Irish & American Paediatric Society

56th Annual Meeting

March 25-27th 2025

Hyatt Centric Hotel

Dublin, Ireland

The aims of the Society are to promote fellowship and exchange scientific and cultural information in the broad area of child health and life in Ireland, Northern Ireland, The United States and Canada. To initiate joint collaborative clinical research projects and establish closer professional ties between Ireland and North American Pediatricians.

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2025-2026 Sheena Durnin, M.D Present

	Irish and American Paediatric Society, Dublin, 2025		
	March 26th, 2025		
	Moderators Session I – Sheena Durnin and Mariette Murphy		
		Authors	**Title**
0800 - 0815	1	Meredith Kinoshita (Fellow) (SickKids, Toronto, CA) **Travel Award Winner**	Validation of Breastfeeding Assessment Tool using Test Weights
0815 - 0825	2	Lucy Dockery (Intern) (UHL, Limerick, IRL)	Is Ambulatory Care a Feasible Care Option for Children with Type 1 Diabetes in Ireland?
0825 - 0835	3	Teresa Carney (Nurse) (Stony Brook, NYC, USA)	Community of Practice in Our Cystic Fibrosis Center: Patient and Family Partners Taking the Lead (Quality Improvement)
0835 - 0845	4	Aoife Branagan (SpR) (UCD/TCD, Dublin, IRL)	Azithromycin as an Immunomodulator in Neonatal Encephalopathy
0845 - 0855	5	Harish Chaudhary (Registrar) (UHW, Waterford, IRL)	Exploring the impact of insulin pump therapy on body mass index and glycaemic control in children with type 1 diabetes
0855 - 0905	6	Nese Gadzama (SpR) (UHL, Limerick, IRL)	Evaluating medical students' knowledge, skills and attitude on managing childhood obesity: a pilot study
0905 - 0920	7	Marley Tucker (Undergrad) (UAB, Birmingham, USA) **Travel Award Winner**	Respiratory Morbidity in Extremely Preterm Infants Randomized to Early or Delayed Human Milk Fortification: A Secondary Analysis
0920 - 0940		**BREAK**	
	Moderators Session II – Colm Travers and Rita Ryan		
0940 - 1025 Founders Lecture	**8 (CT)**	**Fred Burke Lecture:** Prof. Patrick McNamara	**"**Hemodynamic Precision in PDA-Related BPD Outcomes**"**
1025 – 1035	9	Sheena Durnin (Consultant) (CHI Tallaght, Dublin, IRL)	Paediatric Emergency Care for Autistic Children: Challenges and Opportunities for Improvement
1035 – 1045	10	Barbara Leyva (Nurse) (Stony Brook, NYC, USA)	Oh Baby! It's Cold Outside: Re-examining Newborn Hypothermia Risks and Prevention
1045 – 1055	11	Declan Quinn (Prof) (University of Saskatchewan, CA)	Accelerated Resolution Therapy to Treat Children and Adolescents with Psychiatric Symptoms

1055 - 1105	12	Echezona Maduekwe (Assoc Prof) (Stony Brook, NYC, USA)	Is Oro-helical length a better predictor of ideal endotracheal tube depth than the Naso-tragal length or gestational age-based table?
1105 – 1115	13	Echezona Maduekwe (Assoc Prof) (Stony Brook, NYC, USA)	The Reliability of Point-of-Care Hemoglobin in Neonates >28 weeks Gestational Age
1115 - 1200 Founders Lecture	**14 (SD)**	**Thomas Cone Lecture:** Prof. Basil Elnazir	**"**Paediatric Cystic Fibrosis: From Fundamentals to the Future**"**
1200 – 1300		LUNCH	
	Moderators Session III – Catherine Kier and Ward Rice		
1300 - 1315	15	Evelyn Obregon (Fellow) (Cincinnati CHMC, USA) **Travel Award Winner**	Twin-to-Twin Transfusion Syndrome and Neonatal AKI after SFLP
1315 – 1325	16	Duaa Othman (Registrar) (CHI Tallaght, Dublin, IRL)	Audit on the Utilisation of CT Brain Scans in Children Under 16 Years for Head Injuries at CHI, Tallaght
1325 – 1335	17	Amy Hobson (Assis Prof) (UI, Iowa City, USA)	Artificial Intelligence Can Identify High Volume Patent Ductus Arteriosus in Preterm Neonates
1335 – 1345	18	Rita Ryan (Prof) (CWRU, Cleveland, USA)	Comparative Efficacy of 300 u/kg vs. 500 u/kg Dosing of Recombinant Erythropoietin in Preterm Infants
1345 – 1355	19	Colm Travers (Assoc Prof) (UAB, Birmingham, USA)	Non-invasive Oscillometry to Quantify the Severity of Lung Disease among Preterm Infants
1355 - 1405	20	Chloe McGuire (Medical student) (UHL, Limerick, IRL)	An analysis of the investigations of children with hypoglycaemia at a regional paediatric endocrinology service: to explore their outcomes and ongoing management.
1405 - 1425		**BREAK**	
	Moderators Session IV– Eche Maduekwe and Willie O'Connor		
1425 - 15:10 Founders Lecture	**24 (JM)**	**Bill Kidney Lecture:** Prof. Lise Johnson	"Power of AMOR-Informed Care for Newborn Families**"**
1510 - 1520	25	Ruslan Petrov (Registrar) (CHI Tallaght, Dublin, IRL)	The Influence of respiratory disease in the population under the age of 2 years during the Bronchiolitis season 2021-22 in Ireland

1520 - 1530	26	Catherine Kier (Prof) (Stony Brook, NYC, USA)	Somatic Syndromes in Adolescents with Obstructive Sleep Apnea and Obesity
1530 - 1540	27	Rita Ryan (Prof) (CWRU, Cleveland, USA)	PROP Revisited: What NICU exposures contribute to BPD?
1540 - 1550	28	Rita Ryan (Prof) (CWRU, Cleveland, USA)	Can we Use Radiographic Measurements to Predict Need for Intervention in Neonatal Pneumothorax?
1550 - 1600	29	Estelle Cloete (Registrar) (CHI Tallaght, Dublin, IRL)	Resuscitation qualifications and experience in CHI NCHDs
1600		Closing Remarks and Adjourn for evening activities	
1615		Business Meeting to Follow	
1830		Dinner	

Keynote Speakers

 ***Fred Burke Lecture***	Prof Patrick McNamara is the Neonatology Division Director, Professor of Neonatology, Professor of Cardiovascular Medicine, and Vice Chair for Inpatient Acute Care of the Department of Pediatrics at the University of Iowa. Originally from Mayo, he completed his medical degree at Queen's University Belfast and went on to complete higher specialist training in neonatology through the Royal College of Physicians in Belfast and London. He obtained a Master's of Science from the University of London. He completed a neonatal cardiology and transport fellowship at the Hospital for Sick Children, Toronto, where he later helped establish a neonatal hemodynamics program. He subsequently established a landmark hemodynamics training program at the University of Iowa. Prof McNamara is a world-renowned neonatal intensivist who's clinical and research interest is in the developing heart, the use of target neonatal echocardiography and assessment of hemodynamics, precision medicine and clinical decision making in the NICU.
 ***Thomas Cone Lecture***	Prof Basil Elnazir is a Consultant in Respiratory Paediatrics with Children's Health Ireland in Dublin. He obtained his PhD from the University of Birmingham UK and completed his clinical training in the UK and Ireland. He has held many key leadership positions during his career with the Asthma Society of Ireland, Cystic Fibrosis Ireland, Make a wish Ireland and Internationally with Arab Paediatric Pulmonology association & as a cofounder of Middle East Cystic Fibrosis Association. He also served as a National Specialty Director in Paediatrics at Royal College of Physicians of Ireland. Prof Elnazir has published more than 60 manuscripts in peer-reviewed medical journals and presented extensively at national and international meetings. He has also served as an Editor and Reviewer to many Paediatric medical journals. He has a special clinical and research interest in asthma, cystic fibrosis, chronic cough and paediatric sleep medicine.
 ***Bill Kidney Lecture***	Prof Lise Johnson is an Assistant Professor of Pediatrics at Harvard Medical School, the Director of the Brazelton Institute at Boston Children's Hospital and coauthor of the Newborn Behavioural Observations (NBO) system. She received her undergraduate degree in Healthy and Society at Brown University and her medical degree at Harvard Medical School. Prof Johnson served her paediatric residency and chief residency at Massachusetts General Hospital. She devoted the first decade of her career to paediatric primary care. For the past 24 years, Prof Johnson has worked as a newborn hospitalist at Brigham and Women's Hospital, where she was medical director of Well Newborn Care from 2001 through 2018. She also chairs the board of directors for Healthy Learners, a non-governmental organization partnered with the Zambian government to implement a unique model of school-based healthcare.

Title: Validation of Breastfeeding Assessment Tool using Test Weights

Authors: Meredith Kinoshita[1,2], BMedSc, MB, BCh, BAO (Hons), Naomi Keenan[1], Karen O'Neill[1], Aoife Branagan[1], Sean Tamgumus[1], Anne Doolan[1,3]

1. Neonatal Department, The Coombe Hospital, Dublin, Ireland
2. Royal College of Surgeons, Ireland
3. University College Dublin

Background: Breastmilk is the preferred source of nutrition for premature infants to support their growth and development. The establishment of nutritive sucking typically starts around 33-34 weeks gestation marking a critical step towards oral feeding. Accurately gauging the volume of milk ingested during breastfeeding presents a challenge, particularly for preterm infants where feeding difficulties and inadequate breastmilk intake are common. The Neonatal Breastfeeding Assessment Tool (BAT) is a widely used subjective measurement tool adopted by the Baby Friendly Hospital Initiative with Unicef UK. It is used to describe and assess infant feeding behaviours, latch, sustained sucking and swallowing. Scores from the BAT are used to assess breastfeeding adequacy in healthcare settings, however this tool remains unvalidated in preterm infants. Our unit has recently added to the evidence of the utility of test weights in preterm infants in line with previous validation studies. Test weights involve precisely measuring the infant's weight immediately before and after breastfeeding providing an objective metric of milk transfer. This study seeks to validate the BAT in comparison to test weights, in order to support reliable clinical breastfeeding assessment in this vulnerable population.

Methods: A prospective cohort study was performed in a single tertiary neonatal unit. Local research ethics committee approval was obtained prior to commencement. Mothers of preterm infants (born < 35 weeks gestation) deemed eligible for oral feeding and who wished to breastfeed were approached for consent. A test weight was obtained before and after breastfeeding using a validated protocol. The infant's post-breastfeed nasogastric feed requirement was calculated and then broadly categorised by percentage of total requirement (0-32%, 33-66%, and 67-100%) based on test weight intake. The test weight was blinded to all but the researcher. The Breastfeeding Assessment Tool (BAT) was used by the nurse caring for the infant to determine whether the infant received full (scores A,B,C), half (scores D,E) or no top-up (score F) in line with current practice. Data were pseudo-anonymised in Excel and analysed using SPSS v23.0.

Results: 30 infants were included with 54 paired BAT and test weights performed. The mean birth gestational age was 31+0 weeks (range 24-34 weeks). The mean birth weight was 1527g (605-2560g). BAT scoring and test weights showed poor agreement. 46.2% (25/54) test weights determined the infant had an inappropriate top-up using the BAT. Of those who received an inappropriate top-up, 88% (22/25) received a top-up suboptimal for their requirements.

Conclusion: While the BAT is widely used for evaluating breastfeeding performance, it is subjective and this study demonstrates that almost 1 in 2 infants receive inappropriate top-ups based on the BAT tool alone. The vast majority received a top-up less than their overall requirement which may impact infant growth and may extend length of stay. A more effective breastfeeding assessment tool is needed for preterm infants to ensure optimal intake while fostering emerging oral feeding skills.

Title: Is Ambulatory Care a Feasible Care Option for Children with Type 1 Diabetes in Ireland?

