVS procedure

Variables	One-Pass N = 342	Two-Pass N = 66	*P- Value*
CVS route			*0.14*
Transvaginal	49%	39%	
Transabdominal	51%	61%	
Needle size*			*0.13*
18	65%	53%	
20	33%	43%	
22	1%	0%	
Lidocaine use*	53%	53%	*1.00*
Years of attending experience	4 (2–8)	5 (2–13)	*0.30*
Fellow involvement	49%	56%	*0.29*
Fellow experience (years)	2 (2–3)	2 (1–2)	*0.01*

Data presented as % or median (IQR)
*Transabdominal route only

Human neonatal CD8 T cells exhibit rapid, short-lived effector responses and a unique transcription factor landscape

Nina N. Brodsky[1, 2], Monisha Chakder [1,2,*] Dinesh Babu Uthaya Kumar[2], Anis Barmada[2], Julia Wang[3], Aanchal Wats[1], Liza Konnikova[1,2] and Carrie L. Lucas[2]
[1]Pediatrics Department, Yale University School of Medicine, New Haven, CT, USA
[2]Immunobiology Department, Yale University School of Medicine, New Haven, CT, USA
[3]Yale University

Background: Neonates are distinct in their clinical and cellular responses to viral infections, with neonatal CD8 T cells featuring innate-like characteristics and a lower threshold for T cell receptor (TCR) activation relative to adult counterparts. However, specific molecular programs that drive these unique responses are incompletely understood, particularly in humans, and targetable pathways to modulate viral illness in this vulnerable population remain to be elucidated.

Objective: We set out to define the unique response characteristics and underlying transcription factor landscape of human neonatal CD8 T cells, which may be developmentally programmed for rapid responses to limit immunopathology in early life.

Methods: Naive CD8 T cells (CD8+CCR7+CD45RA+) were sorted from whole blood of healthy young adults (<30 years) and full-term neonates at birth (cord blood). Cells were then stimulated with anti-human CD3 and CD28 in complete RPMI medium with IL-2. At day two and three after stimulation, cells were re-stimulated using Phorbol 12-myristate 13-acetate (PMA) and ionomycin for four hours and cytokine secretion was prevented with Brefeldin A/Monensin. Flow cytometry was used to quantify cell surface molecules, transcription factors and intracellular cytokines both at baseline and after restimulation.

Results: Expression of surface markers KLRB1, KLRG1 and CD226 were significantly higher in cord at baseline and expression of transcription factors TOX and Helios were significantly higher in cord both at baseline and after restimulation. Activated neonatal CD8 T cells also produced significantly enhanced TNFα and IL-2 after restimulation compared to the adult counterparts. Furthermore, rapid cell death occurred with or without activation of neonatal CD8 T cells, with improved survival in the presence of IL-2 and IL-7.

Conclusions: In conclusion, neonatal CD8 T cells have a unique transcription factor landscape associated with rapid differentiation into short-lived effector cells, revealing key nodes of regulation relevant to the distinctive immunobiology of human neonates. Further work is needed to decipher molecular programs driving this phenotype in early life immunity.

SATURDAY, MARCH 8, 2025
Third Scientific Session: Poster Walk

Poster Walk A: Moderators—Liz Yen, MD and Michele Hacker, ScD

Coding and non-coding transcriptome expression in the placental of mothers affected by obesity.
R. Spadafora, Tufts

Beyond 911 and medical control: Creation of 24/7 baby and a new national model and cross-disciplinary collaboration and program innovation to improve neonatal outcomes and team success.
B. Redmond, Yale

Functions of placental t cells in distal fetal mucosal tissues using organoid and non-human primate models.
K. Gawon* Yale

Sex-specific molecular pathways in neonates exposed to maternal opioid use.
T. Keneko-Tarui, Tufts

Religious minority status and maternal mental health: Perinatal depression, anxiety and stress among Muslin patients in the US.
R. Forati*, Harvard Med School, BIDMC

Association of perinatal vaccination counseling and non-birthing partners vaccination rates.
L. Griffin* WIHRI

Smart phone applications to support perinatal mental health: A systemic review.
E. Chang* WIHRI, Brown

Impact of maternal flu immunization on infant antibody levels 1-3 months following flu immunization.
R. Bhowmik* BIDMC

Racial/ethnic and nativity disparities in heavy metal(loid) exposure and sources among women of reproductive age in the US, NHANES 2011-2020.
K. Kui* Tufts

The experience continually affects daily life: A qualitative analysis of how birthing ob/gyns define birth trauma. N. Echeng* WIHRI

*Denotes person in training

Coding and non-coding transcriptome expression in the placenta of mothers affected by obesity

Ruggero Spadafora[1,2], Jiayi Zhang[3] and Perrie O'Tierney-Ginn[1]
[1] Mother Infant Research Institute (MIRI), Tufts University, Boston, MA USA, [2] Department of Pediatrics, Tufts Medical Center, Boston MA USA, [3] Department of Data Analytics, Tufts University, Boston MA USA

Background: Maternal obesity affects one in five women at the start of pregnancy, exposing offspring to increased incidence of obesity, cardiovascular disease, and non-alcoholic fatty liver disease (NAFLD). Placentas play a fundamental role in fetal development. However, placentas of obese mothers have higher lipid content and inflammation resulting in a lipotoxic environment that impacts function and alters fetal development. Furthermore, the expression of placental small non-coding RNA, miRNAs which modify mRNA translation, is also altered in maternal obesity. The mechanisms underlying placental changes and miRNAs disruption in obesity are poorly understood. Objective: To explore the placental coding and miRNA landscape in maternal obesity, and to predict their interactions. Methods: Placentas (N=39) were obtained at term from mothers with obesity (BMI>30) and uncomplicated pregnancy. Bulk RNA-Seq was performed. *Whole genome correlation network analysis* (WGCNA) was performed for mRNA and miRNA, to establish correlations between placental genes that present similar patterns of expression (modules) and metabolic traits of the fetal-maternal dyad. Using mirTarRnaSeq an R-Bioconductor that filters the miRNA data through the Miranda database we predicted miRNA-mRNAs interactions. Results: Cord blood free fatty acids (cbFFA) were negatively correlated with an mRNA module (Green, P-value <0.001) containing key components of the epigenome such as *DNMT3A*, the enzyme responsible for de-novo DNA methylation; *MTA3*, and *RSF1* both components of chromatin remodeling complexes with repressive function during development. The Green module also contained *CDS1* and *SMUG1*, key lipid metabolism genes associated with NAFLD. A positive correlation was detected between cbFFA and a miRNA module (Turquoise, P-value <0.029) which contains miRNAs identified in animal models of NAFLD and obesity (miR-32, miR-23b), and childhood obesity (miR-223 and 24). Significant interactions were predicted between miR-24 and MTA3 and SMUG1, miR-32 with SMUG1 and miR-23b with CDS1.Interestingly, miR138, a miRNA identified in animal model of obesity targeting precursors of adipocytes, was predicted to target both CDS1 and SMUG1 Conclusions: Overall, we show that both coding and non-coding placental gene expression correlates with fetal cbFFA. Interestingly, epigenetic and lipid metabolism genes show similar relationships with cbFFA suggesting a possible placental molecular link between lipid metabolism and altered fetal development in the offspring of mothers affected by obesity. Furthermore, we predict miRNA-mRNAs interactions highlighting potential endogenous targets for placental miRNAs. Further studies are necessary to

investigate the biological consequences of placental miRNA-mRNA interactions

Beyond 911 and medical control: creation of 24/7 BABY and a new national model for cross-disciplinary collaboration and program innovation to improve neonatal outcomes and team success

Brooke Redmond, MD, FAAP, Yale School of Medicine

Background: Neonatal resuscitations in the field are low frequency, high stakes events. EMS professionals have limited opportunities to develop the conceptual framework and advanced skills crucial for successfully managing critically ill neonates after delivery. Effective neonatal interventions differ from pediatric and adult advanced life support in important ways, especially with respect to airway emphasis. EMS requires reliable neonatal expertise integrated into existing infrastructure for support during life-threatening neonatal events. Approximately 2% (~74,000) of all term and preterm births annually occur outside the hospital in the United States. Connecticut has ~300 field deliveries a year with an estimated 10% of neonates requiring resuscitation. Systems issues amplify the urgency to ensure preparedness for out-of-hospital neonatal emergencies. Care regionalization impacts perinatal-neonatal services, necessitating more travel for access, and expanding the likelihood of EMS involvement. Modern pregnancies are increasingly complex, babies admitted to neonatal ICUs smaller, sicker, and more complicated, and hospital-based medical professionals interfacing with EMS less experienced in neonatal care and resuscitation. Yale's 24/7 BABY program – the first of its kind nationally, broadly scalable, freely available – aims to improve infant outcomes, enhance EMS performance, and decrease stress for families and providers through a dual approach: practical training and real-time expert help.

Objectives: Discuss unique challenges for babies and teams during field deliveries. Detail the creation, development, and evolution of this innovative program. Analyze educational survey data and qualitative feedback. Assess expected and surprising activations of the program's emergency line. Explore adaptation and translation of this multidimensional program model into other medical specialties.

Methods: 24/7 BABY began neonatal education late 2022, serving ~600 EMS professionals to date. The 475-247-2229 line launched April 2023 in CT EMS Region 5 then expanded throughout the state by fall 2024.

Following education, brief surveys with free text responses and Likert ratings are collected. All live calls are analyzed and debriefed. Alignment with CT OEMS, regional medical controls, and state protocols is ongoing.

Results: Survey responses (7/2023-11/2024): 23% return. 96.4% (80/83) were "extremely likely" to recommend program. 3.6% (3/83) were "somewhat likely." 100% would consider direct support. Five live calls since launch.

Conclusions: Neonates, prehospital providers, and the hospital-based multidisciplinary team all benefit from continued support for and expansion of the 24/7 BABY program (bit.ly/247BABY). EMS-specific neonatal education offered as community-based CME effectively addresses an unmet need for high quality, accessible, hands-on training. EMS appreciates availability and collaboration via a direct audio-video line to a specialized neonatologist 24 hours a day, 7 days a week, 365 days a year. Systems barriers to broader implementation, especially the heterogeneity of EMS services and resources across municipalities and regions, should be identified and addressed with targeted action plans, enhanced communication, grants, and wider availability.

Functions of placental T cells in distal fetal mucosal tissues using organoid and non-human primate models

Kalida Gawon[1]*, Tyler Rice[1], Madison Strine[2], Bunmi Olaloye[2], Weihong Gu[2], Liza Konnikova[1-3].
[1]Yale Department of Pediatrics, [2]Yale Department of Obstetrics, Gynecology and Reproductive Sciences, [3]Yale Department of Immunobiology

Background: The effective maturation of various human fetal organs is a process that is interrupted by preterm delivery (<37 weeks). As one of the earliest organs to form, the gastrointestinal system undergoes rapid growth as early as 4-5 weeks of estimated gestational age (EGA). Although it was believed that adaptive immunity matures after birth based on murine studies, maturation of the adaptive immune system in humans occurs early in gestation, where by 8 weeks EGA, both CD4+ ("helper") and CD8+ ("cytotoxic") T cells are found in the periphery and by 16 weeks EGA these cells traffic to the small intestine where they proliferate and secrete cytokines. Even though cord blood contains mostly naïve T cells, central memory CD4+ T cells are enriched for in the placenta and cord blood of preterm infants. While preterm labor associated T cells exhibit inflammatory signatures, whether they traffic to distal sites such as the intestine and how they affect these sites is unknown.
Objective: This study aims to investigate whether memory T cells can traffic between fetal organs and to determine how placental T cells, particularly those associated with preterm labor, might influence the development and function of the fetal intestine.
Methods: We utilized a non-human primate (NHP) model of preterm labor, with fetuses delivered at approximately 32 weeks EGA. Placenta and small intestine tissues were harvested and cryopreserved, from which T cells were isolated and their T cell receptors (TCRs) were sequenced for repertoire analysis. To explore the impact of placental T cells on the intestine, we also developed a human intestinal organoid T cell co-culture model to assess intestinal epithelial cell growth and intestinal permeability.
Results: TCR repertoire analysis revealed a placental T cell clone that was also present in the small intestine, suggesting T cell trafficking between the two organs. Additionally, placental villi T cells appeared to support intestinal organoid generation, indicating a potential role in promoting epithelial growth.
Conclusions: These findings suggest that placental villi T cells may influence the development and function of the fetal small intestine, particularly in the context of preterm labor. Further research across different donor cohorts in term and preterm conditions will be crucial to understand how placental immune T cells affect gastrointestinal homeostasis and barrier function during fetal development.

Sex-specific molecular pathways in neonates exposed to maternal opioid use

Tomoko Kaneko-Tarui,[1,2] Francesca Carasi-Schwartz,[2] Kiran Singh,[2] Kelsea Gildawie,[3] Fair Vassoler,[3] Elizabeth Byrnes,[3] Elizabeth Yen[1,2,4]
[1]Tufts University School of Medicine, Boston, MA, [2]Mother Infant Research Institute at Tufts Medical Center, Boston, MA, [3]Tufts University Cummings School of Veterinary Medicine, Grafton, MA, [4]Tufts Medicine Pediatrics, Boston, MA.

Background: Maternal opioid use affects male and female offspring differently, though the mechanisms remain unclear. Our preliminary data suggest sex-specific alteration in reward signaling, with increased dopamine receptor type 2 (*DRD2*) expression in opioid-exposed males. Animal data demonstrated that inflammation enhanced opioid reward signaling via opioid binding to the microglia's toll-like receptor 4 (*TLR4*), initiating a pro-inflammatory cascade.

Objective: To investigate sex-specific molecular effects of maternal opioid exposure on inflammatory and hypothalamic/reward pathways in offspring.

Design/Methods: Saliva samples from nine opioid-exposed and nine non-exposed neonates were collected within 48 hours of birth and analyzed, focusing on reward, energy homeostasis, inflammation, oxidative stress, and neuropathology pathways. Continuous data were analyzed using a student's t-test and categorical data using a Chi-square test.

Results: Opioid-exposed neonates are born significantly smaller, with a greater incidence of small for gestational age and maternal hepatitis C than in the non-exposed cohort. Gene analyses revealed distinct molecular pathways linked to maternal opioid use and sex differences. Stratified by *exposure*, opioid-exposed females showed lower inflammation-related gene expression than non-exposed females. Conversely, opioid-exposed males exhibit elevated oxidative stress, inflammation, and *DRD2* gene expression compared to non-exposed males. Methadone exposure was associated with greater immune- and neuro-related genes than buprenorphine. Stratified by *sex*, non-exposed males had lower oxidative stress and inflammation than non-exposed females, while opioid-exposed males showed upregulation in energy/metabolism, inflammation, and *TLR4* genes relative to opioid-exposed females.

Conclusions: Maternal opioid use is associated with unique sex-specific molecular pathways, with heightened inflammation in opioid-exposed males and reduced inflammation in opioid-exposed females. The upregulation of *DRD2* and *TLR4* genes in opioid-exposed males highlights inflammation's role in opioid reward signaling through *TLR4* modulation. Given the pronounced energy homeostasis and metabolic themes in the exposed cohort and their reduced birth size, future studies will assess the impact of maternal opioid use on offspring growth and metabolic health.

Religious minority status and maternal mental health: Perinatal depression, anxiety, and stress among Muslim patients in the U.S.

Rasadokht Forati, BS* [1] , Sarrah Shahawy, MD MPH [1,2]
1. Harvard Medical School, Boston, USA
2. Department of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, Boston, USA

Background:

Religion/spirituality is an important dimension of many patients' social determinants of health, often seen as a protective factor against adverse mental health conditions. However, it is underexplored in the U.S. Muslim maternal population where social and political stressors may compound the stressors of pregnancy.

Objective:

This narrative review aims to explores the intersection between religion and maternal mental health through the lens of the Muslim community.

Methods:

A literature search was conducted through PubMed and PsycINFO using combinations of terms related to "Muslim," "maternal" and "mental health" and resulted in 243 articles, 26 of which were included based on exclusion and inclusion criteria.

Results:

Analysis resulted in three main findings: 1) Muslim religious identity can have both a positive and negative effect on maternal mental health; 2) mental health symptoms may be interpreted through a spiritual rather than medical lens; 3) Islamic-based interventions have generally shown to be effective in
improving perinatal stress and anxiety.

Conclusions:

These findings suggest that religion/spirituality influence maternal patients' mental well-being and should be considered in a person-centered approach towards reproductive health equity.

Association of prenatal vaccination counseling and non-birthing partners' vaccination rates

Laurie Beth Griffin, MD, PhD[a]*, Jeannine Whelan, MD[b], Natalie Passarelli, BA[a], Emily Zitek, PhD[a], Erica Hardy, MD, MMSc[a,c], Melissa A. Clark, PhD[a,d], Adam K. Lewkowitz, MD, MPHS[a]
Department of Obstetrics and Gynecology, Women and Infants Hospital; [b]Department of Obstetrics and Gynecology, University of Connecticut; [c]Division of Infectious Disease, Women and Infants Hospital; Department of Health Services Policy and Practice, Brown University School of Public Health

Background: Neonatal infectious morbidity is reduced when both parents receive recommended vaccinations prior to delivery. The Center for Disease Control and Prevention and American College of Obstetricians and Gynecologists recommend prenatal providers counsel both pregnant patients and their non-birthing partners on the recommendation for pertussis (Tdap), COVID-19, and influenza vaccination. However, there are limited studies assessing real-world experiences of non-birthing partners regarding prenatal vaccine counseling and the association of counseling on vaccine uptake in non-birthing partners. **Objectives:** This study assessed the association of real-world prenatal vaccine counseling and vaccination rates among non-birthing partners of perinatal patients.

Methods: In this single-institution cross-sectional study, non-birthing partners completed a postpartum survey assessing their prenatal vaccine counseling experience for Tdap, influenza, and COVID-19 vaccinations, vaccination status, barriers to vaccination, and acceptability of prenatal vaccination programs for non-birthing partners. Rates of vaccination counseling for individual vaccines were compared between those who reported vaccination and those who were unvaccinated.

Results: Of the 525 non-birthing partners approached, 330 (63%) participated. Most participants self-identified as male (95.8%), had a primary care provider (78.0%), and attended ≥1 prenatal visit (88.2%). Sixty percent (n=198) of participants reported receiving counseling on vaccine recommendations for themselves during prenatal care, but only 17% (n=56) of participants reported being offered vaccine administration in the prenatal care provider's office. Vaccinated participants had increased prevalence of vaccine counseling compared to unvaccinated participants for Tdap (prevalence ratio (PR) 1.28, 95% confidence interval (CI)[1.13-1.44]), influenza (PR 1.80, 95% CI[1.40-2.31]), and COVID-19 (PR 1.16, 95% CI[1.06-1.28]). Unvaccinated participants cited barriers to vaccination as a lack of knowledge of recommendations for Tdap (46.6%) and belief that vaccination was not needed given personal health status for COVID-19 (25.9%) and influenza (31.9%). Fifty-seven percent of participants stated they would "likely" or "absolutely" receive a vaccine recommended by a prenatal care provider, and 88.5% reported vaccination of partners during prenatal visits would be desirable given provider access and convenience.

Conclusions: Non-birthing partner vaccination was associated with an increased prevalence of having received prenatal counseling and the majority of participants felt vaccination of non-birthing partners in prenatal clinics is desirable. Efforts to increase universal prenatal vaccine counseling for non-birthing partners with or without in office vaccination has the potential to increase non-birthing partner vaccination rates, thereby maximizing protection from vaccine preventable illness for individuals and their neonates.

Smartphone applications to support perinatal mental health: A systematic review

Erin Chang, BA*[1], Adam K Lewkowitz, MD, MPHS[1,2], Craig F Garfield, MD, MAPP[3,4], Jacqueline Gollan, PhD[4], Young S Lee, PhD[4], Kathleen T O'Sullivan, MS, CCLS[4], Dinah Williams, LICSW[2], Emily S Miller, MD MPH[1,2]

[1]Alpert Medical School of Brown University, [2]Women and Infants Hospital of Rhode Island / Alpert Medical School of Brown University, [3]Lurie Children's Hospital, Department of Pediatrics, [4]Northwestern University Feinberg School of Medicine

Background: Digital mental health interventions delivered through smartphone applications (apps) can expand access to mental healthcare. However, many marketed interventions lack evidence of efficacy or effectiveness.

Objective: To evaluate the current landscape of digital tools tailored to treat perinatal mental health conditions and identify whether existing apps have evidence to support their efficacy or effectiveness.

Methods: We conducted a systematic review of perinatal mental health apps available on the Apple App Store and Google Play Store. Using five search terms, we evaluated each identified app using the following criteria: 1) the app's primary audience includes pregnant or postpartum individuals or their partners; 2) the app provides an intervention design to improve perinatal mental health; 3) the app is commercially available in the United States. Apps that met these inclusion criteria were tabulated by intervention characteristics and then evaluated for evidence of efficacy or effectiveness via a systematic review using each app's title on PubMed and ClinicalTrials.gov. Those with published evaluations were classified according to level of evidence.

Results: Of 570 identified smartphone apps, 30 satisfied all inclusion criteria (Figure). Across the 30 apps, technical features included are described in the Table. Of the 30 apps that met inclusion criteria, 2 (7%) were supported by any evidence of efficacy or effectiveness for perinatal mental health outcomes and 2 (7%) have randomized trials underway. Levels of evidence are described in the Table.

Conclusion: Despite the proliferation of smartphone apps marketed for perinatal mental health support, scientific evidence of their efficacy or effectiveness remains scarce.

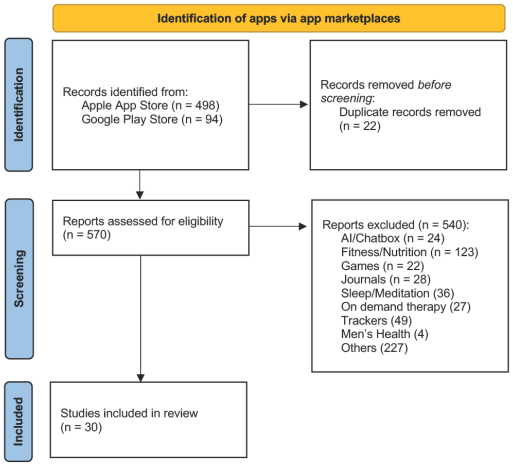


Figure.

Table.

Eligible Perinatal Mental Health Smartphone Applications	App Characteristics: Symptom Tracking	Symptom Screens	Fitness Videos	Educational Resources/ Modules	Community Forums	Access to Providers or Treatment	Level of Evidence
Poppy Seed Health				x	x	x	None
EXO Women's Health	x						None
MGHPDS		x					C
Soulside					x	x	None
Motherocity Postpartum Tracker	x			x	x		None
Postpartum Depression Test		x					None
LEIA Health: for new mothers	x	x	x	x			None
In Bloom - Postpartum Wellness				x			None
Mavida Health				x	x	x	None
Mahmee: Maternal Health App	x			x		x	None
Malia Maternity Health Tracker	x			x	x		None
Expectful: Wellness for Moms				x	x	x	C
The Matrescence				x	x	x	None
Connect by PSI				x	x		None
Postpartum Journey		x	x	x			None
Hoag Nona				x		x	None
MamaZen: Mindful Parenting App						x	None
Canopie for Parents	x			x	x		None
MamaLift	x			x		x	None
Joey Care						x	None
Mindful Mamas: Support and Calm	x			x	x	x	None
Haplocare	x			x	x	x	None
Mammha for Parents				x		x	None
ReByrth				x		x	None
Birth By Us	x			x	x		None
Mampedia	x			x	x		None
Health2mama			x	x		x	None
Candlelit Care		x		x		x	None*
BABY2HOME	x			x		x	None*
Babyscripts myJourney	x			x			None
	13 (43%)	5 (17%)	3 (10%)	24 (80%)	13 (43%)	17 (57%)	

Legend: *A randomized controlled trial is registered in clinicaltrials.gov and underway.

Impact of maternal flu immunization on infant antibody levels 1-3 months following flu immunization

Ritobhas Bhowmik,* Eleanor Nicholson,* Amanda Michael,* Alejandra Waller-Pullido,* Sam Nangle,* Valerie Perrinez, Alejandra Barrero-Castillero, Ai-ris Y Collier
Beth Israel Deaconess Medical Center, Boston, MA

Background: Influenza infections in infants can lead to high rates of hospitalization. It is critical to optimize vaccination strategies for infants to reduce influenza-related disease burden. Maternal immunization during pregnancy is a key public health strategy to protect both mothers and their infants from severe influenza-related illness. Despite the well-established benefits of maternal immunization in reducing disease burden, the impact of maternal influenza vaccination on infant antibody responses after their 6-month vaccination is not fully understood.

Objective: The objective of this study is to quantify flu-specific antibody responses in infants receiving influenza vaccines at 6 months in infants after either no influenza vaccination during pregnancy or following maternal vaccination during pregnancy to assess for maternal antibody interference.

Methods: We conducted an observational cohort study enrolling infants from across the United States. We collected infant capillary blood samples using remote home blood collection devices and collected vaccine and infection history by patient report. Informed consent was obtained from all participating parents/guardians. Infant serum IgG antibody levels specific to influenza strain hemagglutinin proteins (Flu A/Darwin/2021 and Flu B/Austria/2021) were quantified using the Mesoscale discovery (MSD) V-PLEX Respiratory Panel 4 (IgG) Kit. Data reported as median relative light units (RLU) and interquartile range and comparisons made using Wilcoxon rank-sum test.

Results: Twenty-four infants received at least one dose of the flu vaccine and provided serum samples following vaccination; 13 were born after maternal influenza vaccination during pregnancy and 11 had no maternal vaccine exposure. Samples were obtained at 66 days (42,90) from last vaccine dose. Median IgG for Flu A was 17.84 (11.83,70.15) for maternal vaccine group and 30.85 (13.86,43.91)
in the no maternal vaccine, p=1.0. Median IgG for Flu B/Austria was 24.92 (10.59,91.59)
and 23.73 (15.44,97.21), p=0.772, respectively.

Conclusions: Our analysis did not reveal significant differences in infant antibody levels between infants whose mothers received the influenza vaccine during pregnancy and those whose mothers did not. However, a trend towards higher levels of Flu A antibodies was observed in infants born to mothers who did not receive the flu vaccine. This finding raises the possibility of maternal antibody interference, similar to that observed in pertussis. However, due to the limited sample size, we cannot draw firm conclusions. This data, despite the inconclusive findings regarding infant antibody levels, continues to support the recommendation for maternal influenza vaccination during pregnancy to prevent severe illness in the pregnant individuals.

Racial/ethnic and nativity disparities in heavy metal(loid) exposure and sources among women of reproductive age in the the US, NHANES 2011-2020

Kiran Yan Kui, MPH[a,b]*, Perrie O'Tierney-Ginn, PhD[c], MyDzung Chu, PhD, MSPH[a,b]
[b] Tufts Clinical and Translational Science Institute, Boston, MA;
[b] Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, MA;
[c] Mother Infant Research Institute, Tufts Medical Center, Boston MA

Background: Exposure to heavy metal(loids) like arsenic (As), cadmium (Cd), and manganese (Mn) are associated with adverse perinatal outcomes, such as gestational diabetes, low birth weight, and preterm birth. Asian populations have the highest biomarker concentrations of heavy metal(loids) compared to any other racial/ethnic groups in the US, which may contribute to perinatal health disparities. However, little is known about sources of heavy metal(loids) among women of reproductive age, and much less among Asian women.