Authors: Lucy Angela Dockery[1,2] BSc BMBS, Alison McCaffrey[1], Orla Neylon[1], Clodagh S O Gorman[1,2]

[1]University Hospital Limerick Paediatric Department, [2]University of Limerick

Background: In Ireland, the majority of children are admitted to the hospital for education at the time of a Type 1 Diabetes (T1D) diagnosis, regardless of diabetic ketoacidosis (DKA) status. ISPAD suggests ambulatory management is feasible for metabolically stable patients from diagnosis if adequate resources are available.

Objectives: This study assesses the feasibility of such care in the University of Limerick Paediatric Department by analysing care over the past 8 years. The objectives were

1. to explore how many children might have been spared a prolonged inpatient stay
2. to estimate the bed-days and costs of the admissions that might have been prevented if ambulatory care for paediatric diabetes education was available at UHL during this time period.

Methods: This study assesses the feasibility of such management in the University of Limerick (UHL) Paediatric Department by quantifying the care and education provided to children and families following a T1D diagnosis over the past 8 years. Children aged between 0 and 15.99 years at time of diagnosis were included.

Estimated bed days savings were estimated from retrospective data using the following criteria: days of stay during which the child had metabolic stability; no clear social or family reasons why inpatient education was required; and distance from hospital. Data was collected retrospectively from UHL clinic charts, including data pertaining to admission length, complications, intensive care unit (ICU) or paediatric high dependency unit (PHDU) admission, patient address (town only), age at diagnosis, family history of T1D, and any social concerns flagged on admission.

Data was collected using Microsoft Excel and analysed using Excel, Minitab and OpenStax.

Results: Assuming one-night initial admission for those metabolically stable at diagnosis and three nights for those in DKA (without PHDU/ICU admission), a total of 535 bed days would have been saved across the study period, averaging 67 bed days annually. 84% of children were found to eligible for ambulatory care during study period.

Conclusion: In an era of hospital overcrowding and in the effort to provide family-centred care, exploration of ambulatory care model feasibility is increasingly important. This study demonstrates that ambulatory care is a feasible option for UHL paediatric department and would result in a considerable saving of bed-days, and cutting admission costs with no projected impact on diabetes care.

Title: Community of Practice in Our Cystic Fibrosis Center: Patient and Family Partners Taking the Lead (Quality Improvement)

Authors: Catherine Kier, M.D.Teresa Stables-Carney, N.P.; Barbara Leyva, R.N., Sandra Corr; Christopher Firek; Barry Diener, M.D.; Aleksey Tentler, M.D.; Karissa Weidman, M.D. Maureen Hoelzer, P.A.; Mathew Ednick, M.D.; Vicki Masson, M.D. and the Stony Brook CF Care Center Team.

Division of Pediatric Pulmonary, Stony Brook Children's Hospital, Renaissance School of Medicine at Stony Brook University, Stony Brook, NY 11794, United States.

Background: The Cystic Fibrosis Learning Network (CFLN) of the CF Foundation supports the CF Care Team members as well as Patient and Family Partners (PFPs) to succeed with their quality improvement (QI) work by providing a system for data-driven collaborative learning. Our PFPs got out of their comfort zone and took the lead in our Community of Practice (COP) project focusing on co-production of care.

Pre-visit planning (PVP) improves workflow and patient care and strengthens team and patient satisfaction. The PFPs together with the CF team members developed a standardized PVP form. The form asked for CF patients to list their concerns during their CF outpatient visit, and asked the patients whom, among the team members, they would like to meet during the visit.

Our PVP form is a "bold yellow" sturdy paper, serving as "baton" to pass between team members. It is both a communication tool between team members and patients, as well as a workflow tool between CF team members. We aim to increase the number of patients filling a PVP form from 0% to 80% during CF outpatient visits by 6 months in our CF population. By doing so, we will have a method of communicating among the team and with patients, we will address patients' concerns, and we will engage our PFPs as confident leaders in our QI work, strengthening co-production of care.

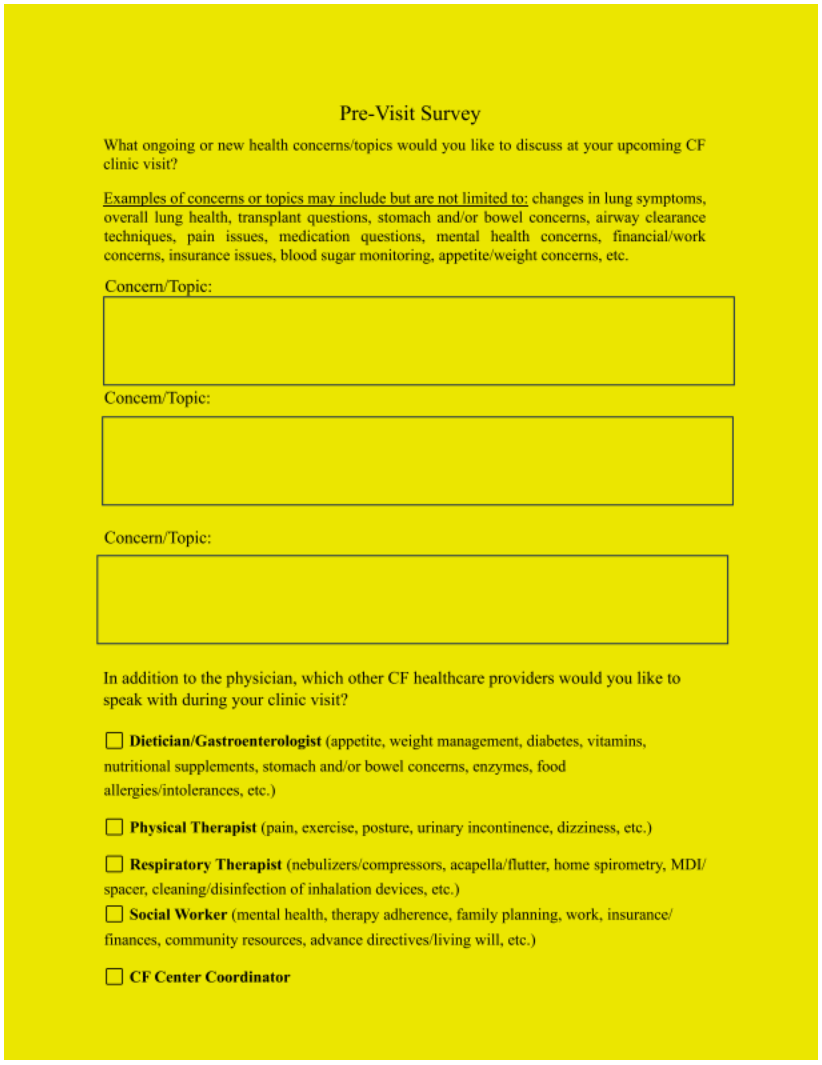
Methods: From September 2022, the PVP form was given at the start of the CF outpatient visit to every CF patient. During the initial intake, the CF nurse assisted the CF patient to fill up the form. A Plan Do Study Act (PDSA) was done when we found that 25% of our patients wrote "no concerns" on the form. The PDSA involved a "team and patient communication" to confirm that our patients truly do not have any concerns or issues they would like to discuss during their visit.

Results: By March 2023 (6 months), we met our aim and had 94% (118/126) of the PVP form filled. Over the 24-month period (from September 2022 to September 2024), 96% (428/445) completed a PVP form or "baton". We identified 37% (169/445) who had initially "no concerns" and 58% (260/445) who had "concerns". After our PDSA, there was 16% (72/445) who had additional "concerns" and 22% (102/445) who truly remained with "no concerns". The "team and patient communication" helped our patients disclose and identify any concerns that were not initially written on the form.

Conclusions:
We are sharing the new idea of the PVP form as a "baton" that served as a communication tool and a workflow tool between the CF team members and our CF patients. The form aided in identifying patients' "concerns". A follow through "team and patient communication" is strongly recommended even if the patient initially identified "no concerns" on the PVP form. Our CF Center highlighted that PFPs would be strong leaders in QI efforts, as they gained experience in QI work learned through partnerships in CF care and co-production.

Grant: CF Learning Network, CF Foundation: KIER23QIO-CFLN

Figure 1. Pre-visit planning form serving as “baton”



Pre-Visit Survey

What ongoing or new health concerns/topics would you like to discuss at your upcoming CF clinic visit?

Examples of concerns or topics may include but are not limited to: changes in lung symptoms, overall lung health, transplant questions, stomach and/or bowel concerns, airway clearance techniques, pain issues, medication questions, mental health concerns, financial/work concerns, insurance issues, blood sugar monitoring, appetite/weight concerns, etc.

Concern/Topic:

Concern/Topic:

Concern/Topic:

In addition to the physician, which other CF healthcare providers would you like to speak with during your clinic visit?

☐ **Dietician/Gastroenterologist** (appetite, weight management, diabetes, vitamins, nutritional supplements, stomach and/or bowel concerns, enzymes, food allergies/intolerances, etc.)

☐ **Physical Therapist** (pain, exercise, posture, urinary incontinence, dizziness, etc.)

☐ **Respiratory Therapist** (nebulizers/compressors, acapella/flutter, home spirometry, MDI/spacer, cleaning/disinfection of inhalation devices, etc.)

☐ **Social Worker** (mental health, therapy adherence, family planning, work, insurance/finances, community resources, advance directives/living will, etc.)

☐ **CF Center Coordinator**

In the new model of CF care, the CF team usually includes a core team of a physician, dedicated CF nurse, dietitian, respiratory therapist, social worker, but could be a larger team, and may include other members such as the mental health coordinator, psychologist, pharmacist, and potentially other specialists depending on individual needs for a comprehensive collaborative CF care.

Title: Azithromycin as an Immunomodulator in Neonatal Encephalopathy

Authors: Aoife Branagan MSc[1-3], Rachel Mullay[4], Sean Tamgumus[4], Johana Isaza-Correa[1,2], Lynne Kelly[1,2], Martin White[1], Jan Miletin[1], Eleanor J Molloy[1-3,5]

1. Discipline of Paediatrics, Trinity College, The University of Dublin, Dublin, Ireland
2. Trinity Translational Medicine Institute & Trinity Research in Childhood Centre (TRiCC), Trinity College Dublin
3. Paediatrics, Coombe Women and Infants University Hospital, Dublin, Ireland
4. Paediatrics, Rotunda Hospital, Dublin
5. Neonatology and Paediatrics, Children's Health Ireland

Introduction: Neonatal Encephalopathy (NE) ranks as a leading cause of death and neuro-disability globally, with the major burden occurring in low-resource settings, where the routine treatment employed in high-resource settings, therapeutic hypothermia (TH), has not been shown to have a benefit. Azithromycin, a macrolide antibiotic with several mechanisms of immunomodulation distinct from its antibacterial properties, has been proposed as a potential immunomodulator that may improve outcomes in NE and could be beneficial as an adjuvant therapy to TH or as a monotherapy.

Methods: Twenty-six infants were recruited in this prospective cohort study – 19 infants with NE and 7 neonatal controls. Whole blood was sampled on day 1 (N=9), day 3 (N=14) and day 7 (N=6) in infants with NE and once in the first week of life in infants with NE who remained normothermic (n=3) and healthy neonatal controls (n=7). Multiplex ELISA was used to measure 14 pro- and anti-inflammatory cytokines and flow cytometry was used to measure innate immune function - cluster of differentiation (CD) 11b and toll-like receptor 4 (TLR4) expression on neutrophils and monocytes

Results: Azithromycin caused alterations in both infants with NE and healthy neonatal controls. In infants with NE on day 1 there was a decreased LPS-response for GM-CSF, IFN-γ, TNF-B and IL-2 after azithromycin. On day 3, azithromycin caused a decreased response to LPS in some indices (IL-1α, neutrophil TLR4 and intermediate monocyte CD11b) with an increased response in others (EPO, GM-CSF, and IL-2). On day 7, azithromycin decreased response to LPS stimulation in GM-CSF and intermediate monocyte CD11b. The normothermic NE group showed a decreased response to LPS in IL-1α and IL-1RA after azithromycin. The neonatal control group also had a decreased response to LPS stimulation with azithromycin (GM-CSF, IL-2, IL-6, IL-8, IL-10, IFN-γ, and IL-1α) with increased levels of both IL-1βand TNF-β after azithromycin treatment, but also a decreased LPS response in these indices.