Objective: Our study assessed associations of heavy metal(loid) sources (e.g., diet, smoking, drinking water) with urinary As, blood Cd, and blood Mn concentrations among women of reproductive age in the National Health and Nutrition Examination Survey (NHANES), 2011-2020. We also compared the prevalence distribution of these sources by race/ethnicity and acculturation indicators (i.e., nativity status, English language proficiency).

Methods: Exposures (e.g., diet, smoking, drinking water) for each heavy metal(loid) were identified through a combination of *a priori* research, including data from the Centers for Disease Control and Prevention (CDC) and a scoping review. We then used multivariable generalized linear models to estimate the least squares geometric means (LSGM) of urinary As, blood Cd, and blood Mn concentrations for each source and race/ethnicity/acculturation subgroups, adjusting for energy intake, age, BMI, selenium, and income-to-poverty ratio.

Results: Asian women overall had the *highest* urinary As, blood Cd, and blood Mn concentrations than any other racial/ethnic groups. An acculturation gradient was observed for Asian women: foreign-born and non-English speakers had *highest* heavy metal(loid) concentrations, followed by foreign-born English speakers, and US-born women. *Dietary sources such as white rice, shellfish and fish* and *drinking water* were significant predictors of urinary inorganic As levels, while *current smoking* was a significant predictor of elevated blood Cd levels. No sources measured were significant predictors of blood Mn. Consumption of these sources varied by race/ethnicity/acculturation.

Conclusions: Our study highlights racial/ethnic and nativity disparities in heavy metal(loids) exposure among women of reproductive age attributed to differences in their dietary, drinking water and smoking patterns, suggesting that environmental exposure disparities may contribute to disparities in perinatal health outcomes.

The experience continually affects daily life: A Qualitative analysis of how birthing ob/gyns define birth trauma

Margaret M Thorsen MD[1]*, Ntami P Echeng MD[1]*, Vicky A Adewale MD[1]*, Anna R Whelan MD[2]
[1]Women and Infants Hospital of Rhode Island/Alpert Medical School of Brown University, Providence, RI, [2]University of Massachusetts Memorial Medical Center, Worcester, MA.

BACKGROUND: Psychological birth trauma refers to emotional distress that occurs when a person feels that their health/life or the health/life of their baby is threatened during birth. OBGYNs who have given birth have a unique perspective. They may experience birth trauma during their own deliveries and also witness other families' traumatic experiences while at work.

OBJECTIVE: We aimed to elucidate how birthing OBGYNs define birth trauma.

METHODS: Qualitative thematic analysis of an anonymous, web-based survey of OBGYNs response to: "In your own words, how would you define birth trauma?". Participants, OBGYNs who had given birth, were recruited from the "OMG (OBGYN Mom Group)" on Facebook. All responses were reviewed by the research team. De-novo themes were independently identified then discussed as a group and all responses were double-coded in an iterative process to reach consensus.

RESULTS: 370 of 591(62.6%) OBGYNs responded to the open-ended question. Identified themes included: (1) Birth trauma may involve real harm and threat of harm, physical and emotional components and all may have impact the entire family, (2) Loss of control or encountering the 'unexpected' has a lasting psychological impact regardless of pregnancy outcome, (3) Timing of trauma is variable and extends beyond the experience itself. Lastly, we found that respondents used the survey as an opportunity to share narrative stories of their own experiences.

CONCLUSIONS: OBGYNs have varied but overlapping definitions of birth trauma. Our data will inform further education and training efforts and encourage comprehensive support for our birthing and non-birthing colleagues and patients.

SATURDAY, MARCH 8, 2025
Third Scientific Session: Poster Walk

Poster Walk B: Moderators—Liz McGowan, MD and David Sink, MD

SDOH needs in a community special care nursery highlight importance of keeping care local.
M. Young, Tufts

Quality of reporting neonatal randomized controlled trials: A 5-year analysis.
K. Ruiz-Arellanos * BIDMC

Gestational age, feeding type, and infant feeding behaviors in very and extremely preterm infants.
M. Mourao* BIDMC

Produce prescriptions on improving pregnancy outcomes: Results from a pilot intervention.
F. Zhang, Tufts

Placenta accreta spectrum and perinatal mental health: A national study in the United States.
V. Karabadji* BIDMC

Obstetric outcomes following maternal respiratory syncytial virus vaccination.
T. Hsieh*, BIDMC

Inpatient versus outpatient management of preterm prelabor rupture of membranes: A systematic review and meta-analysis.
R. Germano-Toledo* BIDMC

Association of neonatal hypoglycemia with neurobehavior using continuous glucose monitors.
A. Coburn-Sanderson* BWH

Characteristics of paternal visitation in the neonatal intensive care unit.
J. Bernardo, MGH

*Denotes person in training

SDOH needs in a community special care nursery highlight importance of keeping care local.

Michelle Young MSN, RN, FNP-BC, Rebecca Sabatini BSN RN , Margaret Begen MSW, Maureen Couture MSW, Lorna Rajkowski BSN RN , Raja R Senguttuvan MD Lawrence General Hospital, Lawrence, Massachusetts

Background: Social determinants of health (SDOH) are non-medical elements that may impact a person's health. The needs can be categorized into 5 domains-1. Economic Stability 2. Healthcare access and quality 3. Social and Community support 4. Education access and quality 5. Neighborhood and environment.

Aim: Our aim is to screen SDOH needs of all our families whose babies were admitted to our 10 bed Level 2 A Special Care Nursery located in Lawrence, Massachusetts and make referrals for appropriate services. This is our first standardized needs assessment for our unit.

Methods: Families are screened using the Boston Medical Center THRIVE survey, adapted for use in NICU. When a family screens positive, we refer them to appropriate resources and services. We have compiled a resource binder with services and resources in the area that may be convenient to the family.

Results: We are a 10-bedded Special Care Nursery unit that discharges 140 babies a year. We screened 67 families in the period from March 2024 to August 2024.

81% (54/67) of our families had Medicaid. 32/67 (47%) families were non English speaking

29/67 (43%) families screened positive for food support needs (SNAP, WIC and referral to local food pantry). 28/67 (41%) for childcare needs (examples day care, after school programs)

26/67 (38%) expressed need for support with housing (emergency shelter, eviction prevention, rent help housing application). Utility support needs 25/67 (37%). Education needs 20/67 (30%) examples – obtaining GDE, English as second language classes. 27% (18/67) of families report food worry.

12/67 (18%) reported looking for a job or job training for themselves or anyone in their family.

Only 13% (9/67) screened positive for unmet transportation needs.

Conclusion: Our lowest rates for a screen was for transportation needs- only 13% of those screened needed help to get to the hospital. This result is in contrast to the 2022 Greater Lawrence Community Health needs assessment report with 16% of commuters carpooling, and 26% of households lacking a vehicle in Lawrence. There is public transportation with the bus stopping at the main lobby entrance to the hospital. This low screening rate compared to other SDOH needs highlights the importance of keeping care local when medically appropriate. More granularity in needs assessment is needed to more accurately identify a family’s needs and offer appropriate resources.

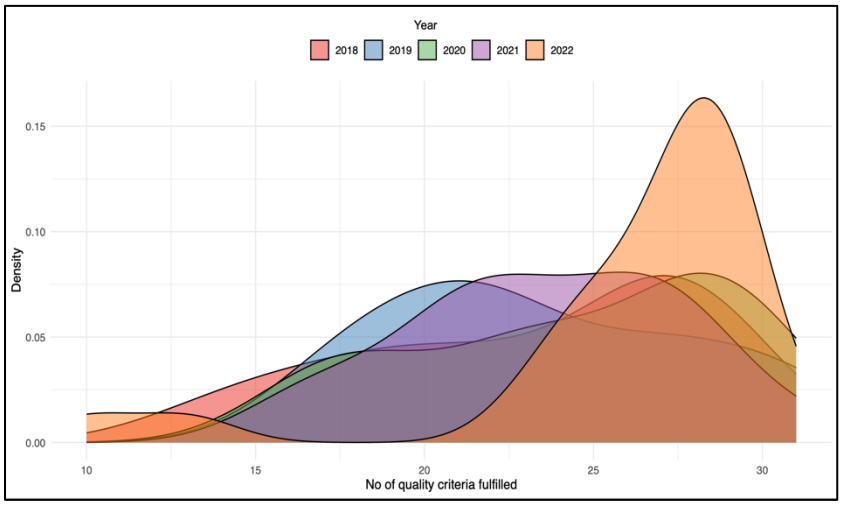
Quality of reporting in neonatal randomized controlled trials – A 5-year analysis

Kim Ruiz-Arellanos[1*], Susanne Hay[1,2], Brian King[1,2], Roger Soll[3], Sofia Gnecco[1], Maria Laura Mourao[1], Rhys Johnstone[1], Adrian Baca[4], Marianna Castellanos[5], Kristyn Beam[1,2], John A. F. Zupancic [1,2]
1 Department of Neonatology, Beth Israel Deaconess Medical Center, Boston, MA; 2 Harvard Medical School, Boston, MA; 3 Larner College of Medicine, University of Vermont, Burlington, VT. 4 Holtz Children's Hospital, University of Miami, Miami, FL; 5 The Children's Hospital at Montefiore. NY.

Background*:* Randomized controlled trials (RCTs) are the cornerstones of evidence-based medicine, but even these are not immune to bias. Therefore, transparent reporting is crucial, to enable readers to evaluate a study's rigor and validity. Compliance with reporting standards has not been systematically evaluated across a broad sample of RCTs in neonatology.

Objective: The ongoing study aims to evaluate the reporting quality of key methodological items in neonatal RCTs from 2018 to 2022 and to correlate these with study characteristics including year, country, funding, and studied interventions.

Methods: We queried NeoCanon, a comprehensive, validated database of over 5,000 neonatology RCTs, which includes studies on interventions for infants under 31 days old or before discharge, with no language restrictions. Our intended analysis will use a random sample of 20% of neonatal RCTs published between 2018 and 2022, totaling 392 studies. Four authors will extract and summarize data on 32 quality criteria that evaluate Study Design, Trial Conduct, and Transparency. The relationships between reporting quality and key study characteristics will be test using nonparametric statistics. In this preliminary work in progress, we report the results of the 25% (98 RCTs) of our intended sample size.



Preliminary results: The proportion of studies meeting a particular quality criterion varied from 9.5% and 95.7%. The median number of criteria fulfilled by each article was 25 (IQR: 21–28). When examining the relationship between reporting quality and year, we found that over the years, there appears to be a recent increase in the number of quality criteria fulfilled, with 2022 showing the highest concentration of high values (Fig. 1).

Timeline: The results of this ongoing study are limited by the small sample size. Datasets and results including statistical testing will be finalized by March 6, 2025, for presentation at the NEPS 2025 Meeting.

Gestational age, feeding type, and infant feeding behaviors in very and extremely preterm infants

Maria Laura Mourao*[1], Marianna Castellanos[2], Rhys Johnstone[1], Sofia Gnecco[1], Kim Ruiz-Arellanos[1], Sarah Taylor[3], Camilia Martin[4], Kristin Santoro[1]
[1]Department of Neonatology, Beth Israel Deaconess Medical Center; Harvard Medical School, Boston, MA, [2]The Children's Hospital at Montefiore, NY, [3]Department of Pediatrics, Yale School of Medicine, New Haven, CT, [4]Division of Neonatology, Weill Cornell Medicine, New York, NY

Background: Very and extremely preterm infants face difficulty with oral feeding with higher rates of poor feeding skills, food refusal, mechanical difficulties, and delayed development. Identifying risk factors for feeding difficulties could provide opportunities for earlier intervention.

Objective: To determine how clinical and sociodemographic exposures relate to parental-reported feeding behaviors of very and extremely preterm infants at four months corrected age (CA) with a focus on gestational age at birth and breast milk feeding.

Methods: Parental responses to the Baby Feeding Behavior Questionnaire (BEBQ) and infant feeding type (any breast milk or exclusively formula) were collected from the 4-month CA study visits of preterm infants born < 32 weeks. Demographic, clinical, and social data through 4 months was collected. Mean BEBQ scores across five domains—enjoyment of food, food responsiveness, slowness in eating, satiety responsiveness, and appetite—were analyzed. Associations between feeding type, gestational age, and feeding behaviors were evaluated using univariate and adjusted regression analyses. T-tests and ANOVA were used for normal data, while Kruskal-Wallis and Mann-Whitney tests were applied for non-parametric data. Variables with p < 0.1 were included in adjusted models, and Bonferroni correction was applied for multiple comparisons.

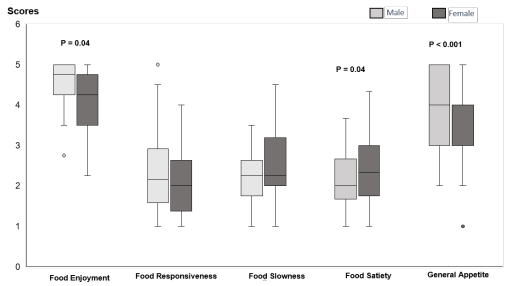


Figure 1: Univariate Analysis of feeding domains by sex

Results: 115 infants were included in the analysis, with 59% exclusively formula-fed. Formula-fed infants exhibited lower slowness scores which represent faster feeding behaviors (p-value=0.01). After adjusting for potential confounders, neither feeding type nor birth gestational age related to feeding behavior in all five domains. In the univariate analysis, sex was associated with most feeding domains (Figure 1). Female infants had a lower mean general appetite score, increased food satiety, and decreased food enjoyment compared to male counterparts. Infants who required treatment for retinopathy of prematurity (ROP) had significantly higher feeding slowness scores, indicating slower feeding.

Conclusion: In this study of infants born 23 to 31 weeks, birth gestational age did not relate to feeding patterns at 4 months CA. Differences in feeding were observed by sex, and diagnosis at discharge.

Produce prescription on improving pregnancy outcomes: Results from a pilot intervention

Fang Fang Zhang,[1] Chloe Andrews,[1] Emma Noyes,[2] Chenchen Sun,[3] Perrie F. O'Tierney-Ginn[2]
[1]Friedman School of Nutrition Science and Policy, Food is Medicine Institute, Tufts University; [2]Mother Infant Research Institute, [3]Tufts Medical Center; Dept OB/GYN, Tufts Medical Center, Boston, MA, USA

Background. Integrating food and nutrition into healthcare through "food is medicine" (FIM) interventions shows significant promise for improving dietary intake and health outcomes, yet few studies have evaluated the potential benefits of FIM interventions for pregnant women.

Objective. We conducted a pilot study to assess the impact of a produce prescription (PRx) program on pregnancy outcomes.

Methods. Among 40 English-speaking pregnant women aged 18+ years receiving prenatal care at Tufts Medical Center who were screened positive for food insecurity, 22 women between 6-24 weeks gestation participated in the PRx program and received weekly home delivery of locally sourced fresh produce at $35 per week for 16 weeks, coupled with nutrition education materials. Eighteen women who did not participate in PRx served as controls. Adverse pregnancy outcome (APO) was evaluated as a composite score including gestational diabetes, gestational hypertension, pre-eclampsia, preterm birth, and newborns small or large for gestational age. Weight gain during pregnancy was assessed as the weight difference between the initial prenatal visit (<12 weeks) and 32-37 weeks gestation. Linear regression was performed to estimate the difference (β) and 95% confidence intervals (CI) in APO composite score and weight gain between PRx and controls, with multivariable adjustments of maternal age, race and ethnicity, pre-gravid body mass index, and baseline physical and mental comorbidity status.

Results. Twenty-one participants completed the PRx program. Women in PRx had a lower median APO composite score (PRx vs. control: 1 vs. 0) and a lower percentage of having 1+ APOs (47.6 vs. 55.6%) than controls. The median weight gain during pregnancy (lbs) was also lower in the PRx than control groups (13.9 vs. 15.9). However, none of the differences reached statistical significance (all p-values>0.05). After multivariable adjustments, the difference in APO score and weight gain during pregnancy was -0.06 (95% CI: -0.57 to 0.45), and -0.38 (-10.7 to 11.4) lbs, respectively.

Conclusions. A produce prescription program can potentially reduce APOs and gestational weight gain for food-insecure pregnant women. Larger-scale interventions are warranted to further evaluate the impact of FIM interventions on improving maternal and offspring outcomes.

Placenta accreta spectrum and perinatal mental health: A national study in the United States

Vanya Karabadji[1]*, Scott A. Shainker DO, MS[1,2], Anna M. Modest PhD, MPH[1,2]
1. Department of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, Boston, MA
2. Department of Obstetrics, Gynecology, and Reproductive Biology, Harvard Medical School, Boston, MA

Background: Previous research has identified as association between placenta accreta spectrum (PAS) and an increased risk of perinatal mental health disorders. However, there has been limited research comparing PAS patients to others with high-risk pregnancies.

Objective: To determine if individuals with PAS had a higher prevalence of perinatal mental health diagnoses compared to an obstetrics population at high risk of maternal hemorrhage without PAS.

Methods: This study utilized the National Impatient Sample (NIS) dataset from 2016-2019. We included patients with delivery, prior cesarean delivery and placenta previa. The prevalence of anxiety, obsessive compulsive disorder (OCD), depression/other major depressive disorders, stress disorders (including post-traumatic stress disorder (PTSD)) was compared in those with PAS and those without PAS. ICD-10 codes were used to assign all diagnoses and medical history. Demographics were included in the NIS dataset. All data were weighted, as per NIS documentation, to estimate prevalence.

Results: There were 5190 patients with PAS and 24,835 patients without PAS during that time period. Race, ethnicity, median household income, and insurance status were similar between the groups. PAS patients were more likely to deliver in large, urban teaching hospitals compared to non-PAS patients. PAS patients were also more likely to deliver earlier in gestation. Other comorbidities were similar between groups. PAS patients were more likely to have a diagnosis of anxiety (7.0% vs. 5.4%, $p = 0.04$), compared to non-PAS patients. However, there was no statistically significant difference between the PAS and non-PAS groups in diagnosis as it relates to stress/PTSD (1.2% vs. 0.8%, $p = 0.29$) or depression/other major depressive disorders (11.3% vs. 9.5%, $p = 0.08$). There were too few cases of OCD to draw any meaningful conclusions.

Conclusions: Individuals with PAS have a higher prevalence of anxiety disorders compared to those without PAS among high-risk cohort Future research can be used to implement potential intervention strategies to create more efficient support systems for mothers with PAS.

Obstetric outcomes following maternal respiratory syncytial virus vaccination

*Tina Yi Jin Hsieh, Ai-ris Yonekura Collier
Department of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center

Background: The Centers for Disease Control and Prevention recommends maternal respiratory syncytial virus (RSV) vaccination using RSVpreF (Abrysvo) at 32 to 36 weeks of gestation to reduce severe infant RSV disease. Initial trials revealed an imbalance in preterm births in those receiving RSVpreF; however, real-world data on post-vaccination obstetric outcomes remain limited.

Objective: The objective of our study is to describe vaccine uptake in the first two RSV seasons since RSVpreF availability. The second objective was to determine the risk of obstetrical complications among those who received RSVpreF vaccination during pregnancy versus unvaccinated controls.

Methods: We utilized the TriNetX U.S Collaborative Network, a federated electronic health record network with 70 healthcare organizations (22% Northeast, 15% Midwest, 52% South, and 10% West, with <1% unspecified) to identify births occurring during RSV vaccination season (Sept 1 to Jan 31) plus 10 weeks to account for late term births after the last vaccine date. 1:1 propensity score matching was performed based on demographics, health utilization, comorbidities, aspirin use, assisted reproductive technology, multi-fetal gestation, and body mass index. Maternal outcomes were identified by ICD-10 codes within a 6-month period after the index date (vaccination date for RSVpreF group or 32 to 36 weeks of gestation for control group). Risk ratios (RR) and 95% confidence intervals (95CI) were calculated for preterm birth (PTB), hypertensive diseases of pregnancy (HDP), gestational diabetes (GDM), abruption, cesarean delivery (CD), and postpartum hemorrhage (PPH). The delivery cohort for this 2024-25 RSV season included births up until 1/22/2025.

Results: For the 2023-24, RSV vaccination rates peaked at 1.7% in January 2024. The 2024-25 vaccine rates were higher overall, peaking at 2.2% in November 2024. We included 6,061 vaccinated with matched unvaccinated individuals from the 2023-24 RSV season and 5,133 vaccinated with matched unvaccinated individuals for 2024-25 season. In the 2023-2024 cohort, there were 338 (6.4%) PTBs in the vaccine group compared to 437 (7.2%) in the unvaccinated group [RR 0.89, 95CI: 0.78-1.01]. In the 2024-25 cohort, there were 347 (6.8%) PTB vs. 417 (8.1%) [RR 0.83, 95CI: 0.72-0.96]. HDP risk in the vaccinated compared to unvaccinated group was RR 1.0; (95CI 0.94-1.07) and RR 1.02; (95CI 0.93-1.10) for the two seasons, respectively. Rates of GDM, abruption, and CD were also no different in the two groups**.** The vaccinated group had a slightly elevated risk of PPH (2023-2024: RR 1.16; 95% CI 1.04-1.29; 2024-2025: RR 1.27; 95% CI 1.11-1.44) even after PSM matching.

Conclusions: In this large multi-site study, we found no association between maternal RSV vaccination and preterm birth but identified a possible association with postpartum hemorrhage, requiring further investigation.

Inpatient versus outpatient management of preterm prelabor rupture of membranes: A systematic review and meta-analysis

Rafaela Germano Toledo[1,2]*; Nadiha Noor Chelsea[1,2]; Tina Yi Jin Hsieh[1,2]; Carol Mita[2]; Anna M. Modest[1,2]; Cassandra R. Duffy[1,2]

[1.] Beth Israel Deaconess Medical Center, Boston, MA; [2.]Harvard Medical School, Boston, MA

Background: The management of preterm prelabor rupture of membranes (PPROM) varies across healthcare settings with limited data on the safety of outpatient management. **Objective:** The aim of this study was to compare neonatal sepsis and other maternal and perinatal outcomes by outpatient vs inpatient management of PPROM. **Methods:** We performed a systematic review in October 2023 of Cochrane Central, Embase, PubMed and Web of Science databases for studies comparing outpatient and inpatient management of PPROM. We included studies of pregnancies complicated by PPROM < 37 weeks' gestational age (GA) published in full text English. Primary outcome was neonatal sepsis; secondary outcomes included neonatal intensive care unit (NICU) admission, NICU length of stay (LOS), intrauterine fetal demise (IUFD), neonatal death, pregnancy latency, chorioamnionitis, and maternal LOS. A random-effects model was used to calculate pooled odds ratios (OR) or mean differences (MD) and 95% confidence intervals (CI) for all outcomes. **Results:** Out of the 485 studies identified, 10 were included. These studies comprised 2,286 patients, with 1,040 undergoing outpatient and 1,246 inpatient management. Included studies involved pregnancies from 20 to 35 weeks' GA. Neonatal sepsis was assessed in all studies, and no significant statistical differences were found between the groups (pooled OR 0.92, 95% CI 0.63-1.35, Figure 1). The latency period was longer (pooled MD 7.73; 95% CI 0.56-14.90) and there was less chorioamnionitis (pooled OR 0.54; 95% CI 0.41-0.72) in the outpatient setting. Regarding neonatal outcomes, the outpatient group had lower odds of NICU admission (pooled OR 0.57; 95% CI 0.36-0.90) and a shorter NICU LOS (pooled MD -9.43 days; 95% CI -13.02 to -5.84). There were no significant differences in maternal LOS, IUFD, and neonatal death. **Conclusions:** Outpatient management of PPROM was associated with a longer latency period, lower odds of chorioamnionitis, NICU admission, and shorter NICU length of stay, without an increase in rates of neonatal sepsis.

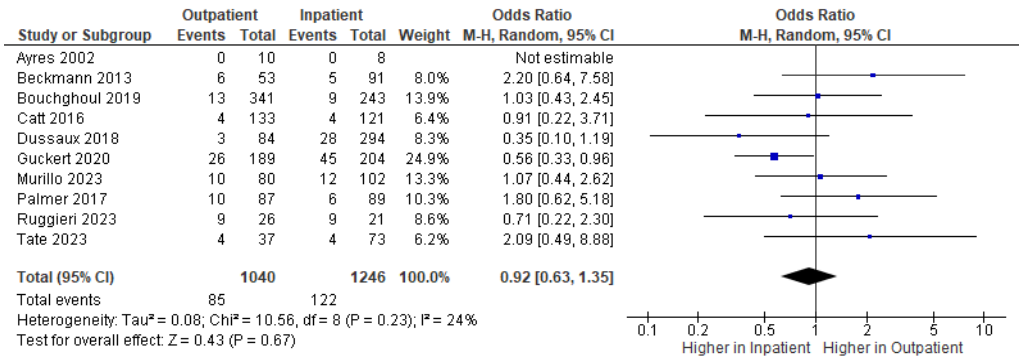


Figure 1. Forest plot showing the odds ratios for neonatal sepsis

Association of neonatal glycemia with neurobehavior using continuous glucose monitors

A. Coburn-Sanderson[1], S. Cherkerzian[1,2], F. Prendin[3], A. Galderisi[4], L. Foster[1], A. Facchinetti[3], S. Sen[5,6] and C. Monthé-Drèze[1,2];
[1]Brigham and Women's Hospital, Boston, MA; [2]Harvard Medical School, Boston, MA; [3]University of Padova, Padova, Italy; [4]Yale University, New Haven, CT; [5]Women and Infants Hospital, Providence, RI; [6]Brown University, Providence, RI.

Background: Neonatal hypoglycemia (NH), particularly in the first 12 hours of life (HOL), presents an increased risk for adverse neurodevelopment. Standard of care methods for NH screening involve intermittent blood glucose (iBG) sampling, which can miss over 25% of NH episodes and does not quantify duration of NH exposure. Continuous glucose monitoring (CGM) better reflects cumulative glycemic exposures, such as hypoglycemia duration and BG variability. Little is known about the associations of CGM and iBG derived glycemic metrics with early neurodevelopment. The NeoNatal Neurobehavioral Scale (NNNS) was developed as a tool to assess and quantify neurobehavior in early infancy and is strongly related to later neurodevelopment.

Objective: We compared glycemic metrics derived from two testing methods (CGM vs. iBG) and associations with NNNS scores.

Methods: We included n=21 neonates at risk for NH enrolled in the observational LAMMBS study. Blinded CGM was performed from delivery to discharge, and traces were re-calibrated with a validated adjustment algorithm to reconcile for known CGM inaccuracy in this population. Neonates were also screened for NH with iBG point-of-care testing and treated per institutional protocol. We used Spearman's correlations to determine associations of glycemic metrics with NNNS scores.

Results: Greater iBG variability (0-12 HOL, R^2 = -0.45; **Fig.A**) and % of hypoglycemic iBG measures (0-12 HOL [R^2 = -0.46]; 0-24 HOL [R^2 = -0.47]) correlated with lower self-regulation scores. Lower mean iBG (0-24 HOL, R^2 = -0.44; **Fig.B**) correlated with greater need for substantial soothing and settling of infants by the examiner to elicit attention and response to stimuli (handling scores). Higher % of time in hypoglycemia range by CGM (0-48 HOL, R^2 = 0.43; **Fig.C**) correlated with higher arousal (i.e. fussiness) scores.

Conclusions: Greater neonatal glucose variability and hypoglycemia were associated with poorer neurobehavior, with CGM adding additional prognostic metrics that relate to early neurodevelopment. Tools such as CGM have the potential to improve NH evaluation, management, and outcomes, and require further investigation and optimization for neonates.