Conclusion: Azithromycin showed evidence of immunomodulation modulating immune dysregulation in infants with NE who were, and were not, treated with TH and in healthy neonatal control. Further evaluation is needed to assess its potential prior to clinical trials in infants with NE.

Title: Exploring the impact of insulin pump therapy on body mass index and glycaemic control in children with type 1 diabetes

Authors: Harish Chaudhary[1], Shamaaz Saeed[1], Aoife Carroll[1]

University Hospital Waterford, Waterford Ireland

Objectives: This retrospective study aimed to evaluate changes in body mass index (BMI) and haemoglobin A1c (HbA1c) levels among children and adolescents with type 1 diabetes mellitus (T1DM) transitioning from multiple daily injections (MDI) to insulin pump therapy over one year.

Methods: Data were collected from chart reviews of 33 T1DM patients. BMI z-scores were calculated using WHO charts, and HbA1c levels were recorded at pump initiation, 6 months, and 1 year thereafter.

Results: At pump initiation, mean HbA1c was 7.81% (95% CI: 7.49-8.12), improving to 7.41% (95% CI: 7.13-7.68) at 6 months (p=0.0068) and 7.42% (95% CI: 7.12-7.72) at 1 year (p=0.009). The initial BMI z-score was 0.65 (95% CI: 0.24-1.06), with a trend toward weight gain at 6 months (0.76, 95% CI: 0.45-1.26, p=0.097) but no significant change at 12 months (0.73, 95% CI: 0.34-1.12, p=0.377).

Conclusion: Insulin pump therapy significantly improved glycaemic control within 6 months and maintained it at 1 year, though BMI z-scores showed no significant change.

Title: Evaluating medical students' knowledge, skills and attitude on managing childhood obesity: a pilot study

Authors: Nese Gadzama[1], MD, Grace O'Malley[2], PhD, MSc, PgDip, BSc, Clodagh O'Gorman[1], MB BCh BAO, MSc (Ocf.), MHS, MD, FFPAEDS, FRCPI, FRCPCH

1. University of Limerick, School of Medicine, Limerick, Ireland.

2. RCSI University of Medicine and Health Sciences, School of Physiotherapy, Dublin, Ireland.

Background: The prevalence of childhood obesity (CO) has risen in the last few decades, necessitating improved undergraduate medical education on CO. This study aimed to explore the impact of an educational intervention on the knowledge, skills and attitudes of medical students regarding CO.

Methods: This observational pre-post study evaluated a blended educational intervention on CO, for final year medical students at the University of Limerick, Ireland (UL, SOM). The intervention included an online course, recorded lecture and case-based discussion (CBDs) on CO.

The online course and recorded lecture were informed by clinical guidelines and addressed key aspects of CO management. The CBDs facilitated discussion regarding history taking, physical examination, investigation and management of CO. Self-assessment questionnaires using Likert scales measured students' perceived knowledge, skills, and attitudes before and after the intervention.

Results: We present pilot results for 29 students who attended the CBD session, with pre- and post-intervention questionnaires completed by 24 (83%) and 20 (69%) students, respectively. Post intervention, self-reported confidence improved significantly in prescribing a management plan (21% to 100%) and treating CO (13% to 95%). There was also a slight increase in disagreement with the notion that obesity is caused by poor parental and personal choices (21% to 40%). The percentage of students interested in counselling children and their parent/carer about healthy growth and development remained unchanged at 75%.

Students self-reported knowledge of the etiologies of CO increased, where at baseline 62% reported no or little knowledge vs 90% reported moderate to extreme knowledge post-CBD. Self-reported skills on correctly plotting anthropometric measurements (62% to 95%) and interpreting blood pressure measurements in a child (29% to 55%) increased. Knowledge of physical activity and nutrition recommendations in childhood increased (8% to 80% and 25% to 75% respectively), alongside referral pathways (38% to 85%).

While both the self-reported knowledge of appropriate language to discuss CO and confidence in prescribing a management plan increased (75% to 95% and 21% to 100% respectively), there was an unexpected increase in the percentage of students who reported feeling uncomfortable discussing CO with children or their parent/carer (63% to 90%).

Conclusion: Our preliminary results suggest that the educational intervention enhanced final year medical students' self-perceived knowledge, skills and attitudes regarding CO at the end of their Paediatric rotation. Although no statistically significant differences were observed, this remains to be proven.

Title: Respiratory Morbidity in Extremely Preterm Infants Randomized to Receive either Early or Delayed Human Milk Fortification: A Secondary Analysis

Authors: Tucker, Marley[1]; Gunawan, Emily[1]; Jeffcoat, Seabrook Hannah[1]; Salas, Ariel[1]

1. University of Alabama at Birmingham, Birmingham, AL, United States.

Background: Observational data suggest that providing higher energy intake to critically ill infants during the first week after birth is associated with a lower risk of bronchopulmonary dysplasia (BPD). This secondary analysis of a masked randomized clinical trial aims to determine whether infants randomized to receive higher energy intake through early human milk fortification have a lower risk of BPD at 36 weeks of postmenstrual age (PMA).

Methods: This is a post-hoc, secondary analysis of the IMPACT trial (NCT04325308) in which infants born at 28 weeks of gestation or less were randomized to receive fortified human milk at either postnatal day 3 or postnatal day 14. Daily fluctuations in weight, fluid intake, and serum sodium values were assessed using unadjusted repeated measures mixed models. Weight measurements were converted into z-scores using the INTERGROWTH-21st growth curves. A human milk sample was collected between postnatal day 7 and 10 and analyzed for macronutrient analysis to determine differences in energy and protein intake between groups. The BPD Jensen criteria were used to define respiratory morbidity at 36 weeks PMA.

Results: Respiratory outcomes of 150 extremely preterm infants were analyzed (median gestational age: 26 weeks; mean birthweight: 750 g). Total fluid intake and enteral fluid intake did not differ between groups, but cumulative weight loss expressed in percentages (Fig 1A) and declines in weight-for-age z scores (Fig 1B) was more excessive in the delayed fortification group. The macronutrient analysis of 101 human milk samples revealed that early human milk fortification resulted in higher energy intake (median difference: +10kcal/100 ml; 95% CI: 3 to 15 kcal/100 ml; p=0.0001) and higher true protein intake (median difference: +0.4g/100 ml; 95% CI: 0.1 to 0.7g/100 ml; p=0.002), but not higher Protein/Energy ratios (median difference: +0.3g/100 kcal; 95% CI: -0.1 to 0.7 g/100 kcal; p=0.19), The severity of respiratory morbidity at 36 weeks PMA differed between groups (Figure 2). Although the proportions of infants without BPD at 36 weeks PMA and those with severe BPD were similar between groups, mild BPD was more prevalent in the early fortification group, while moderate BPD was more common in the delayed fortification group (p=0.038).

Conclusions: Early human milk fortification, through the provision of higher energy intake during the first two weeks after birth, may be associated with a lower severity of respiratory morbidity in critically ill infants born extremely preterm.

Figure 1. Longitudinal variation in the percentage of weight loss **(A)** and declines in weight-for-age z scores **(B)** in infants born extremely preterm.

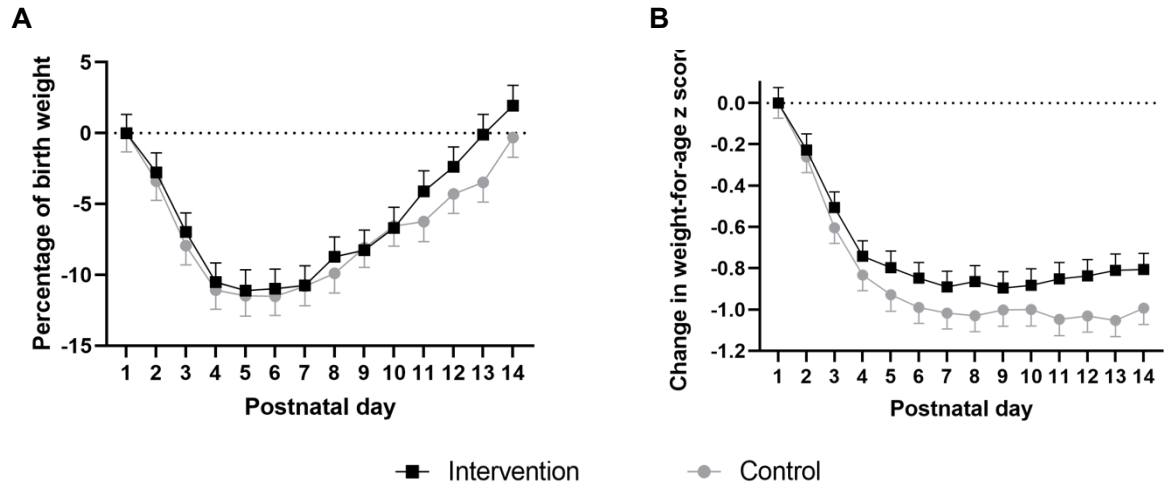
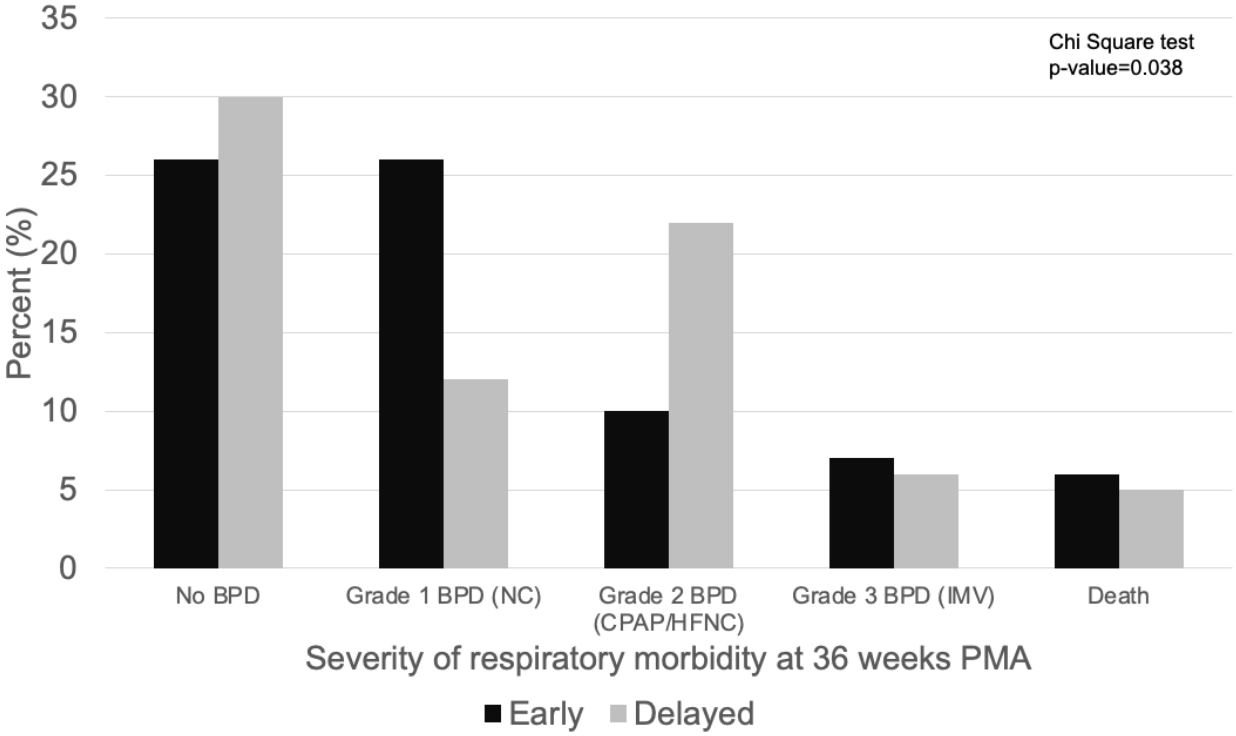


Figure 2. Respiratory morbidity at 36 weeks PMA in infants randomized to receive either early or delayed human milk fortification.