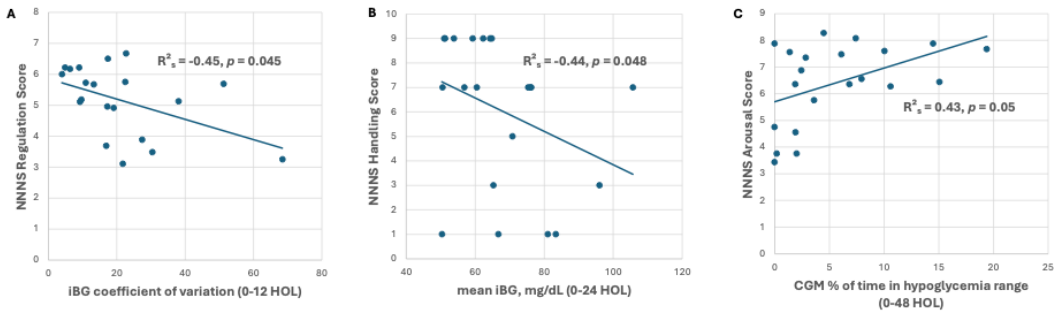


Figure. Associations between neonatal glycemia and neonatal neurobehavior by testing method

Characteristics of paternal visitation in the neonatal intensive care unit

Janine Bernardo, MD, MPH[1], Milton Kotelchuck, MPH, PhD[2]
1, Division of Newborn Medicine, Department of Pediatrics, Massachusetts General Hospital, Boston, MA
2, Professor of Pediatrics, Harvard Medical School, Senior Scientist, Maternal Child Health Center in the Center for Child and Adolescent Health Policy, Massachusetts General Hospital, Boston, MA

Background: Parental involvement in the Neonatal Intensive Care Unit (NICU) encapsulates the earliest possible moments of interaction with an infant and can be beneficial to all members of the family unit. More frequent visitation of fathers to the NICU, specifically, is associated with benefits to infants including better growth and improved development. Paternal benefits also exist to fathers including short term benefits such as less stress as well as long term benefits like more positive parenting styles, higher attachment scores, and less anxiety. Yet, characteristics of paternal visitation in the NICU is poorly described. Of limited existing data, most focus on premature infants during time frames of hospitalization. Descriptors of paternal visitation patterns for *all* NICU babies during the course of the hospitalization would be most informative given the heterogeneous nature of NICU hospitalizations in regards to wide ranges of length of stay, significant proportion of term neonates, and reasons for admission. **Objective:** In this study, we seek to describe paternal visitation patterns including how often fathers visit, when they visit, how fathers participate at the bedside, associations between infant and comparison to maternal visitation patterns. **Methods:** This is a retrospective analysis of paternal visitation patterns in a Level IV NICU from January 2017 to December 2023. We will examine visitation characteristics including frequency, timing and persons who visited, as well as types of interactions and behaviors. Analyses will evaluate visitation characteristics based on length of stay (LOS) categories, neonatal clinical characteristics, maternal sociodemographics, and comparisons to maternal visitation patterns. Data will be analyzed using descriptive statistics and logistic regression. **Results:** 3148 NICU infants will be included in the study population. Eighty eight percent of infants have at least one paternal visit during the course of the hospitalization. Descriptive statistics will include neonatal and maternal characteristics. Average visit days per week and percentage of infants whose fathers visit more than one time a day will be reported. We will describe the timing of day during which visits take place along with duration of visits. Characteristics of participation, including holding, feeding, sitting at bedside, will also be described. We will also report associations of paternal visitation with LOS, neonatal characteristics and maternal sociodemographics. Finally, we will compare patterns of paternal visitation with maternal visitation characteristics. **Conclusions:** Knowledge of visitation characteristics could allow for stronger support of NICU fathers by targeting timely and accessible interventions and education. Next steps include exploring father's viewpoints on visitation, including barriers and facilitators, in order to enhance visitation.

SUNDAY, MARCH 9, 2025
Fourth Scientific Session: Oral Presentations

Modertors: Liz Yen, MD and Michael House, MD

9:00 am Time to early nutrition milestones among extremely preterm low birth weight infant in the NICU: Differences by gestational age. S. Talebiyan* BWH

9:12 am Impact of stress and anxiety o milk macronutrient and energy content. S. Roytek* and E. Zucker* BWH

9:24 am Discontinuity during outpatient pregnancy care: A retrospective cohort study. D. Reyes* BIDMC

9:36 am Memory T cell activation in the second trimester prior to preeclampsia onset. A. Mutoni* BIDMC

9:48 am Maternal mid-upper arm circumference during pregnancy in Ethiopia: Trends and association with adverse birth outcomes. Y. Kim* Brown

10:00 am Association between time npo and body composition in VLBW infants. V. Belavusava* Tufts

10:12 am Assessing adherence to first trimester diabetes screening guidelines in publicly insured patients. Z. Kassem* Tufts

10:24 am Predictors of perinatal perceived stress among pregnant women in rural Ethiopia. S. Jensen* BCH

10-MINUTE BREAK

10:34 AM Non-invasive prenatal testing results, nuchal translucency size, and second-trimester resolution modify first trimester cystic hygroma outcomes. M. Wang* BIDMC

10:46 am Accuracy of infant clinical signs to predict neonatal mortality in rural Bangladesh. S. Widyaningsih* BWH

10:58 am scRNAseq reveals immune profile differences at the maternal-fetal interface across gestation. Y. Cao* Yale

11:10 am Accuracy of patient and provider prediction of spontaneous labor at term. A. Oppong* BIDMC

11:22 am Improving intubation premedication use in infants ≤1500g. D. Daniel* Yale

11:34 am Comparative analysis of NICU visitation and social vulnerability by preferred language to inform intervention development. A. Acevedo*, MGH

11:46 am Adverse perinatal outcomes among patients with iron deficiency without anemia and implications for treatment. I. Sigman* WIHRI

11:58 am Impact of lesion-specific delivery room guidelines on resuscitation practices for newborns with critical congenital heart disease. E. Hauser* BWH

*Denotes person in training

Time to early nutrition milestones among extremely preterm low birth weight infants in the NICU: differences by gestational age

Saharnaz Talebiyan*, MD, Margaret L. Ong, MD, MPH, Hunter Pepin, MS, RDN, LDN, CLC, Deirdre Ellard, MS, RDN, LDN, CNSC, Tina Steele, RN, IBCLC, Mandy Brown Belfort, MD, MPH (all at Brigham and Women's Hospital, Boston, MA, United States)

Background: Using a standardized feeding guideline promotes growth and reduces morbidities among extremely preterm (EPT, <28 weeks) and extremely low birth weight (ELBW, ≤1000g) infants and limits unnecessary practice variation. Survival of infants born at 22-23 weeks is increasing. However, little is known about early feeding practices in these infants.

Objective: Among ELBW infants, compare time to early nutrition milestones by gestational age (GA) group, hypothesizing later achievement of enteral feeding milestones among infants born at lower (22-23) compared with higher (24-27) weeks' GA.

Methods: We studied 253 surviving ELBW and EPT infants admitted to a single academic center between 2015-2024 during which a standardized feeding guideline was in place. Early nutrition milestones included: hour of life (HOL) of first enteral feeding; day of life (DOL) of initial human milk fortification; DOL achieving 100 and 150 mL/kg/day enterally; and parenteral nutrition (PN) days. We plotted medians by GA and compared medians between groups (22-23 vs. 24-27 weeks) with Mann-Whitney U test.

Results: Median (range) GA was 25 (22, 27) weeks and birth weight 754 (400, 1000) grams. Timing of achieving early nutrition milestones by GA are shown in the **Figure**. Time to first enteral feeding was later in 22-23 vs. 24-27 week infants (43 vs. 19 hours; p<0.001). Similarly, 22-23 week infants reached 150 mL/kg/day (45 vs. 14 days, p<0.001) of enteral volume and initial milk fortification to 24 kCal/oz (37 vs. 9 days, p<0.001) later. 22-23 week infants also received more PN (42 vs. 11 days, p<0.001).

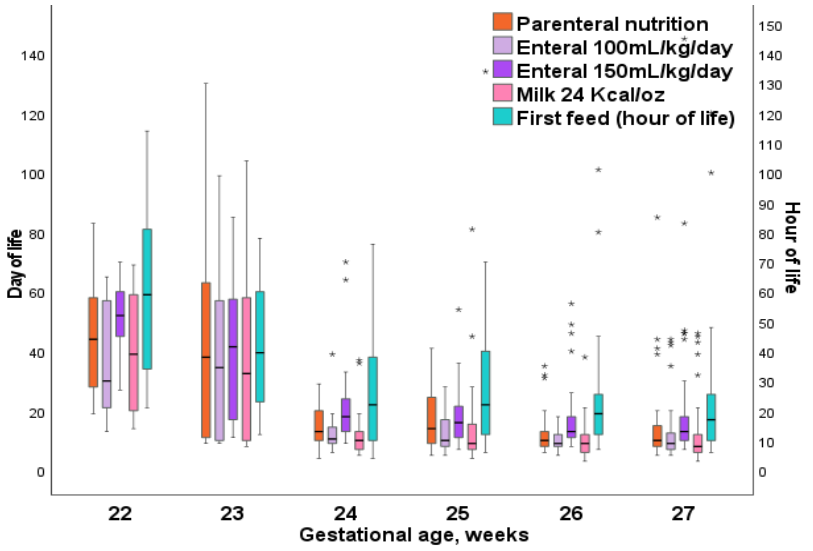


Figure. Early nutrition milestones by gestational

Conclusions: Despite the use of an established, unit-based standardized feeding guideline, timing of early nutrition milestones differed substantially between ELBW infants born at 22-23 weeks' gestation compared with those born at 24-27 weeks. These differences may reflect differences in gastrointestinal maturity, severity of critical illness, and/or provider concerns. As survival increases and standardized care practices emerge for 22-23 week infants, our findings suggest a need for tailored feeding guidelines and implementation efforts targeting this vulnerable population.

Impact of stress and anxiety on milk macronutrient and energy content

Sarah Roytek*, Emily Zucker*, Manasa Kuncham, Tina Steele, Laurie Foster, Mandy Belfort
**Contributed equally as first authors.* Department of Pediatrics, Division of Newborn Medicine, Brigham and Women's Hospital

Background: The neonatal intensive care unit (NICU) environment provokes high parental stress and anxiety compared to a normative birthing experience. High stress and anxiety may adversely impact lactation, including milk composition, but little is known about this relationship within the NICU setting. **Objective**: To examine associations of stress and anxiety after very preterm delivery in the mother or lactating parent with milk macronutrient content during the infant NICU hospitalization. **Methods**: We analyzed data from the Nourish Study, an ongoing randomized trial enrolling infants born <31 weeks and their mother or birthing parent. For this analysis we included 44 parents who provided 100% milk for their infant(s) and completed surveys of stress and anxiety at study enrollment. We assessed stress with the Parental Stressor Scale (PSS:NICU) and state anxiety with the State Trait Anxiety Inventory (STAI) scale. We classified high stress as PSS:NICU ≥2 and high anxiety state as STAI >40. We analyzed milk macronutrients daily from enrollment to 36 weeks' postmenstrual age with mid-infrared spectroscopy. We estimated associations of high vs. low stress and anxiety with mean milk macronutrients and energy, adjusting in linear regression for gestational age at delivery. **Results**: Median (range) gestational age at delivery was 28 (24, 30) weeks. Mean (SD) PSS:NICU score was 1.6 (0.8) and 9 (24%) had high stress. Mean (SD) STAI state score was 37 (13) and 15 (35%) had high state anxiety. Mean (SD) crude protein content was 1.5 (0.2) g/dL; fat, 4.1 (0.5) g/dL; carbohydrate, 8.1 (0.3) g/dL; and energy, 76 (5) kcal/dL. Adjusted associations of anxiety and stress with milk macronutrients and energy are in the **Table**. We did not find significant associations of high anxiety or high stress with lower milk fat, protein, carbohydrate, or energy content. **Conclusions**: Counter to our hypothesis, we did not find evidence that high anxiety or stress experienced by lactating parents after very preterm delivery adversely impacted milk composition. Overall high levels of anxiety and stress during lactation point to opportunities to enhance psychosocial support in the period following very preterm delivery and during the infant's NICU hospitalization.

Table. Adjusted associations of anxiety and stress with milk macronutrients (n=44)

	Protein (g/dL)	Fat (g/dL)	Carbohydrate (g/dL	Energy (kcal/dL)
	β (95% confidence interval)			
Anxiety	**0.18 (0.04, 0.30)**	-0.09 (-0.45, 0.28)	0.07 (-0.15, 0.29)	-0.12 (-3.53, 3.76)
Stress	-0.14 (-0.31, 0.03)	0.09 (-0.28, 0.46)	0.04 (-0.21, 0.29)	0.82 (-3.09, 4.73)

State anxiety measured with State Trait Anxiety Inventory (STAI). Stress measured with Parental Stressor Scale: neonatal intensive care unit (PSS:NICU). High anxiety state defined as STAI >40; high stress defined as PSS:NICU ≥2. Milk macronutrients measured daily from enrollment to 36 weeks' postmenstrual age with mid infrared spectroscopy-based analyzer. Energy calculated with the Atwater equation. β estimates indicate the difference in mean milk macronutrient content between birthing parents with high vs. low scores, adjusted in linear regression for gestational age at delivery. Bold face type indicates that 95% confidence intervals excluded the null hypothesis.