Title: Paediatric Emergency Care for Autistic Children: Challenges and Opportunities for Improvement

Authors: Amel Osman[1], Sheena Durnin[1,2], Elena Rubios[3,4]

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Background: Autistic children face unique challenges in acute emergency presentations, and previous literature has shown that longer wait times, heightened distress, and communication barriers can be encountered. Addressing these challenges is crucial to enhance their experience and outcomes in emergency care. This audit aimed to detail the experience of autistic children in acute emergency presentations to Children's Health Ireland (CHI), with a focus on any difficulties encountered.

Methods: A retrospective notes review was conducted on autistic children <16 years of age who presented to Emergency Care at CHI at Tallaght from May 1st–July 31st 2024. Data was collected from the electronic record system (Symphony) and included presenting complaints, diagnoses, interventions, outcomes, waiting times, and documented difficulties.

Results: During the study, 122 autistic children registered. Presenting complaints are detailed in Table 1 with a median ED stay of 4.2 hours compared to 3.1 hours for all patients during the study period. Those presenting with psychosocial issues had longer ED stays, averaging 8.6 hours. Notably, 13% of patients had no observations recorded (n=16), and a further 2% of patients had difficulties performing observations documented in their notes (n=2). Additionally, 13% of patients faced challenges during interventions like examinations and blood tests (n=16). Table 2 details the diagnosis. Regarding discharge location, 11% of patients were admitted (n=13), 11% were referred to orthopaedic clinics (n=14), 69% were discharged home (n=84), 6% required GP follow-up (n=7) and 3% were referred to other outpatient departments (n=4).

Conclusion: This audit reveals challenges for autistic children in emergency medicine, particularly extended stays and challenges in performing observations and interventions. While their presenting complaints align with general paediatric trends, the unique difficulties faced by these children highlight the need for tailored strategies. Recommendations include specialised staff training, improved communication tools, and autism-friendly environments to enhance care and reduce distress.

Table 1: Presenting complaint at registration (n=122)

Presenting complaint	**Number of patients (%)**
Injury	28 (23.0%)
Unwell child	19 (15.6%)
Vomiting with or without diarrhoea	14 (11.5%)
Airway or breathing difficulties	14 (11.5%)
Head injury or headache	12 (9.8%)
Abdominal pain	11 (9.0%)
Psychosocial problem	7 (5.7%)
Ear, nose or eye complaint	7 (5.7%)
Seizure	2 (1.6%)
Other	8 (6.6%)

Table 2: Diagnosis at discharge from the Emergency Care Unit (n=122)

Discharge diagnosis	**Number of patients (%)**
Injury / Injuries	36 (29.5%)
Respiratory infection	29 (23.8%)
Gastroenteritis	20 (16.4%)
Anxiety or suicidal ideation	10 (8.2%)
UTI, vulvovaginitis or balanitis	7 (5.7%)
Tonsillitis	5 (4.1%)
Constipation	3 (2.5%)
Other	12 (9.8%)

Title: Oh Baby! It's Cold Outside: Re-examining Newborn Hypothermia.
The Risks and Prevention: Evaluating Thermoregulatory Practices.

Authors: Barbara Leyva RNC-MNN MSc[1], Lisa M. Clark DNP,[1] Susan Katz DNP[1], Candice Foy MD[1]

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Introduction: Keeping newborns warm can be challenging with current guidelines of family center care and mother-baby rooming-in. According to the WHO, newborn hypothermia (NH) is defined as temperatures < 36.5 °C mild ≤36.0 moderate and < 36.0C as severe. There can be significant negative effects NH on metabolic demand, hypoglycemia, increased risk of respiratory distress, metabolic acidosis, and noted increased mortality in the newborn. (1) Creating a NTE environment allows an infant to maintain a normal body temperature which is essential in prevention of NH.

Objective: Establishment of baseline data to identify the incidence of newborn hypothermia episodes occurring within the first 24 hours following birth and additional interventions.

Methods: A multidisciplinary team conducted a retrospective review of newborns born from 1/1/24-2/28/24 at a university-affiliated children's hospital as part of an ongoing QI/QA improvement project on NH. Data collected identified newborns with a skin temperature below 36.5C and gestational age ≥36 admitted directly to the mother-baby-unit. Additional data collected included timing of low temperature event, type of delivery, GA and classification (LGA, AGA, SGA). Data analysis for hypothermia was classified hypothermia by severity and timing.

Results: The incidence of NH events occurred 8% (41/504) of all newborn admissions over 2 months. Of the newborns who experienced NH, 59% (24) occurred less than 6 hours of age with half having a body temperature <36C and noted 4/41 infants required to be transferred to NICU. The delivery type of newborns experiencing NH identified 31% (13) C/S with 68% (28) NSVD. Newborn care in the post-delivery setting identified 40% (17/41) of newborns with a NH did not receive therapeutic practices such as providing skin to skin.

Conclusion: Once NH was identified, the rewarming practice guidelines were to be initiated which includes for the newborn to placed skin to skin. Many of the infants required additional rewarming on Radiant warmer over 2 hours increasing maternal separation time. The staff education completed in 2023 on NH and the evaluation of the data identifies the need for further education and interventions to reduce NH.

To reduce NH identified next steps intervention to include:

1. Re-education of RNs on proper skin to skin technique -> with extra attention on drying off mom/baby Skin to skin positioning and proper dressing by adding an infant shirt / warm blankets.
2. Including Family education about hypothermia beginning in LD and what they can do to keep infant warm.
3. Monitoring MBU Rooms and L&D rooms temperatures to be set at 74 degrees.
4. Reinstituting rectal temps at 2 hours of age on admission due to wide variability axillary to rectal with hypothermia in newborn.

Limitations: Many maternal and newborn factors influence NH. Due to the small sample size additional factors and practices, may not have been identified thus limiting generalizability. More research is needed with new interventions and ongoing review.

Title: Accelerated Resolution Therapy to Treat Children and Adolescents with Psychiatric Symptoms

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Background: There is empirical evidence for use of Accelerated Resolution Therapy (ART) in adult populations for treating post-traumatic stress disorder and anecdotal evidence for relieving symptoms of various psychiatric conditions. However, research on ART in youth is limited.

Objective: Our study aimed to evaluate the effectiveness of ART with various psychiatric profile of youth who received ART and identify potential barriers to ART.

Methods: We performed a retrospective medical chart review on child and adolescent psychiatric outpatients seen at Royal University Hospital (2017-2021). Ninety-five ART patients and 95 non-ART patients were matched on primary diagnosis from the electronic medical record (EMR). Data was analyzed using descriptive analysis, independent t-test and chi square tests for group comparisons.

Results: The ART population was significantly older (mean age=17.7±2.9 years vs. 15.3±3.1 years) and included more female (85% vs. 64%) than the non-ART group. The most common reasons for ART were sexual assault (22%) and anxiety (21%) in females, and household dysfunction (23%) and anxiety (15%) in males. ART was effective in 75% of patients. Barriers to receiving ART were reported in 22% and these were largely those who did not find ART effective and were identified as having poor engagement. Only 31% of patients completed rating scales prior to ART.

Conclusion: ART is highly effective in treating psychiatric symptoms in youth as assessed by ARTometer and physician clinical observation. There is a need to apply standardized scales to measure pre- and post-psychiatric symptom burden in those who receive ART. Future prospective studies examining ART for treatment of PTSD in youth are recommended and will be a focus for our research moving forward.

Key words: ART, Accelerated Resolution Therapy, youth, child and adolescent population, psychiatric

Title: Is Oro-helical length a better predictor of ideal endotracheal tube depth than the Naso-tragal length or gestational age-based table?

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Background: Endotracheal tube (ETT) malposition is a prevalent issue in neonates that can result in serious complications. To minimize risks, the Neonatal Resuscitation Program (NRP) suggests two methods for determining ETT depth: the nasal-to-tragus length (NTL) formula and a gestational age-based (GA) table. While there are variances in ETT depth predictions among different populations, some studies indicate no significant difference between the GA table and the 7-8-9 rule commonly used. Furthermore, the Oro-helical length (OHL), measuring from the mouth's angle to the ear tragus, may provide a more accurate depth prediction for infants weighing ≤1500g. The study aims to compare ETT insertion depths predicted by OHL, NTL, and GA methods with the ideal position, hypothesizing that OHL will be the most accurate for this weight group.

Objectives: To evaluate which method - OHL, NTL, or GA table—best predicts the ideal depth for an endotracheal tube (ETT) in neonates weighing ≤1500g.

Methods: This observational study focused on neonates with a birth weight of ≤1500g admitted to the neonatal intensive care unit, approved by the Stony Brook IRB. It aimed to compare three methods for estimating the ideal endotracheal tube (ETT) depth—NTL, GA table, and OHL—using post-intubation chest X-rays (CXRs). ETT malposition was defined as any measurement exceeding 0.5 cm above the T1 vertebra or below the T2 vertebra. Our hypothesis postulated that the discrepancy between OHL and ideal ETT depth would be 0.5 cm less than that of the NTL or GA table. A sample size of 50 neonates was determined to provide over 99% power to detect differences among the methods. Statistical analyses were conducted using SAS version 9.4, with a significance level set at <0.05.

Results: Sixty-seven intubated neonates were assessed for eligibility, and 50 were enrolled in the study. The mean gestational age of the participants was 27.6 ± 2.4 weeks, with a mean birth weight of 960 ± 250g. Most neonates (74%) were considered appropriate for their gestational age, and there was an equal male-to-female ratio of 1:1. All methods used to predict the depth of the ETT - specifically the NTL, GA table, and OHL - demonstrated a linear relationship with gestational age and weight. However, OHL showed the highest coefficient of determination (R^2), indicating that it is the most reliable method for ETT depth determination. The coefficients of determination (R^2) were as follows: 0.52 for NTL, 0.55 for the GA table, and 0.61 for OHL concerning gestational age; and 0.52 for NTL, 0.59 for the GA table, and 0.62 for OHL regarding weight. Notably, the slopes obtained from the NTL method significantly differed from those of the ideal ETT depth on the chest X-ray measurements ($p < 0.0001$).

Conclusion: Our study indicates that, compared to the NTL and GA methods, the OHL method aligns more closely with the ideal ETT depth as observed on chest X-rays (CXR), particularly in smaller neonates weighing ≤1500g.

Title: The Reliability of Point-of-Care Hemoglobin in Neonates >28 weeks Gestational Age

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Background: Point-of-care (POC) testing for blood gas analysis is commonly used for neonates in the Neonatal Intensive Care Unit (NICU) and provides quick hemoglobin values with more minor blood volume requirements, reducing the risk of blood loss and enabling faster treatment. However, many clinicians remain skeptical about these results, especially for neonates born at gestational ages >28 weeks without in-situ umbilical catheters. They often seek clarification on the reliability of POC hemoglobin values compared to those from central laboratories, but limited information is available on this topic.

Objective: To assess the agreement between point-of-care testing and laboratory measurement of hemoglobin concentration in infants born at gestational ages >28 weeks.

Design/Methods: This prospective observational cohort study analyzed 187 paired blood samples from infants born after 28 weeks of gestation admitted to the neonatal care unit. It compared hemoglobin measurements from laboratory tests with the blood gas analyzer. The Laboratory analyzer (Sysmex XN-9100®) needs a minimum of 500µl of blood, and the blood gas analyzer (ABL90 Flex Radiometer®) needs 65µl per sample. A Bland-Altman plot was used for statistical analysis to assess agreement and identify systematic differences. Using a non-inferiority test, a sample size of 187 was required to detect the significance with 80% if the paired difference was greater than 2g/dL. The SUNY Stony Brook Institutional Review Board approved the study without requiring informed consent.

Results: Out of 197 eligible patients, 187 were enrolled in the study. Among the participants, 94 were female, making up 50.3% of the total, with a mean gestational age of 36.6 weeks (± 3.2). Most samples were arterial (60.4%), while venous samples accounted for 5.4%, and capillary samples represented 34.2%. Most of the subjects were Caucasian (65.3%). The most common mode of delivery was cesarean section, occurring in 62.6% of cases. When comparing the mean hemoglobin concentration obtained in the lab (16.66 g/dL) to that from point-of-care testing (16.73 g/dL), no statistically significant difference was found (p-value = 0.38). The Bland-Altman plot indicated a mean difference of -0.08, with limits of agreement ranging from -2.39 to 2.24.

Conclusions: The hemoglobin readings obtained from point-of-care testing in the Stony Brook Children's Hospital neonatal intensive care unit strongly correlate with laboratory results for infants born after 28 weeks of gestation, even when using smaller sample volumes. While this method does not substitute for a complete blood count, it may be a valuable supplement for monitoring hemoglobin levels in neonatal care.

Title: Twin-to-Twin Transfusion Syndrome and Neonatal AKI after SFLP

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Background: Twin-twin transfusion syndrome (TTTS) is caused by unbalanced shunting of blood between monochorionic twins. The recipient twin becomes hypervolemic and polyuric, while the donor twin becomes hypotensive, hypovolemic, and oliguric. The donor is considered at highest risk for kidney impairment. However, evidence suggests the recipient may also develop acute kidney injury (AKI). Antenatal treatment of severe TTTS with Selective Fetoscopic Laser Photocoagulation (SFLP) to eliminate placental shunting may improve hemodynamics and alter the risk of developing kidney injury.

Objective: To characterize AKI following birth in infants with TTTS.

Methods: We included mother-infant dyads with TTTS from 2010-2023. We excluded infants without neonatal intensive care unit stay, demise within 48h of birth, kidney or cardiac anomalies. We defined AKI by Neonatal Modified KDIGO serum creatinine (SCr) and/or urine output (UOP) definitions and severe AKI as $\geq$ stage 2. We excluded UOP in the first 24h of life, mixed urine/stool was counted as urine. Primary outcome was AKI incidence before 14 days. Secondary outcomes were AKI duration and severity. We compared infants with and without AKI using Fisher's exact and Mann-Whitney U test.

Results: We reviewed 46 mother-infant dyads, of which 77 infants met inclusion criteria (Fig.1). Eleven infants (15%) had AKI, primarily defined by SCr. median AKI duration was 10 (IQR 1-12) days, with 9.1% of infants meeting criteria for severe AKI. Infants with AKI were associated with higher Quintero staging and later diagnosis of TTTS (23 vs 20 weeks, p=0.02), pre-SFLP oligohydramnios (DVP 1 vs 8.15 cm, p =0.04), lack of definitive treatment (AR only), and shorter latency to delivery after SFLP (2 vs 9 weeks, p<0.01). They also had younger gestational age (GA) (26 vs 30 weeks, p<0.01), lower birthweight (BW) (748 vs 1378.5 grams, p<0.01) and received more doses of nephrotoxic medications (3 vs 1, p<0.01) (Table 1). There was no difference in the incidence of AKI between donor and recipients (63.64% vs 36.35%, *p=0.160*) even after adjusting for GA and BW (OR 0.15, 95% CI: 0.18-1.32).

Conclusion: This study shows that infants with TTTS after SFLP were more likely to have AKI after higher stages of TTTS at diagnosis, when delivered preterm, and growth restricted. However, since incidence of AKI was similar among donor and recipients, attention should be paid to both twins especially when considering nephrotoxin medication use. Efforts to implement kidney protective measures are warranted, as is long-term follow up after AKI with the risk of chronic kidney disease in this high-risk group.

Table 1. Characteristics of infants with AKI vs non-AKI

	Non-AKI n= 66	**AKI** n= 11	***p***
Maternal Variables			
Maternal Age (years), median (IQR)	31 (28-34)	29 (25-33)	0.40
Sex of Twins, n (%)			

Female	36 (55)	7 (64)	0.57
Male	30 (45)	4 (36)	
Maternal Nephrotoxic Medication Exposure, n (%)	50 (76)	6 (55)	0.14
Receipt of Antenatal steroids, n (%)	63 (97)	11 (100)	0.55
Rescue Steroids, n (%)	26 (40)	5 (45)	0.74
Premature Rupture of Membranes (ROM), n (%)	37 (56)	5 (45)	0.51
GA at ROM (weeks), median (IQR)	28 (25-31)	25 (25-25)	0.04
Chorioamnionitis, n (%)	12 (18)	1 (9)	0.45
Cesarean Delivery, n (%)	56 (85)	9 (82)	0.79
Prenatal Characteristics			
Selective FGR, n (%)	19 (13)	7 (64)	0.03
Abnormal Initial Umbilical Artery (UA) doppler, n (%)	16 (24)	3 (27)	0.82
Normal UA doppler after SFLP, n (%)	48 (73)	8 (73)	0.92
Abnormal UA doppler before delivery, n (%)	10 (15)	2 (18)	0.81
Deep Vertical Pocket (DVP) before SFLP (cm), median (IQR)	*8.15 (1.5-11.4)*	*1 (0-9.8)*	*0.04*
DVP after SFLP (cm), median (IQR)	5.31 (3.4-7.2)	3.1 (0.66-6.15)	0.10
DVP before delivery (cm) median (IQR)	4.2 (3.12-5.8)	4.7 (3.2-8.7)	0.56
Cardiac dysfunction at diagnosis, n (%)	6 (9)	0	0.24
Cardiac dysfunction after SFLP, n (%)	6 (9)	2 (18)	0.35
Latency to delivery (weeks), median (IQR)	*9 (4-12)*	*2 (1-5)*	*< 0.01*
SFLP Characteristics			
Complete (SFLP + Amnioreduction), n (%)	63 (96)	8 (73)	0.03
Incomplete (Amnioreduction only), n (%)	3 (5)	3 (27)	
GA at TTTS diagnosis (weeks), median (IQR)	*20 (18-23)*	*23 (19-26)*	*0.02*
GA at SFLP (weeks), median (IQR)	*21 (18-23)*	*24 (21-26)*	*0.01*
Quintero Stage at SFLP, n (%)			
I	10 (15)	-	0.01
II	19 (29)	1 (9)	
III	36 (54)	9 (82)	
IV	1 (2)	1 (9)	
Net amount of fluid removed (ml), median (IQR)	1770 (980-2360)	2400 (1330-3557)	0.11
Placental Share (%) median (IQR)	50 (40-70)	45 (40-75)	0.96
Total Number of vessels, median (IQR)	19 (13-26)	14.5 (13-16)	0.12
Infant Variables			
Gestational Age (weeks), median (IQR)	*30 (27-32)*	*26 (25-29)*	*< 0.01*
Birth Weight (grams), median (IQR)	*1378.5 (953-1740)*	*748 (595-1178)*	*<0.01*
Recipient Twin, n (%)	39 (59)	4 (36)	0.16
Donor Twin, n (%)	27 (41)	7 (64)	
Fetal distress at Delivery, n (%)	23 (35)	6 (55)	0.31
Comorbidities			
Respiratory distress, n (%)	44 (67)	11 (100)	0.02
Mechanical Ventilation (days), median (IQR)	*0 (0-3)*	*14 (1-22)*	*<0.01*
Sepsis, n (%)	10 (15)	2 (18)	0.67
Hypotension first week of life, n (%)	5 (8)	2 (18)	0.26
Severe IVH (Grade 3-4), n (%)	8 (12)	3 (27)	0.18
Necrotizing Enterocolitis, n (%)	4 (6)	3 (27)	0.05
Patent Ductus Arteriosus, n (%)	12 (18)	5 (45)	0.63
Nephrotoxic Medication Exposure (doses)	*1 (0-2)*	*3 (2-6)*	*<0.01*

Title: Audit on the Utilisation of CT Brain Scans in Children Under 16 Years for Head Injuries at CHI, Tallaght

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Background: Computed Tomography (CT) brain scan is a crucial diagnostic tool in paediatric care, particularly for head injuries. However, CT use in children requires careful consideration due to radiation exposure risks. This audit aims to evaluate the indications, appropriateness, and outcomes of CT brain imaging in children under 16 years of age, as well as to assess adherence to clinical guidelines.

Methods: A retrospective audit was conducted at CHI, Tallaght, examining the medical records of children under 16 who underwent CT brain scans for head injuries over a one-year period. Data collected included patient demographics, clinical factors (presence and duration of headache, red flags for increased intracranial pressure (ICP) or head injury), completeness of clinical documentation, indications for CT scanning, CT findings, and patient outcomes.

Results: A total of 97 children underwent CT brain scans during the study period, with a male predominance (60%, n=58). The median age was 10 years (IQR 4–13). Most patients (93%, n=90) received CT scans within 24 hours of presentation, with 89% (n=86) scanned during their first presentation and 11% (n=11) scanned on subsequent visit. Notably, 28% (n=27) of patients had no red flags for raised ICP or head injury, and 24% (n=23) underwent CT scans that were not indicated according to local guidelines. Among these 23 patients, 91% (n=21) had normal CT results, while 9% (n=2) showed nonspecific changes, leading to MRI follow-up, which yielded normal results. Of the 74 patients whose CT scans were indicated by guidelines, 88% (n=65) had normal findings, 7% (n=5) were found to have skull fractures (including one with subgaleal haemorrhage and three requiring outpatient neurosurgery referral), and 1 patient had a sigmoid sinus haemorrhage requiring immediate neurosurgery referral. Three patients had non-specific findings; one underwent MRI, which returned normal results, and all three patients were subsequently discharged without the need for further follow-up.

Conclusion: The audit revealed a high rate of normal CT findings, with a significant proportion of scans performed despite a lack of clinical indications according to local guidelines. This raises concerns about the overutilisation of CT scans in children, which could expose patients to unnecessary radiation without clear clinical benefit. It is recommended that stricter adherence to clinical guidelines be enforced to limit the unnecessary use of CT brain scans in children, ensuring that imaging is only performed when clinically indicated to minimise radiation exposure risks.

Keywords: CT brain, paediatric head injury, red flags, intracranial pressure

Title: Artificial Intelligence Can Identify High Volume Patent Ductus Arteriosus in Preterm Neonates

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Background
Premature infants are at increased risk for complications from hemodynamically significant patent ductus arteriosus (hsPDA). Clinical signs of high-volume PDA shunt are imprecise, which may delay disease recognition and therapeutic intervention. The use of predictive modeling, based on continuous vital sign monitoring, to enable earlier detection of higher volume shunts represents a key knowledge gap.

Objectives
To create a clinical model to predict presence and severity of a hsPDA in premature infants.

Methods
A retrospective cohort analysis of infants < 27 weeks gestational age from 3/20-9/23 with targeted neonatal echocardiography (TnECHO) screening for hsPDA was conducted at the University of Iowa neonatal intensive care unit. TnECHOs were excluded if the patient was on inotropes, vasopressors, or pulmonary vasodilators at the time of the exam. TnECHOs were categorized as **high-volume PDA** (score ≥ 9) or **no PDA/low-volume shunt** (score ≤ 2) based on the modified Iowa PDA score. Continuous vital sign data including post ductal arterial waveform were evaluated in 5-minute increments for the hour preceding each TnECHO. For each increment, a Fourier transform was applied to the arterial blood pressure (BP) waveform to obtain the values of the harmonics. Predictor variables (e.g. systolic and diastolic BP) were used to create a logistic regression model in MATLAB (Mathworks, version 2020b) to classify each 5-minute window as **high-volume PDA** or **no PDA/low-volume shunt**. The model was evaluated using 5-fold cross validation with stratification and further evaluated by training 1000 times with randomized 20% holdout. Demographics and clinical variables were collected correlating with each TnECHO.

Results
The model included a total of 173 TnECHOs (37 high-volume shunt and 136 no PDA/low-volume shunt) from 90 patients. Mean airway pressure was higher in the high-volume shunt group ($p<0.01$), but other variables were similar. The model predicted presence of hsPDA with high accuracy. The best model used 8 of 14 predictor variables and achieved a testing AUC of 0.9125 (95% CI 0.8771, 0.9480). Training the model 1000 times with 20% holdout resulted in a receiver operating characteristic curve with a mean testing AUC of 0.8891(95% CI 0.8858, 0.8924).