Discontinuity during outpatient pregnancy care: A retrospective cohort study

Rose L. Molina[1], Sara Booth[1], Ryan Gould[1], Ashley O'Donoghue[1], Stephanie Li[1], Sarah Little[1], Daniela Reyes[1]*, Anjali J. Kaima[2], Michele R. Hacker[1], Jeanne-Marie Guise[1]
[1] Beth Israel Deaconess Medical Center, Boston, MA
[2] Department of Obstetrics and Gynecology, University of South Florida, Tampa, FL

Background: Clinician discontinuity poses a significant challenge in person-centered pregnancy care and may be driven by clinician turnover and structural variations in practice settings. Team-based models of pregnancy care have become the norm in academic medical centers, which have important implications for clinician continuity. **Objective:** This study aims to measure clinician continuity vs. discontinuity during outpatient pregnancy care among a cohort of patients who gave birth at an urban academic medical center. **Methods:** This retrospective study examined patients who gave birth between June 2023 and May 2024 at an urban academic medical center with available outpatient data. We analyzed the number of clinicians seen during pregnancy and the proportion of visits with the most frequently seen clinician for those with ≥3 visits. Clinician discontinuity was defined as seeing multiple clinicians from conception to 12 weeks postpartum. Statistical analysis included means, standard deviations, ANOVA F-tests for group differences, and Poisson regression to assess associations with the number of providers seen. **Results**: This study included 2,238 patients, with a mean of 12.44 (SD 4.05) total visits and 3.97 (SD 1.96) clinicians seen during pregnancy care. Patients in the resident physician practice had the highest number of clinicians seen (mean 7.32, SD 2.61; p <0.001), followed by maternal-fetal medicine patients (mean 5.05, SD 2.22; p <0.001). Across nine practice sites, the number of clinicians seen ranged from 2.32 to 7.32. Among patients with 3 or more visits (n=2,204), the mean proportion of visits with the same clinician was 0.54 (SD 0.17), with Asian and Black patients having the lowest continuity (0.52 and 0.53, respectively; p=0.003). Only 21% of patients had a prenatal visit with their delivering clinician, with continuity higher among White, English-speaking, and commercially insured patients. Black patients saw 5% more unique providers than White patients, and those primarily seeing residents had 59% more providers than those seeing attendings. No significant association was found between severe maternal morbidity and the number of clinicians seen. Among the 2,238 patients, 597 were seen by at least one provider team (i.e. at least two team members). When team providers were counted as unit, the mean number of providers seen decreased from 3.97 to 3.67, while trends remained consistent.

Conclusions: Clinician discontinuity during outpatient pregnancy care varied by clinician type, practice, clinical site, and patient factors among patients giving birth in a single urban academic medical center. Redesigning care delivery in team-based models may be needed to address disparities in clinician continuity, particularly for minoritized patients who are more likely to receive care in resident clinics due to insurance constraints or require maternal-fetal medicine services for high-risk pregnancies.

Memory T cell activation in the second trimester prior to preeclampsia onset

Audrey Mutoni,* Tina Yi Jin Hsieh,* Emily Stonestreet,* Bridget Wixted,* Reed Boduch,* Bismark Acquah,* Krishna Shah,* Anna Modest, Ai-ris Yonekura Collier
Department of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center

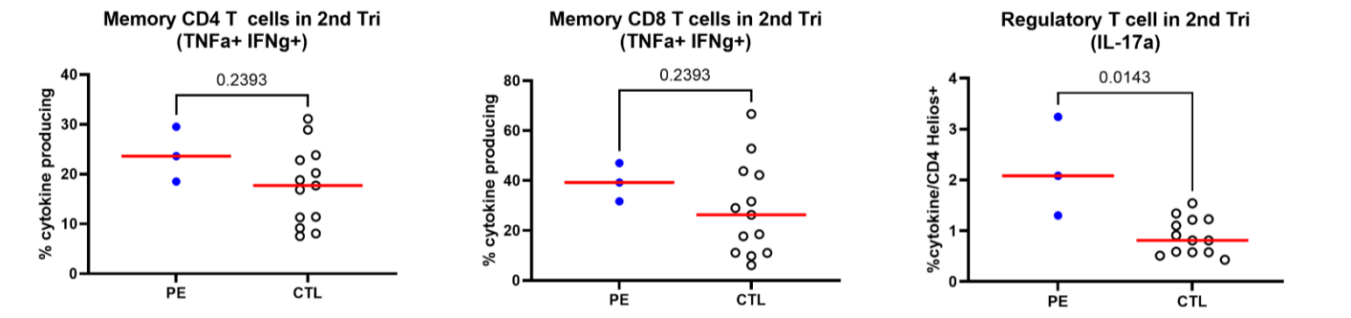
Background: Preeclampsia (PE) affects 4-10% of pregnant individuals and is a leading cause of maternal mortality and morbidity globally. Our group previously identified uterine pro-inflammatory T cell polarization in association with PE at delivery. Earlier detection of immunologic changes leading up to PE will facilitate early surveillance and identify new immune targets for prevention or treatment of PE.

Objective: The objective of this study is to identify functional memory (CD45RO+) T cell changes in the second trimester associated with progression to PE.

Methods: We conducted a single-site longitudinal prospective cohort study that enrolled pregnant people. Blood samples were obtained at each trimester and clinical and obstetric data were collected by review of electronic health record. Second trimester samples obtained before onset of PE were analyzed for proinflammatory Interferon gamma (IFN-γ), tumor necrosis factor alpha (TNFα), and interleukin 17 (IL-17α) cytokine production using intracellular flow cytometry. Cytokine levels were reported as median (interquartile range) and compared using a two-tailed Wilcoxon rank-sum test.

Results: Of 100 enrolled participants, 3 participants with PE with severe features and 13 participants with no hypertension had second trimester samples to analyze. The median TNFα and IFN-γ producing memory CD8 T cells was 39% (32, 47) for PE and 26 (11, 43) for the control group, p=0.24. For memory CD4 T cells this proportion was 24% (19, 30) for PE and 18 (10, 23) for the control group, p=0.24. The IL-17α producing CD4 regulatory T cells (Treg) was 2.1% (1.3, 3.2) in the PE group and 0.81 (0.58, 1.2) for the control group, p=0.01.

Conclusions: Second trimester CD8 and CD4 memory T cells from participants who developed PE produced higher pro-inflammatory IFN-γ and TNFα, though this was not statistically significant likely related to low sample size. PE was associated with a significant increase in Treg IL-17α production. Further studies are needed to investigate whether IL-17α or TNFα inhibitor therapies (currently approved for chronic inflammatory diseases) could be used to correct these immunologic changes identified prior to the diagnosis of PE.



Maternal mid-upper arm circumference during pregnancy in Ethiopia: trends and association with adverse birth outcomes

Yumin Kim*, Firehiwot Workneh, Nebiyou Fasil, Kalkidan Yibeltal,Alemayehu Worku, Yunhee Kang, Nandita Perumal, Yemane Berhane†, Anne CC Lee† (†Co-senior authors)
Global Alliance for Infant and Maternal Health (AIM) Research Group, Brown University
Addis Continental Institute of Public Health

Background: Maternal undernutrition increases adverse perinatal risks, often via intrauterine growth restriction. Mid-upper arm circumference (MUAC) is a proxy for maternal undernutrition, but its predictive value remains unclear. **Objective**: This study examines MUAC trends in pregnancy and the association of different MUAC thresholds with adverse pregnancy outcomes. **Methods**: A prenatal RCT in rural Ethiopia enrolled 2,399 pregnant women at <24 weeks gestation (ISRCTN15116516). Anthropometric measurements, including MUAC, were taken at enrollment and follow-up antenatal visits (mean visits: 3.6±1.7). Women who received balanced energy protein supplementation as the trial intervention were excluded from this analysis. A linear mixed-effects model assessed MUAC trends. Regression models evaluated MUAC cutoffs (<23cm, <22.5cm, <22cm) for associations with gestational weight gain (GWG) rate, stillbirth, preterm birth, small-for-gestational-age (SGA, <10th percentile per INTERGROWTH standards), and low birth weight (LBW) in singleton pregnancies, adjusting for maternal age and parity. GWG rate (g/week) was total weight gain divided by weeks between first and last measure.

Results: Among 1,872 women (5,772 observations), MUAC did not significantly change over the gestational period (β=-0.0016, p=0.234). **Figure 1** illustrates MUAC and BMI distributions by completed gestational week. Low enrollment MUAC was associated with increased odds of LBW, with the highest odds ratio (OR) at the <22cm cutoff. Associations with other pregnancy outcomes were not significant. **Table 1** presents regression coefficients for GWG rate and ORs for binary outcomes by MUAC cutoffs. **Conclusions**: MUAC remains stable throughout pregnancy, making it a useful indicator of undernutrition, particularly in later gestation as BMI increases. Low MUAC (<22.5 cm) in early pregnancy was associated with LBW, supporting its clinical utility as a screening tool for maternal undernutrition affecting fetal growth.

Table 1. Regression coefficients for GWG rate and odds ratios for binary outcomes in singleton pregnancies, adjusted for maternal age and parity [95% CI]

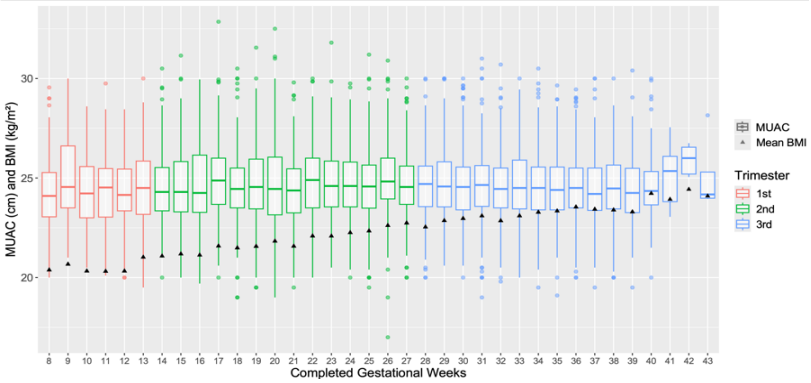


Figure 2. MUAC and BMI measurements by completed gestational weeks

		GWG rate (g/week)	Stillbirth (OR)	Preterm (OR)	SGA (OR)	LBW (OR)
Enrollment MUAC (N=1,851)	**<23 cm** (n=313)	13.47 [-19, 46]	1.02 [0.2, 3.2]	0.91 [0.4, 1.7]	0.91 [0.6, 1.4]	1.55 [0.9, 2.7]
	<22.5cm (n=246)	18.16 [-18, 54]	0.82 [0.1, 3.0]	0.96 [0.4, 1.9]	0.98 [0.6, 1.5]	**1.94* [1.1, 3.3]**
	<22 cm (n=151)	21.61 [-23, 66]	1.46 [0.2, 5.4]	0.85 [0.3, 2.0]	1.25 [0.7, 2.1]	**1.97* [1.0, 3.7]**

Association between time NPO and body composition in VLBW infants

Volha Belavusava[1*], Rachana Singh[1], Olivia Marchioni[1], Gregory P. Goldstein[1]
[1]Division of Newborn Medicine, Department of Pediatrics, Tufts Medical Center. 800 Washington St, Boston, MA 02111

Introduction: Postnatal growth restriction in preterm infants is associated with increased risk of poor neurodevelopmental outcomes. Fat-free mass (FFM) may be more suitable than body weight, the traditional anthropometric measurement, to assess the quality of growth during the NICU hospitalization (Simon 2014). Higher protein and energy intake during a critical early period in development is advantageous for preterm infant growth and body composition because it increases weight gain, weight z-score and FFM accretion (Antonio 2011). It is unclear whether minimizing time receiving no enteral feeds (i.e. nothing per mouth or NPO) impacts body composition in preterm infants. The objective of this study was to assess time receiving no enteral feeds and body composition at NICU discharge in VLBW infants. We hypothesized that time receiving no enteral feeds is associated with a dose-dependent negative effect on FFM at NICU discharge.

Methods: VLBW infants <32 weeks gestational age (GA) or <1500 grams at birth were prospectively consented from the Tufts Medical Center NICU and underwent air displacement plethysmography (ADP) near time of NICU discharge to measure body composition. Patient characteristics were assessed including prenatal medical and sociodemographic factors, postnatal clinical factors, and ADP measurement data, which included FFM and fat mass (FM) percentage. Multivariable regression models were used to estimate the association between number of days NPO and FFM at NICU discharge.

Results: 10 infants were enrolled with an average birth GA of 29.2 weeks (standard deviation 3.3) and birth weight of 1155 grams (SD 369). The ADP measurement was performed on average at 37.7 weeks corrected gestational age. Infants received full volume enteral feeds for an average of 80% of their NICU hospitalization and NPO for 2.9%. Average FFM was 87.7% (SD 4.7), FM 12.3% (SD 4.7), and NICU discharge weight z-score -1.13 (SD 0.69). Infants with lower FFM percentages were more likely to have lower gestational ages at birth, were more likely to have major morbidities including bronchopulmonary dysplasia and sepsis, and longer hospitalizations. After adjusting for confounding variables in a multivariable model, number of days NPO negatively associated with FFM (p=0.03).

Conclusion: Increased fat-free mass on body composition measurement near NICU discharge is associated with longer duration of time NPO. Time NPO may negatively impact body composition in VLBW infants. More research is needed to understand how to improve body composition in the VLBW infants using nutrition during the NICU hospitalization.

Assessing adherence to first-trimester diabetes screening guidelines in publicly insured patients

*Zeinab Kassem MD[1], Sebastian Z. Ramos MD[1], Benjamin Koethe MPH[2], Mohak Mhatre MD[1]
[1]Division of Maternal Fetal Medicine; Department of Obstetrics and Gynecology; Tufts University School of Medicine
[2]BERD Center; Clinical and Translational Science Institute; Tufts University School of Medicine

Background: The American College of Obstetrics and Gynecology (ACOG) currently recommends screening for pregestational diabetes (DM) in the first trimester for high-risk patients. Patients with public insurance have higher rates of DM and are less likely to receive preconception care, compared to those with private insurance. The first trimester DM screening rate for high-risk pregnant individuals with public insurance is unknown.

Objective/Hypothesis: This study aimed to assess first-trimester DM screening rates among high-risk publicly insured pregnant patients. We hypothesized that pregnant patients with public insurance in the US are being under-screened for DM in the first trimester. We also assessed the utilization frequency of different DM screening tests. We also sought to examine differences in pregnancy outcomes between high-risk individuals who did or did not receive appropriate early DM screening.

Methods: This is a retrospective cohort study of US claims-based data from January 2020 to December 2022. Publicly insured individuals with a viable intrauterine pregnancy, who presented for care before 14 weeks, and no history of pregestational diabetes were included. International classification of disease 10th revision (ICD-10) codes were used to identify patients who have at least 1 risk factor for having diabetes as per ACOG guidelines. Current procedural terminology (CPT) codes were used to identify the DM screening tests. Chi-square test was used to compare categorical variables, and two-sample t-test was used for continuous variables. Logistic regression was used to assess risk factors associated with early pregestational diabetes screening.

Results: A total of 240,109 individuals met our inclusion criteria. Among them, 64,320 patients were identified as having at least 1 risk factor for DM. In this group, 27,059 (42%) individuals underwent early screening and 37,171 (58%) did not. Insulin resistance (aOR 9.47), history of gestational diabetes (aOR 5.89), family history of DM (aOR 3.34), pre-pregnancy obesity (aOR 3.17), and hyperlipidemia (aOR 1.59) were the most strongly associated with early DM screening. Compared to high-risk patients who were not screened, those who were screened had higher rates of adverse pregnancy outcomes, including gestational hypertension (21.2% vs 19.7%, $p<0.001$), preeclampsia (17.4% vs 15.6%, $p<0.001$), and gestational diabetes (22.8% vs 12.9%, $p<0.001$). Of the available screening tests, hemoglobin A1c and 1hr oral GTT were used most often (50.0% and 29.4%, respectively).

Conclusions: More than 50% of publicly insured individuals who met criteria for early DM screening in pregnancy were not screened, highlighting a gap in appropriate care for a vulnerable population.

Predictors of prenatal perceived stress among pregnant women in rural Ethiopia

Sarah K. G. Jensen*[1], Firehiwot Workneh[2], Kalkidan Yibeltal[2], Theresa Chin[3], Krysten North[4], Nebiyou Fasil[2], Blair J. Wylie[5], Sara Cherkerzian[3], Yemane Berhane[2], Anne CC Lee[3,4]
[1]Boston Children's Hospital, USA; [2]Addis Continental Institute of Public Health, Ethiopia; [3]Brown University [4]Brigham and Women's Hospital, USA; [5]Beth Israel Deaconess Medical Center, USA

Background: Globally 1 in 7 babies are born low birthweight. In Ethiopia, low birthweight affects between 300,000- 600,000 babies (11-20%) each year. Socioeconomic risk factors and poor maternal nutrition are known risk factors for adverse birth outcomes. A few studies from mostly high income countries suggest that maternal perceived psychological stress may also be a risk factor for low birth weight and other adverse birth outcomes, but limited data is available on the association of maternal prenatal stress and birth outcomes among pregnant women in low and middle-income countries.

Objectives: In this study, we examine the associations of maternal prenatal perceived stress and related stressors on birth outcomes (birth weight-for-age; birth length-for-age; preterm birth; stillbirth) in a cohort of pregnant women from the "Enhancing Nutrition and Antenatal Infection Treatment for Maternal and Child Health" (ENAT) study in Ethiopia. ENAT is a cluster randomized nutrition intervention trial and registered at clinicaltrials.gov [ISRCTN15116516].

Methods: ENAT enrolled pregnant women at <24 weeks gestation between August 2020 - December 2021. We collected data on women's socio-demographic information, nutritional status, food insecurity, and antenatal history at enrollment. Data on maternal prenatal perceived stress was collected at antenatal care (ANC) visits using Cohen's Perceived Stress Scale (PSS), a tool that was previously validated with pregnant women in Ethiopia. To determine associations between maternal perceived prenatal stress and birth outcomes, we use a regression model with cluster-robust standard errors, which accounts for the non-independence of observations within health centers (clusters). Models also account for stress-related risks, potential confounders, and nutrition intervention status.

Results: Among 2,399 women enrolled in ENAT, N=1,103 women contributed data on perceived psychological stress in both the second and third trimesters. There were no associations between maternal prenatal perceived stress and birth weight-for-age or preterm birth. Higher maternal prenatal perceived stress did, however, predict lower birth length-for-age (coef. = -0.024, 95% CI = -0.038, -0.009, p=0.007), and each one unit increase in the stress score was associated with a 14% increase in the risk of stillbirth (OR = 1.14, 95% CI = 1.01,1.29, p <0.001).

Conclusions: Maternal prenatal perceived stress was associated with lower birth length-for-age and increased odds of stillbirth among poor women in rural Ethiopia. Screening for maternal stress may help to identify women at risk for poor birth outcomes. Future work will examine whether the associations of stress with birth outcomes differ depending on women's nutrition intervention status.

Non-invasive prenatal testing results, nuchal translucency size, and second trimester resolution modify first trimester cystic hygroma outcomes

Michelle Joy Wang*, MD[1], Maria Bazan, MD, MPH[1], Davia Schioppo, MS[1], Karen Marchand, MS[1], Millie A. Ferrés, MD[1] Yinka Oyelese, MD[1,] Barbara O'Brien, MD [1]

[1]Beth Israel Deaconess Medical Center, Division of Maternal Fetal Medicine, Department of Obstetrics and Gynecology, Boston, MA, USA

Background: Fetal cystic hygroma is an anomaly of the vascular lymphatic system diagnosed on prenatal ultrasound. First trimester cystic hygroma is associated with an approximately 50% aneuploidy risk and 50% residual risk of structural anomaly in euploid fetuses.

Objectives: The aim of our study is to describe outcomes of fetuses with cystic hygromas (CH) based on results of non-invasive prenatal testing (NIPT), nuchal translucency (NT) size, and spontaneous hygroma regression.

Methods: This was a retrospective cohort study of all patients with a CH diagnosed on first trimester ultrasound at our institution over a nine-year period. The primary outcomes were pathogenic genetic abnormalities, structural malformations and perinatal loss. Secondary outcomes included pregnancy termination, live birth, and a composite of primary outcomes.

Results: Of 294 fetuses with CH, 184 (64%) had a genetic abnormality, and among the fetuses with no known genetic diagnosis, 26 (25%) had at least one structural anomaly. Low risk NIPT result was associated with a 19% (13/71) residual risk of pathogenic genetic finding and the frequency of all adverse outcomes rose with increasing NT size. Finally, of 31 cases of expectantly managed CH cases that resolved in the second trimester, only 4 (13%) had a genetic abnormality.

Conclusion: NIPT results, nuchal translucency size, and early resolution are modifiers in the outcomes associated with first trimester CH.

Accuracy of infant clinical signs to predict neonatal mortality in rural Bangladesh

Suci Ardini Widyaningsih,*[a] Alastair Fung,[b] Sophie Driker,[a] Rasheda Khanam,[c] Abdullah Baqui,[c] Anne CC Lee[a,d]

[a]Global Advancement of Infants and Mothers, Division of Newborn Medicine, Department of Pediatrics, Brigham and Women's Hospital. [b]Division of Paediatric Medicine, Hospital for Sick Children, University of Toronto.[c]Department of International Health, Bloomberg School of Public Health, Johns Hopkins University. [d]Brown Global Alliance for Infant and Maternal Health Research, Department of Pediatrics, Warren Alpert Medical School of Brown University.

Background: Clinical signs provide early warning of illness in neonates at high risk of dying in community settings in low- and middle- income countries (LMICs). There is limited validation of current clinical signs and/or algorithms to predict neonatal mortality in LMICs.

Objectives: 1) To examine the diagnostic accuracy of newborn clinical sign algorithms to predict neonatal mortality, and 2) To determine the association of individual clinical signs with neonatal mortality.

Methods: We conducted a secondary analysis of a birth cohort in Sylhet, Bangladesh (NCT01572532). Of 7788 live births, 6251 newborns had a clinical examination during a community health worker home visit within 3 days of birth, and 5289 were followed up until 28 days of age with available vital status. We validated existing newborn clinical sign algorithms identified from our prior systematic review (Shafiq 2024), including four checklist algorithms and the Score of Essential Neonatal Symptoms and Signs (SENSS). We also estimated the odds ratios (ORs) for neonatal mortality associated with individual signs exploring optimal thresholds using logistic regression.

Results: The WHO Young Infant Study 7-sign (YIS7) checklist algorithm had the highest sensitivity of 66.7% (95% CI: 56.6% to 75.7%) and specificity of 68.6% (95% CI: 67.3% to 69.9%). The SENSS algorithm had an Area Under the Curve (AUC) of 75.9% (95% CI: 69.9% to 82.0%), calibration intercept of -1.21 (95% CI: -1.69 to -0.72), calibration slope of 0.94 (95% CI: 0.78 to 1.11), and Brier score of 0.02. Among individual clinical signs, mortality risks varied based on different thresholds of respiratory rate and body temperature. The odds of neonatal death for each sign and thresholds are shown in Table

Table: Association of Individual Clinical Signs with Neonatal Mortality

Clinical Signs	n/N Died (%)	n/N Alive (%)	OR (95% CI)
Fast breathing ≥60 bpm	17/102 (16.7%)	72/5187 (1.4%)	14.66 (8.28 to 25.97)
Fast breathing ≥70 bpm	10/102 (9.8%)	31/5187 (0.6%)	20.03 (9.50 to 42.20)
High body temperature ≥37.5°C	3/102 (2.9%)	73/5187 (1.4%)	3.23 (0.98 to 10.64)
High body temperature ≥38°C	1/102 (1.0%)	9/5187 (0.2%)	8.73 (1.08 to 70.39)
Low body temperature <36°C	33/102 (32.4%)	342/5187 (6.6%)	7.58 (4.76 to 12.07)
Low body temperature <36.5°C	53/102 (52.0%)	1631/5187 (31.4%)	2.55 (1.70 to 3.82)
Stopped feeding well/not able to feed at all (poor feeding)	31/102 (30.4%)	96/5187 (1.9%)	23.69 (14.81 to 37.87)
Multiple signs of systemic infection	36/102 (35.3%)	102/5187 (2.0%)	27.78 (17.66 to 43.69)

Conclusions: Current clinical sign algorithms have moderate accuracy to identify infants at high risk of dying in the newborn period. We identified specific thresholds and signs that may indicate higher odds of mortality. Further research is needed to optimize clinical sign algorithms to identify high-risk infants in different age groups and settings.

scRNAseq reveals immune profile differences at the maternal-fetal interface across gestation

Yi Cao*[1], Tyler A. Rice[1], Christina Megli[2], and Liza Konnikova[1,3-4]
[1]Departments of Pediatrics[1], Immunobiology[3] and Obstetrics, Gynecology and Reproductive Sciences[4] Yale University School of Medicine, New Haven, CT, USA. [2]Division of Maternal-Fetal Medicine, Division of Reproductive Infectious Disease, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Pittsburgh School of Medicine and the Magee-Womens Research Institute, Pittsburgh, Pennsylvania, USA

Background: Preterm birth (PTB) affects 10% of births in the U.S. and is associated with severe consequences such as respiratory distress, feeding difficulties, and developmental delays. The fetal-derived placenta is thought to be a biopsy into neonatal health. The immune cell populations of the placenta are poorly described across the third trimester, but placental immune mediated dysregulation is implicated in adverse maternal and neonatal outcomes.

Objective: We aim to determine the immune cell composition and associated signaling pathways at the maternal-fetal interface across the 3rd trimester and dysregulation with adverse pathologies.

Methods: Cryopreserved placental villi tissue from 8 term birth and 24 PTB were digested and enriched for immune cells using percoll gradient centrifugation. Single cell RNA sequencing was performed on the recovered cells, the results of which were analyzed using R.

Results: We successfully enriched a variety of immune cells from all 32 placentas. UMAP analysis showed a higher percentage of T cells and NK cells in term cases compared to preterm (Fig 1A). When we performed differential gene expression analysis to compare the entire cell populations from term placentas with those from all preterm cases, we observed increased activation of cytokine signaling pathways, suggesting a regulatory shift in immune responses across gestation (Fig 1B).

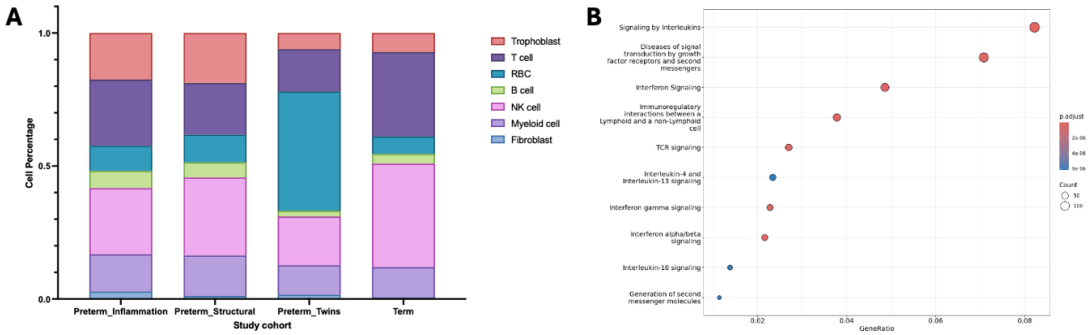


Fig. 1: scRNAseq analysis. (A) Bar plot showing immune cell compositions in preterm and term study cohorts stratified by indication for delivery. (B) Dot plot of enriched pathways in term placenta.

Conclusions: Our study reveals differences in immune cell composition and immunological pathways at the maternal-fetal interface across gestation and pregnancy pathologies. These findings not only indicate the presence of an active immune component of the placenta in the 3rd trimester, but also suggest that immune dysregulation, particularly in cytokine signaling, may play a critical role in the onset of preterm birth.