Conclusion
Identification of a high-volume PDA shunt is possible with high accuracy using logistic regression modeling. Further work should focus on identification of moderate-volume shunts in this manner and correlation with clinical outcomes.

Table 1. Iowa PDA Score, hsPDA ≥ 6

Measurement	Score: 0	Score: 1	Score: 2
Pulmonary vein D wave (cm/s)	<30	30-50	>50
Mitral valve E wave (cm/s)	<45	45-80	>80
Isovolumetric relaxation time (ms)	>50	30-50	<30
Left atrium to aortic root ratio	<1.3	1.3-2.2	>2.2
Left to right ventricular output ratio	<1.5	1.5-2.5	>2.5
Aortic/Peripheral doppler flow reversal	Forward/Absent		Reversed
Ductus diameter indexed to weight (mm/kg)	<1.5	1.5-3.0	>3.0

cm: centimeter, s: second, ms: millisecond, mm: millimeter, kg: kilogram

Table 2. Demographics and Clinical Variables by TnECHO Group

	All TnECHOs n= 173	Low-volume shunt/no PDA n= 136	High-volume shunt n= 37	p- value
Gestational Age (weeks)	24.2 ± 1.5	24.1± 1.4	24.6 ± 1.6	0.192
Birth Weight (grams)	628 ± 191	618 ± 180	664 ±223	0.435
Postnatal Day	6 ± 5	5 ±4	7 ±6	0.12
Male	96 (55)	75 (55)	21 (57)	0.985
Hispanic	10/159 (6)	8/125 (6)	2/34 (6)	0.997
Race				0.663
Black	34 (20)	25 (18)	9 (24)	
White	102 (59)	80 (59)	22 (60)	
Asian/ Pacific Islander	6 (3)	5 (4)	1 (3)	
More than 1 race	16 (9)	14 (10)	2 (5)	
Not reported	15 (8)	12 (9)	3 (8)	
Vaginal delivery	83 (48)	69 (51)	14 (38)	0.382
Multiple gestation	35 (20)	23 (17)	12 (32)	0.115
Antenatal Steroid				0.797
One dose	45 (26)	32 (24)	13 (35)	
Two doses	116 (67)	94 (69)	22 (60)	
5 minute Apgar	7 [6,7]	7 [6,7]	7 [6,7]	0.639

Ventilation Mode				0.879
HFJV	170 (98)	134 (99)	36 (97)	
NIV-NAVA	3 (2)	2 (1)	1 (3)	
Mean Airway Pressure	8.5 ± 2.3	8 .2± 2.1	9.5 ±2.7*****	**0.007**
PEEP	5.9 ± 1.3	5.7 ±1.1	6.3 ± 1.7	0.057
FiO2	0.36 ± 0.16	0.37 ±0.16	0.36±0.14	0.964

HFJV: High frequency jet ventilator, NIV-NAVA: non-invasive neurally adjusted ventilatory assist, PEEP: positive end expiratory pressure, FiO2: fraction of inspired oxygen. If $P < 0.05$ noted by * for no PDA/low-volume shunt versus high-volume shunt. Data presented as mean ± standard deviation, frequency (percent), or median [interquartile range]

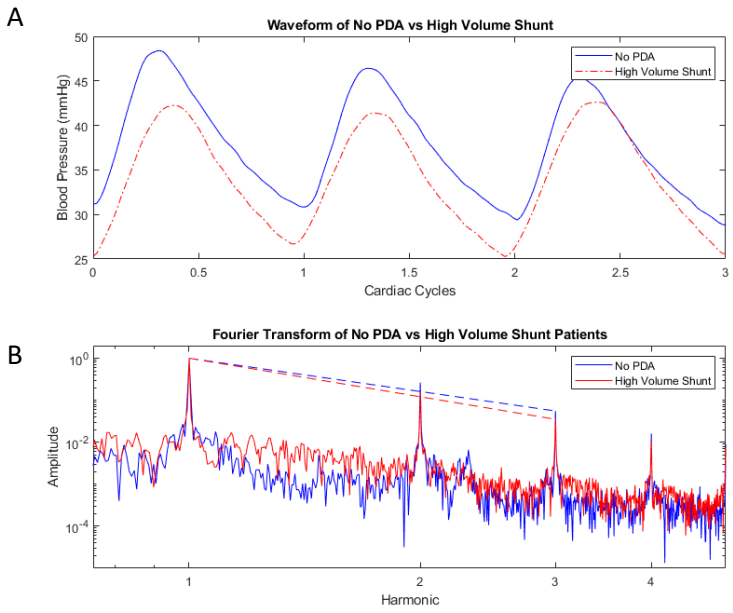
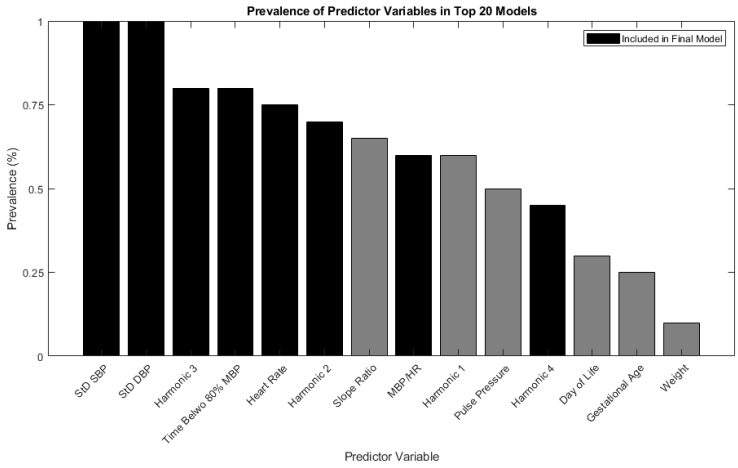


Figure 1. Arterial BP Waveform and Fourier Transform

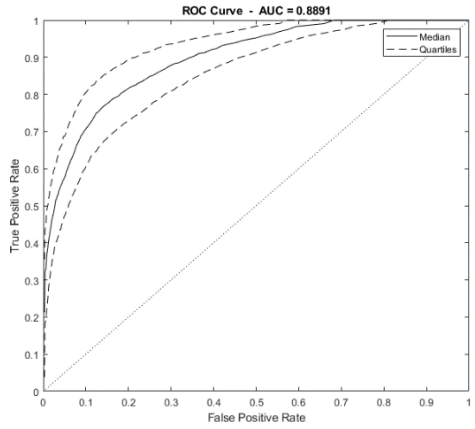
A. Two arterial BP waveforms, one from an infant with a high-volume shunt (red dotted line) and one from an infant with no PDA (blue solid line). The high-volume shunt waveform demonstrates steeper slope near the completion of the cycle correlating with diastolic run-off phase and diastolic steal from the hsPDA.

B. The Fourier transforms of the above waveforms, high-volume shunt (red), and no PDA (blue). This shows the harmonics, or amplitude of the peaks, as well as the slopes between peaks.



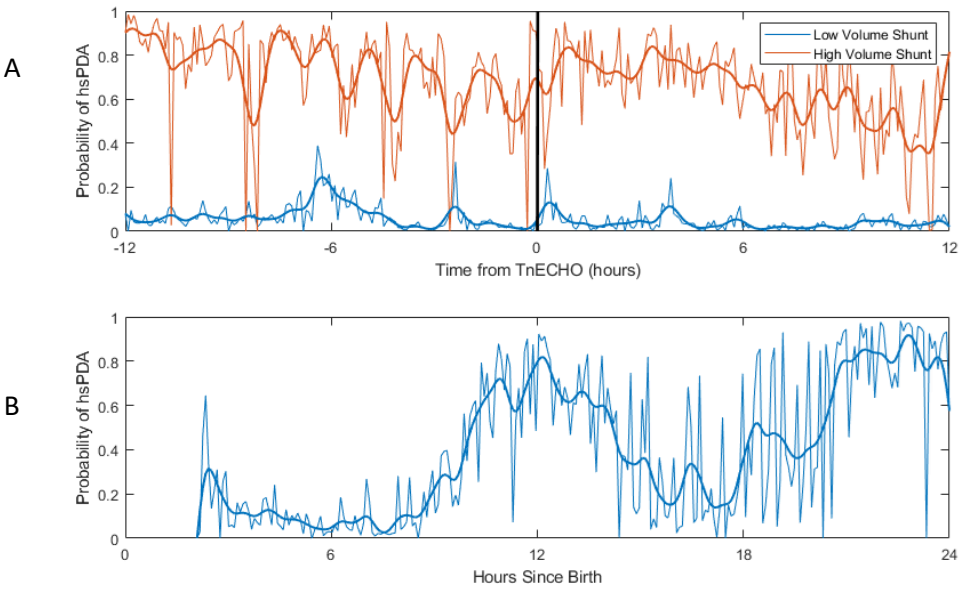
StD: standard deviation, SBP: systolic blood pressure, DBP: diastolic blood pressure, MBP: mean blood pressure, HR: heart rate

Figure 2. Predictor Variables In Top 20 Models This chart demonstrates the impact of each predictor variable based on frequency in the twenty best performing models. The variables that were used in our final model are shown in black, the ones not used in the final model are gray.



ROC: receiver operating characteristic, AUC: area under curve

Figure 3. Training Receiver Operating Characteristic Curve. After the best model was identified, further training the model 1,000 times with twenty percent holdout resulted in a receiver operating characteristic curve with a mean testing AUC of 0.8891(95% confidence interval 0.8858, 0.8924). The curve pictured demonstrates the distribution of the data by showing the median and interquartile range.



PDA: patent ductus arteriosus, hsPDA: hemodynamically significant patent ductus arteriosus, TnECHO: targeted neonatal echocardiography

Figure 4. PDA Predictor Metric

A: Comparison of the PDA predictor output between an infant with a high-volume PDA (red) and one with a low-volume PDA shunt (blue), +/- 12 hours from time of TnECHO.

B: Algorithm output for a 26 week infant, on 21% fraction of inspired oxygen after surfactant and low ventilator settings, with screening TnECHO at 24 hours after birth showing a hsPDA without clinical findings.

Title: Comparative Efficacy of 300 u/kg vs. 500 u/kg Dosing of Recombinant Erythropoietin in Preterm Infants

Author(s) Ryan RM, Tano E, Vekstein C, Marasch J, Nock ML.

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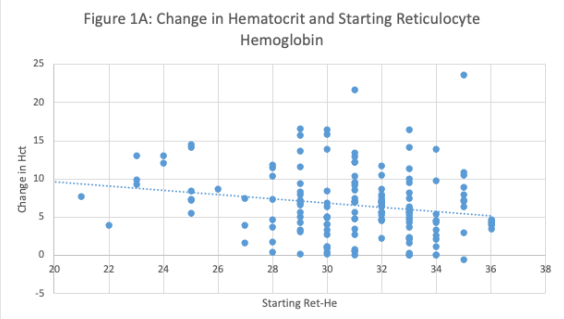
Background: Recombinant erythropoietin (EPO) is utilized to prevent and treat anemia of prematurity, aiming to reduce blood transfusions and donor exposures. Previously, EPO was administered at 500 u/kg, 3x/week after 28 days of life. However, this dosing was not well-supported by literature, prompting a protocol change to 300 u/kg 3x/week.

Objective: The primary objective was to evaluate if the reduced EPO dose (300 u/kg) achieves a similar increase in hematocrit (Hct) compared to the previous 500 u/kg dose. Secondary objectives included assessing EPO's effect on white blood cell count (WBC) and investigating the potential of reticulocyte-hemoglobin (Ret-He) as a marker for iron status during EPO treatment.

Design/Methods: Data for the 500 u/kg cohort had been previously collected, and we retrospectively collected data for infants who received EPO at 300 u/kg following the new protocol. Electronic medical records provided patient demographics, EPO administration details, lab results (before, during, and after EPO), morbidities, and transfusion needs. Paired t-tests were used for continuous, normally distributed variables, and linear regression analyzed continuous variable comparisons.