The accuracy of patient and provider prediction of spontaneous labor at term

Akosua Oppong*[1], Ethan Litman[1], Taylor Freret[1], Anjali Kaimal[2], Julianna Schantz-Dunn[3], Sarah Little[1]

[1]Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, Boston, [2]Obstetrics and Gynecology, University of South Florida Health, Tampa, [3]Obstetrics and Gynecology, Brigham and Women's Hospital, Boston, United States

Background: Understanding the probability of spontaneous labor is necessary to engage in shared decision-making regarding induction of labor without medical indication. We assessed patients' and providers' accuracy in predicting the onset of spontaneous labor at term.

Study Design: Prospective, observational cohort at multiple centers within a healthcare system. Nulliparous patients without a medical indication for induction were enrolled at their 38-week prenatal visit. Patients and providers were asked to assess the probability of spontaneous labor within the next 7 days (0-100%) and prior to 41 weeks (0-100%). Admission to labor and delivery was used as the time of spontaneous labor onset, defined by contractions or rupture of membranes (ROM).

Results: Of the 285 patients enrolled; 279 (97.9%) patient predictions and 269 (94.4%) provider predictions were obtained. Mean age was 30.1 years and BMI 24.97. The cohort was predominately White (59%), privately insured, (84%) and college educated (73%). Overall, 172 (60%) entered labor spontaneously including 97 (34%) with contractions and 75 (26%) with ROM; within 7 days 16% spontaneously labored and prior to 41 weeks 88%, excluding patients induced. Patients overestimated the likelihood of labor within 7 days (median 50%) with only 18% of patients accurately assessing the risk at <25% as compared to providers (median 20%, with 52% assessing the risk at <25%). Patients were more optimistic about labor prior to 41 weeks (median 90%, 26% predicting 100% likelihood) as compared to providers (median 80%, 17% predicting 100% likelihood). In logistic regression, only provider prediction of labor within 7 days was significant ($p< 0.01$) with an area under the curve of 0.69.

Conclusion: Patients significantly overestimate the likelihood of spontaneous labor within 7 days and patients and providers are inaccurate in predicting spontaneous labor prior to 41 weeks. This suggests an opportunity for better patient education and development of prediction models to improve decision-making regarding induction without medical indication.

Improving intubation premedication use in infants ≤1500g

Josh J. Daniel DO*, Cassandra DeMartino MD, Noa Fleiss MD, Lindsay Johnston MD, MED
Department of Pediatrics, Yale School of Medicine

Background: Neonatal endotracheal intubation can be a lifesaving procedure, however, it can require multiple attempts and lead to potential adverse tracheal intubation associated events (TIAEs). Premedication, especially with a paralytic, have been shown to improve intubation safety and decrease the number of attempts. When a rapid sequence intubation (RSI) protocol (combination of a vagolytic, analgesic, and paralytic) was introduced at our level IV NICU, it was only for infants >1,000g to evaluate safety and ensure provider comfort. Given the mounting evidence of benefit in using premedication, we planned to expand our practice and include this higher-risk infant population.

Objective: We aim to improve the use of intubation premedication for non-emergent intubations in infants ≤1500g from 31.2% to 60% and full RSI use from 16.5% to 60% over an 8-month period (from April 2024-January 2025). We also aimed to reduce the total number of TIAEs and severe desaturations by 10% (from 39% to 29% and from 35% to 25%, respectively), and reduce the number of intubation attempts (from a mean of 2.2 to 1.5).

Design/Methods: A retrospective analysis from Jan 2020-Jul 2024 was conducted and a total of 369 intubation encounters were included. Any infant who was intubated in the delivery room, emergently intubated, or had known or suspected difficult airways, were excluded. Out of these 369 intubation encounters, only 16.5% (61/369) received RSI. For infants who did not receive any premedication, 39.2% had a TIAE, 3% had a severe TIAE, and 34.5% had a severe desaturation (≥20% decrease from baseline). To initiate this quality improvement initiative, a premedication multidisciplinary team was assembled. Targeted education on the benefits of RSI was periodically conducted and an RSI Epic-based clinical pathway and order set was created.

Results: Our premedication mean shifted from 31.2% to 90%, a nearly 6-fold improvement. Our mean for RSI use improved from 16.5% to 62.6%, a nearly 4-fold improvement. Additionally, overall non-severe TIAEs decreased from 39% to 7% and severe desaturations decreased from 35% to 9.3%. Mean attempts reduced from 2.2 to 2.

Conclusions: This study surpassed aims to increase rates of premedication and RSI use in this high-risk population while decreasing TIAEs and severe desaturations. However, mean attempts only marginally decreased, and did not meet the targeted goal.

Comparative analysis of NICU visitation and social vulnerability by preferred language to inform intervention development

Ana Acevedo*, Daniela Nunez A., Cindy Odiah, Isabella Lawandy, Chloe Andrews, Shayla Durfey, Alisse Hauspurg, Nicholas Guerina, Michelle Rosa Martins, Sarbattama Sen

Background: Neonatal Intensive Care Unit (NICU) admission rates for Spanish-speaking (SS) families are rising, they experience higher stress and lower discharge readiness. Spanish is the second most common language spoken in our NICU, which represents 10% of our population. Yet little is known about their needs to inform culturally and linguistically appropriate service (CLAS) development in the NICU.

Objectives: We sought to determine how preferred language (English vs. Spanish) was associated with social vulnerability index (SVI), length of Stay (LOS), parental visits per day (VPD), and parental visit timing (day vs night) for families with an infant in the NICU at Women and Infants Hospital of Rhode Island (WIH).

Methods: For outcomes of SVI, LOS, and VPD, we analyzed data from 308 WIH NICU families between 8/1/24 and 10/31/24 with maternal English- (EPL) or Spanish preferred language (SPL). We determined SVI using patient zip code and categorized as high (≥0.50) or low (<0.50) vulnerability. We abstracted LOS and VPD from the medical record. To understand timing of visitation, we compared percentage of daytime (8am-5pm) visits between 11/1/22 to 10/31/24 by EPL vs. SPL (n= 63,005 visits). We compared outcomes with Fisher's exact, Chi2, or Wilcoxon-Mann-Whitney test.

Results: Compared to families with EPL, families with SPL were significantly more likely to have high social vulnerability (SPL 96.9%, EPL 68.5%, p<0.0001) and fewer median (IQR) daily visits (SPL 1.1 (0.5, 1.8), EPL 1.5 (0.9, 2.5), p<0.05) **(Table 1)**. SPL families had a lower proportion of visits between 8am-5pm (SPL 50.9%, EPL 56.9%, p<0.0001) **(Figure 1)**. LOS did not differ by preferred language.

Conclusion: SPL families may have greater social needs than EPL families and yet may not be able to easily access resources during the times that they are offered (primarily during the day). This data is critically important to inform program development and systems transformation to improve outcomes for our vulnerable families. Further evaluation of data trends, and qualitative assessments are ongoing and will inform CLAS programs for WIH NICU families.

Figure 1. Timing of NICU visits by preferred language

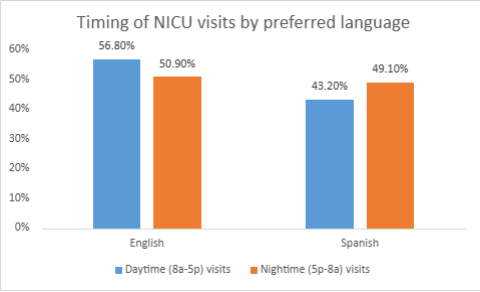


Table 1. Outcomes by preferred language

	SPL n=32	EPL n=276	P-value
High SVI	31 (96.9%)	189 (68.5%)	0.000[a]
Length of Stay, days	7.7 (3.3-16.8)	5.1 (3.2-14.7)	0.486[b]
Visits per Day (n=243)	1.1 (0.5-1.8)	1.5 (0.9-2.5)	0.032[b]

Data is n (%) or median (interquartile range)
[a] Fisher's exact test; [b] Wilcoxon-Mann-Whitney test.

*All differences significant at p<0.05

Adverse perinatal outcomes among patients with iron deficiency without anemia and implications for treatment

Iman Sigman[1]*; Liana Lum[1]; Tracy L Jackson, MPH, PhD[2]; Janet L Rousseau, RN, BSN[2]; Crystal Ware RN, BSN, CCRP[2]; Methodius G. Tuuli, MD, MPH, MBA, MA[2,3]; Adam K. Lewkowitz, MD, MPHS[2,3]
[1]The Warren Alpert Medical School at Brown University, [2]Women and Infants Hospital of Rhode Island, [3]The Warren Alpert Medical School at Brown University, Dept. of Obstetrics and Gynecology

Background: Iron supplementation is not currently standard care for pregnant patients with iron deficiency without anemia (IDWA), defined as hemoglobin ≥11 g/dL & ferritin <30 ng/mL. Prior research is inconsistent, but some studies suggest IDWA is associated with increased risk of developing iron deficiency anemia (IDA) prior to delivery or having an infant with low ferritin. There is a need for data on perinatal and neonatal outcomes among the IDWA population to guide treatment decisions.

Objective: Given the well-documented risks of untreated IDA during pregnancy, this project is designed to assess potential risk for adverse perinatal and neonatal outcomes in the IDWA population. We aim to 1) provide high-quality evidence via a retrospective cohort study on perinatal and neonatal outcomes for IDWA patients, 2) compare outcomes among patients with IDWA prior to 13 weeks and those without IDA or IDWA at 13 weeks, and 3) compare outcomes between patients with IDWA who are <35 vs ≥35 years old.

Methods: Participants will include those with ferritin and hemoglobin data prior to 13wk gestation, from the Women and Infant's Hospital of Rhode Island (WIHRI) population, between 2022-2024. 5 maternal and 7 neonatal metrics will be manually collected from ~350 charts.

Result: 676 potentially eligible participants have been identified. Among 152 charts that have been reviewed, 121 patients were eligible, and 51 have IDWA.

Conclusions: 26% of pregnant patients at Women & Infants Hospital who were screened for iron deficiency anemia (IDA) before 13 weeks' gestation were diagnosed with iron deficiency without anemia (IDWA). This population may be at high risk of developing IDA by the time of delivery, but little is known about the perinatal outcomes among this population.

WIHRI Pre-screening		
Total patients available for screening	5078	
Records reviewed and confirmed to have 1st trimester Hemoglobin (Hb) and ferritin data	676	
Iron deficiency anemia (Hb < 11, ferritin. <30)	96	14.2%
Iron deficiency w/o anemia (Hb > 11, ferritin <30)	173	25.6%

IDWA Chart Review		
Eligible with <13wk labs	121	
Ferritin < 30.0, Hb ≥ 11.0	**51**	**100%**
Nulliparous	3	5.9%
Multiparous	48	94.1%
White or European	17	33.3%
Black or African American	7	13.7%
Asian	5	9.8%
Latina or Hispanic	26	51.0%
Native American, Ai, AN, or Indigenous	4	7.8%
<35 years	35	70.6%
35+ years	16	29.4%
Note: race/ethnicity categories are not mutually exclusive		

Impact of lesion-specific delivery room guidelines on resuscitation practices for newborns with critical congenital heart disease

Emily Hauser*, Francisca L. Chou, MD; Elisabeth Kaza, MD; Alyssa R. Thomas, MD
Department of Pediatrics, Division of Newborn Medicine, Brigham and Women's Hospital

Background: 10,000 U.S. infants per year are born with critical congenital heart disease (CCHD). Newborns with high-risk CCHD often require specialized resuscitation strategies beyond standard Neonatal Resuscitation Program. At Brigham & Women's Hospital (BWH), a high-volume level III NICU, DR practice guidelines for newborns with a prenatal diagnosis of dextro-transposition of the great arteries (d-TGA) and hypoplastic left heart syndrome (HLHS) were written in collaboration with cardiac specialists and implemented in 2023 to support clinical decision-making based on available best evidence. The guidelines include education on the lesions, goal oxygen saturations by time, and thresholds to guide decision-making surrounding DR intubation and sedation.

Objectives: To assess the frequency and type of DR interventions received by newborns with specific cardiac lesions (d-TGA and HLHS) at a single high-volume center, and to compare the incidence of DR intubation and sedation use before and after guideline initiation.

Methods: Characteristics and DR course were abstracted for newborns with prenatally diagnosed d-TGA or HLHS born at BWH between 2018-2024. Means and frequencies of categorical variables were compared using Chi-square analysis.

Results: 172 infants were included; 114 pre-guideline (2018-2022) and 58 post-guideline (2023-2024); 89 d-TGA and 83 HLHS. Among all infants, 47% received blow-by oxygen, 14% positive-pressure ventilation, 23% continuous positive airway pressure, and 25% were intubated. Intubation rates increased post-guideline: 20% pre vs. 34% post ($p=0.06$). Sedation and/or neuromuscular blockade use also rose (16% pre vs. 33% post, $p=0.02$). Sub-diagnosis analysis revealed distinct DR needs. 46% of d-TGA infants had intact ventricular septum (IVS), and 63% of d-TGA-IVS were intubated vs. 17% of d-TGA with ventricular septal defect ($p<0.0001$). For HLHS, 23% had intact or restrictive atrial septum (IAS/RAS), with DR intubation rates of 26% for HLHS-IAS/RAS vs. 7% of HLHS with unrestricted atrial septum ($p=0.06$). Infants with d-TGA-IVS or HLHS-IAS/RAS received sedation and/neuromuscular blockade more than lower-risk subgroups ($p=0.001$; $p=0.02$).

Conclusion: Infants with prenatal diagnoses of d-TGA or HLHS, especially high-risk subtypes, undergo DR interventions at a high rate. The implementation of lesion-specific DR guidelines increased intubation and sedation/neuromuscular blockade usage, addressing the unique needs of these newborns. These findings underscore the importance of standardized resuscitation strategies for this at-risk population. Further research is essential to evaluate the impact of these guidelines on short- and long-term perinatal outcomes and refine best practices for this high-risk neonatal population.