Results: A total of 155 infants received 175 courses of EPO at 300 u/kg, with 18 infants undergoing two courses and two infants receiving three courses. Average birthweight was 1315 grams, and mean gestational age was 29.7 weeks. Mean starting Hct was 26.7% (SD 1.8%), and mean reticulocyte count was 4.1% (SD 1.74%). The mean increase in Hct was 6.6% (SD 4.4%), similar to the 500 u/kg dose. However, the 500 u/kg cohort showed a greater reticulocyte count increase (7.5%) than the 300 u/kg cohort (4.9%). WBC significantly declined following EPO administration, with a mean WBC drop of 2.5 (SD 2.8) within two weeks post-EPO (P< 0.0001). Additionally, lower starting Ret-He correlated with a higher Hct increase, and the magnitude of Hct rise was significantly associated with a drop in Ret-He (P=0.011) during the EPO course.

Conclusion(s): Using 300 u/kg EPO dosing resulted in a hematocrit increase comparable to the 500 u/kg dosing, although reticulocyte counts were higher with the 500 u/kg dose, this may be unnecessary given the similar Hct increases. EPO treatment was associated with a statistically significant WBC decrease. Ret-He shows promise as an iron store marker in preterm infants, though further research is needed to clarify its role in managing anemia of prematurity.



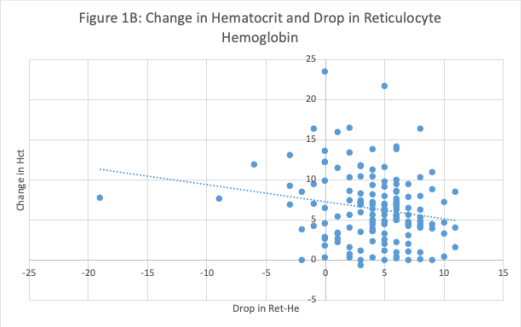


Figure 1A: Relationship Between Baseline Reticulocyte Hemoglobin (Ret-He) and Hematocrit (Hct) Increase in Preterm Infants Treated with 300 u/kg EPO. The figure illustrates the change in hematocrit levels relative to initial reticulocyte hemoglobin values, which serve as an indicator of iron stores. Contrary to expectations, a higher starting reticulocyte hemoglobin level was associated with a lower rise in hematocrit (P<0.0001, by linear regression).

Figure 1B: Association Between Rise in Hematocrit and Drop in Reticulocyte Hemoglobin in Preterm Infants Treated with 300 u/kg EPO. Higher hematocrit responses were associated with a greater decrease in Ret-He (P=0.0101, by linear regression).

Table 1: Descriptive Population Statistics, Baseline Data and EPO Treatment Responses

All NICU Babies who Received EPO	500 u/kg (2019-2020) (Previously Published) [c]	300 u/kg (2021-2023)
Number of Infants	162	172
GA, weeks	29 (26.5, 30.7)	29.7 (27.3, 32.1)
BW, grams	1175 (825,1495)	1315 (897, 1778)
Male sex	70 (53%)	85 (56%)
PMA at first dose (first course), weeks	34 (31.9, 36.1)	35.4 (32.7, 37.4)
DOL at first dose (first course), days	33.5 (24, 45)	39 (21, 57)
PMA at first dose (all courses), weeks	34.6 (32, 37)	35.6 (32.9, 37.4)
DOL at first dose (all courses), days	36 (25, 52)	42 (22, 63)
Baseline Hct, %	26.85 (25.4, 28.5)	26.85 (25.4, 28.0)
Baseline reticulocyte count, %	4.3 (3.2, 5.6)	4.1 (2.4, 4.8)
Baseline Reticulocyte Hgb	ND	31 (29, 33)
Baseline White blood cell count	ND	10.7 (7.1, 14.3)
Highest hematocrit post EPO, %, mean ± SD[a]	33.2 ± 4.2	33.4 ± 4.6
Change in Hct (%), mean ± SD[a]	6.2 ± 4.1	6.7 ± 4.5
Change in reticulocyte count, %, mean ± SD[a]	7.5 ± 4.8	4.8 ± 4.0
Drop in reticulocyte hemoglobin, mean ± SD	ND	4.3 ± 3.37
Drop in WBC count post rEPO	ND	2.5 ± 2.8[b]
Duration of therapy, doses, median ± IQR	6 (5, 7)	6 (3, 8)
Infants requiring blood transfusions, n (%)	33 (20.4%)	21 (12.2%)

Data presented as median (IQR) or n (%)

EPO (recombinant human erythropoietin), GA (gestational age), SD (standard deviation), BW (birth weight), PMA (postmenstrual age), DOL (day of life), IQR (interquartile range), ROP retinopathy of prematurity, ND, not determined.

[a] both significantly higher than baseline, P<0.0001 by paired t-test

[b] significantly lower than pre-EPO within two weeks after EPO course, P<0.0001, by paired t-test

[c] Connolly JM, McClary JD, Desai R, Sundaram A, Neudecker M, Nock ML, Ryan RM, Marasch JL. J Perinatol. 2024 Jun;44(6):892-896. Epub 2024 May 21.PMID: 38773216

Title: Non-invasive Oscillometry to Quantify the Severity of Lung Disease among Preterm Infants

Authors: Colm P. Travers, MD,[1] Viral G. Jain, MD,[1] Kimberly Armstead, BS,[1] Waldemar A. Carlo, MD,[1] Namasivayam Ambalavanan, MD[1]

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Background: Impulse oscillometry (iOS) is a non-invasive method to assess respiratory disease widely used in older children and adults. In a pilot study we showed that iOS can be used to measure the nature and magnitude of lung disease in preterm infants.

Objective: To test the hypothesis that differences in pulmonary mechanics among preterm infants with and without lung disease can be objectively measured using iOS.

Methods: Single center prospective observational cohort study enrolling preterm infants 22-34 weeks' gestation with and without lung disease admitted to the neonatal intensive care unit and healthy term-late preterm infants (≥ 35 weeks' gestation, controls) without lung disease admitted to the newborn nursery. After obtaining informed consent, we measured pulmonary mechanics using iOS at discharge or 40 weeks' PMA (whichever occurred first) using the Tremoflo N-100 Airwave Oscillometry device (Thorasys, Montreal). Two sets of tests including ≥3 measurements using coefficient of variation <20% within a 15% agreement threshold were obtained in the supine neutral head position. The primary analysis compared differences in the mean area under the reactance curve (AX). Secondary analyses compared difference in resistance at 7 Hz (R7), the difference between R7 and resistance at 19Hz (R7-19), and reactance at 7Hz (X7). Data were analyzed using logistic regression adjusted for weight at testing, sex, and multiple testing using the Bonferroni method.

Results: We included 600 infants (145 controls, 94 preterm without lung disease, 228 with respiratory distress syndrome (RDS) but no bronchopulmonary dysplasia (BPD), and 133 with BPD). As expected, the mean (SD) gestational age and birth weight differed between groups (Table 1). AX was highest among infants with BPD suggesting stiffer lungs, followed by infants with RDS but no BPD, preterm infants without RDS or BPD, and controls ($p<0.05$ for all comparisons, Table 2). R7-19 was also highest among infants with BPD suggesting heterogeneous peripheral airway disease, followed by infants with RDS but no BPD, preterm infants without RDS or BPD, and controls ($p<0.05$ for all comparisons, Table 2). X7 and R7 were highest in infants with BPD and lowest in controls.

Conclusion: Impulse oscillometry can objectively quantify the type and severity of lung disease in preterm infants. Abnormal lung mechanics in preterm infants with lung disease are characterized by increased stiffness and heterogeneous peripheral airways disease.

Table 1: Baseline characteristics between infants with and without lung disease who completed oscillometry testing before discharge of 40 weeks' PMA.

	Healthy Control (N=145)	Preterm no RDS (N=94)	Preterm RDS (N=228)	Preterm BPD (N=133)
Gestational Age (weeks), mean (SD)	38 (1)	33 (2)	29 (3)	25 (2)
Birth Weight (grams), mean (SD)	3243 (467)	1865 (463)	1382 (539)	793 (402)
Female Sex, n (%)	72 (50)	50 (53)	121 (53)	68 (51)
Race, n (%)				
Black	46 (32)	42 (45)	90 (40)	77 (58)
White	93 (64)	48 (50)	133 (58)	56 (42)
Other	6 (4)	5 (5)	5 (2)	0 (0)
Antenatal Steroids, n (%)	0 (0)	83 (88)	206 (90)	125 (94)
Cesarean Delivery, n (%)	56 (39)	48 (51)	149 (65)	85 (64)
Weight at test (grams), mean (SD)	3125 (458)	2280 (470)	2434 (471)	2931 (977)
Length at test (cm), mean (SD)	50 (3)	45 (3)	44 (3)	45 (5)

RDS = respiratory distress syndrome, BPD = bronchopulmonary dysplasia

Table 2: Pulmonary mechanics in healthy infants, preterm infants without lung disease, preterm infants with RDS, and preterm infants with BPD adjusted for weight at testing, sex, and Bonferroni correction. AX = area under the reactance curve. X7 = reactance at 7Hz, R7 = resistance at 7 Hz, R7-19 = the difference between R7 and resistance at 19Hz, RDS = respiratory distress syndrome, BPD = bronchopulmonary dysplasia.

	Healthy Control (N=145)	Preterm no RDS (N=94)	Preterm RDS (N=228)	Preterm BPD (N=133)
AX ($cmH_2O \cdot s/L$), mean (95% CI)	388 (351-426)[b,c,d]	498 (454-543)[a,c,d]	577 (549-606)[a,b,d]	671 (634-707)[a,b,c]
R7-19 ($cmH_2O \cdot s/L$), mean (95% CI)	13 (12-14)[b,c,d]	17 (15-18)[a,c,d]	19 (18-21)[a,b,d]	22 (20-23)[a,b,c]
X7 ($cmH_2O \cdot s/L$), mean (95% CI)	-34 (-31 to -37) [b,c,d]	-40 (-37 to -43) [a,d]	-44 (-42 to -46) [a]	-47 (-45 to -50) [a,b]
R7 ($cmH_2O \cdot s/L$), mean (95% CI)	41 (38-43)[c,d]	45 (42-48)[c,d]	49 (47-51)[a,b,d]	53 (51-55)[a,b,c]

a. Significant difference p<0.05 compared with healthy controls after adjustment for weight, sex, and Bonferroni correction.

b. Significant difference p<0.05 compared with preterm no RDS after adjustment for weight, sex, and Bonferroni correction.

c. Significant difference p<0.05 compared with preterm RDS after adjustment for weight, sex, and Bonferroni correction.

d. Significant difference p<0.05 compared with preterm BPD after adjustment for weight, sex, and Bonferroni correction.

Title: An analysis of the investigations of children with hypoglycaemia at a regional paediatric endocrinology service: to explore their outcomes and ongoing management.

Authors: Chloe McGuire[1] Moira Marks[2] Erum Rasheed[3]Annemarie Murphy[1,2] Orla M Neylon[1,2] Clodagh S O'Gorman[1,2]

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2 The Children's Ark, Dept of Paediatrics, University Hospital Limerick
3 Clinical Biochemistry, University Hospital Limerick

Background: Hypoglycaemia in children is important to recognise and treat promptly. It can be a first manifestation of several serious conditions and requires a thorough investigation into the aetiology, which can be challenging to complete. Investigations are numerous and complex, and should occur in the setting of unexplained, or severe or recurrent hypoglycaemia, and prior to the treatment of hypoglycaemia. The patient cohort involved in this study were paediatric patients investigated for hypoglycaemia who received education for home monitoring and management. The two aims of this study were firstly to explore the investigations and outcomes in this cohort. Secondly, to assess the efficacy of education in promoting safe management of hypoglycaemia and appropriate presentations of further hypoglycaemic episodes. It is important to note that emergencies do occur appropriately in this population, and that the focus here is on reducing inappropriate presentations.

Methods: Data was collated from a clinical database, where data had been prospectively collected on children admitted to and with investigations performed during the 3 years study period, namely from January 2021 to June 2024 inclusive.. A total of 45 patients were identified, determined to necessitate glucose monitoring and further investigation. Retrospective audit of medical records was conducted to supplement prospectively collected data, as required. Prospectively collected data from other hospital systems including laboratory and admissions data, were also collated to supplement the clinical database. . Data was analysed using Microsoft Excel.

Results: Forty-five paediatric patients, 55.6% female and 44.4% male, were identified and included. The majority of the cohort was aged between 0 -2 years, and diagnosis of Idiopathic Ketotic Hypoglycaemia was found in over half (57.7%). A number of important diagnosis from critical bloods were made during this study period, including one patient with growth hormone (GH) deficiency and three patients with hyperinsulinism. *Maturity onset diabetes of the young (MODY) was an additional unexpected diagnosis made during this time.* Only 20.9% of the 43 who underwent in depth investigation had results for all parameters of the critical sample documented. Case definition in this study was the receipt of endocrinology nurse led training on hypoglycaemia monitoring and management. Each patient was given an individualised hypoglycaemia monitoring and management plan. Repeated presentations to University Hospital Limerick (UHL) paediatric department were monitored following this education session. No child had an emergency admission to UHL during the study period, and there were no known presentations or admissions to other hospitals either.

Conclusions: This study generates information on the outcomes of investigations in paediatric patients presenting with hypoglycaemia. A number of important diagnoses were made from critical bloods during this study period, which would possibly have led to significant morbidity if diagnoses had been delayed or not made, underpinning the importance of a robust approach to investigation. In other cases, normal

investigations out ruled conditions and this was very important. This study also supports the benefits to patients and families of a nurse-led education system, and access to telephone support for patient education and how this can reduce inappropriate presentations to ED or to emergency services.

Table 1:

Table 1.	
Total no. of Patients	45
Age (Years) Mean (range)	3.02 (4-1)
Age 0-2	26 (57.8%)
Age 3 – 6	14 (31.1%)
Age 7 -10	2 (4.4%)
Age 11- 13	3 (6.6%)
Age Range	0-13
Gender	
male	20 (44.40%)
female	25 (55.60%)
Plasma Glucose Value (mmol/L)	2.6 (3.5-2.3)
Diagnoses	
Idiopathic Ketotic Hypoglycaemia	26 (57.8%)
Growth Hormone Deficiency	1 (2.2%)
Hypoketotic Hypoglycaemia	2 (4.4%)
Persistent Hyperinsulinism:	1 (2.2%)
Transient Hyperinsulinism	2 (4.4%)
MODY	1 (2.2%)
Undergoing further Investigation:	7 (15.5%)
Non-endocrine/Metabolic aetiology:	2 (4.4%)
Unknown/ Not documented:	3 (6.6%)
Additional Testing	19 (42.2%)
UHL	15
Tertiary referral	5
	Median (Q3-Q1); No. (%)

Title: The Influence of respiratory disease in the population under the age of 2 years during the Bronchiolitis season 2021-22 in Ireland.

Authors: Dr Ruslan Petrov MB ChB[1], Dr Sinead O'Donnell MB BCh BAO[1] & Dr Sheena Durnin MB BCh [1,2]

1 Department of Paediatric Emergency Medicine, Children's Health Ireland at Tallaght

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Background: During the SARS-Covid 19 Pandemic, many restrictive measures were implemented.[1] These actions helped the decrease of airborne infections in children. After lifting the restrictions, there was an uncommon explosion of respiratory diseases in the UK and Ireland. This study was initiated in the spring of 2021 to prospectively examine features of an anticipated unusual respiratory syncytial virus (RSV) summer season. At this point there were concerns that lack of exposure to viral infection in mothers and in the 0–23-month age group might lead to more severe disease in young children, and a shift in age distribution of disease in this group, and we therefore focused the study on this population.

Methods: We present the single site data from Children's Health Ireland (CHI) at Tallaght which was collected as part of the BronchStart study[1], a prospective observational study, enrolling children from 0-23 months of age presenting with bronchiolitis, lower respiratory tract infection, or first episode of wheeze in ECU at CHI-Tallaght in the period May 2021- April 2022. Data was collected on admission and seven day follow up including any admission data. We combined testing data with national admissions datasets to infer the impact of RSV disease.

Results: In CHI at Tallaght as part of BronchStart[1] we collected data of 479 children. Most of the admissions were of healthy term born infants. 91.4% had no comorbidities. The most common comorbidity was prematurity (<37 weeks) at 7.3%, other comorbidities occurred in 1.4%, congenital heart malformation was in 1%, congenital lung disease was in 0.4% and neuromuscular disease was in 0.2% of patients. The highest level of care provided to patients during the 7 days after presentation was Paediatric Intensive Care Unit in 1% of patient, High Dependency Unit in 3.5% of patients, admission to the ward in 27.1% and admission for observation in the emergency department in 0.6% of patients. Of those admitted and tested for RSV 54 of 117 (46.2%) were positive. The diagnosis gven in the patients was 380 patients with bronchiolitis (79.2%), 49 with lower respiratory tract infection (10.1%) and 52 patients with first episode of viral wheeze (10.7%). Management strategies utilised in the acute management of the episode in the cohort included nasogastric feeding in 8.3%, intravenous fluids in 10.6%, low flow oxygen in 11.7%, high flow oxygen in 4.8%, CPAP in 0.2%, mechanical ventilation 0.4%, antibiotics in 9.6%, salbutamol in 6% and prednisolone in 3.9% In Ireland the RSV hospitalisations for 2021 was 2073.

Conclusion: RSV infection was the main cause of hospitalisations in the cohort 0-23 months, but 54% of admissions in infants were associated with other viruses. The most of admissions were in previously healthy term-born infants.

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Title: Somatic Syndromes in Adolescents with Obstructive Sleep Apnea and Obesity

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Background: Obstructive sleep apnea (OSA) in children has been correlated with psychosomatic issues, anxiety, depression, ADHD and behavioral changes, being that the body is in a state of chronic stress. About 50% of obese children have OSA compared to 6% of normal weight children. This study aims to quantify somatic arousal in adolescent OSA patients. In addition, since obesity is highly correlated with OSA, this study will determine if obesity contributes to increased somatic arousal in OSA in adolescents. The Body Sensation Questionnaire (BSQ) is a 17-item questionnaire that rates how much a sign or symptom of increased sympathetic nervous system tone was experienced over the preceding week on increasing scale from 1 (never) to 5 (extremely). In a previous study in adults with OSA (Amdo, 2016) there is correlation of the BSQ score with the presence of six somatic syndromes, anxiety, and insomnia. The use of the BSQ score may be important to provide utility in assessing the correlation between childhood obesity and somatic arousal in adolescents with OSA. We hypothesize in this study that obese adolescents with OSA have higher BSQ scores reflecting greater somatic arousal.

Methods: During routine visits for sleep evaluation at the Stony Brook Sleep Disorders Center, children > 12 years old fill out screening forms including the Body Sensation Questionnaire (BSQ), the Epworth Sleepiness Scale (ESS), and the Fatigue Severity Scale (FSS). The latter two rates how likely the patient feels the fall asleep in certain situations and rates how much fatigue impacts the patient, respectively. A retrospective chart review included 43 obese and 44 non-obese adolescents 12-18 years old who answered the BSQ, ESS and FSS from January 2013 to November 2024. Obesity was defined as BMI >/= 95th%. Correlations between BSQ scores and somatic syndromes (anxiety, depression, ADHD, headaches, use of psychotropic medications) as well as the ESS and FSS were assessed using Wilcoxon rank-sum tests or Kruskal-Wallis tests for categorical variables, or Pearson's correlation for continuous variables. A multiple linear regression model with adjustment was further constructed to compare the BSQ difference between obese and non-obese groups.

Results: Higher BSQ score was correlated with anxiety ($p = 0.0166$), depression ($p = 0.0546$) headaches/migraines ($p = 0.0002$) and psychotropic medication use ($p = 0.0181$). BSQ scores had a moderate linear correlation with the ESS ($p < 0.0001$, correlation coefficient 0.51) and a mild correlation with the FSS ($p = 0.0151$, correlation coefficient 0.36). BSQ scores between obese and non-obese adolescents were not statistically significant ($p = 0.1953$). After controlling age, anxiety, headaches and psychotropic medications, although, not statistically significant, there was a trend of difference in BSQ score between obese and non-obese groups (33.8 vs 28.49, $p = 0.1272$).

Conclusions: Higher BSQ scores were correlated with anxiety, depression, headaches/migraines, and use of psychotropic medications in adolescents with OSA, reproducing the findings in adults. The increased somatic arousal associated with sleepiness and fatigue based on the three questionnaires are useful screening tools to further explore the relation of OSA to anxiety and depression and may inform additional treatment options for this population.

Ethics: IRB2023-00035

Table 1: BSQ score between groups and somatic syndromes among adolescent OSA patients

Variable	Level	N	Mean	SD	Min	Median	Max	P-value*
Group	Non-obese	44	28.30	9.92	17.00	26.00	55.00	0.1953
	Obese	43	29.67	7.65	18.00	28.50	53.00	
Headaches/Migraines	N	33	25.91	4.97	18.00	27.00	38.00	0.0110
	Y	27	32.74	10.91	17.00	32.00	55.00	
ADHD	N	38	27.58	8.35	17.00	27.00	55.00	0.0711
	Y	22	31.41	9.24	18.00	31.50	53.00	
Anxiety	N	38	27.13	8.39	17.00	26.00	53.00	0.0166
	Y	22	32.18	8.78	20.00	29.50	55.00	
Depression	N	49	28.06	8.63	17.00	27.00	53.00	0.0546
	Y	11	33.09	8.79	25.00	29.00	55.00	
Hypnotic, benzodiazepine and other psychotropic meds use	N	46	27.30	8.23	17.00	26.00	55.00	0.0037
	Y	14	34.50	8.65	25.00	33.50	53.00	
ADHD meds	N	45	28.47	9.03	17.00	27.00	55.00	0.2766
	Y	14	30.79	8.44	20.00	30.50	46.00	

*: P-values were based on Wilcoxon rank-sum tests (for variables having 2 categories), or Kruskal-Wallis tests (for variables with having >=3 categories).

Table 2: BSQ score vs Epworth sleepiness scale, and Fatigue severity scale

Variable	Pearson correlation coefficient	P-value*
Epworth sleepiness scale	0.51	<.0001
Fatigue severity scale	0.36	0.0062

*: P-values were based on Pearson's test.

Title: PROP Revisited: What NICU exposures contribute to BPD?

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*Case Western Reserve University, Univ. Pennsylvania, UCSF, Univ. Rochester, UNC-Chapel Hill, Northwestern Univ., Emory Univ., Univ/ Cincinnati, Vanderbilt Univ.

Background: The Prematurity and Respiratory Outcomes Program (PROP) was an NIH multicenter observational cohort study of infants born before 29 weeks (w) of gestation enrolled between 2010-2015. PROP-collected extensive demographic and perinatal factors and high-quality daily data on respiratory support, nutrition, and medication exposures during Neonatal Intensive Care Unit (NICU) admission have not been studied for their contribution to bronchopulmonary dysplasia (BPD). We sought to determine the contributions of various practices in neonatal care potentially amenable to intervention.

Objective: To determine the contribution of NICU exposures in the first two weeks of admission to BPD and to examine whether clinical center was an independent contributor.

Design/Methods: PROP data included detailed demographic, perinatal, and NICU exposure information for 765 survivors and assessed their independent association with BPD. We then developed optimal prediction models for BPD using three logistic mixed-effects models – (1) a Day 0 (D0) or Perinatal Model that included demographic factors known at birth; (2) a Day 7 (D7) model that added medication, nutrition, and respiratory exposures during the first 7 days of age; and (3) a Day 14 (D14) model that included the data for the first 14 days. Elastic-Net was used to select variables for each model.

Results: Data were included from nine consolidated clinical centers. There were significant differences in the rates of BPD by clinical center (Table 1). Many individual patient-level factors were associated with BPD (Table 2), including center, and some remained significant in multivariate analysis. In examining the overall model, adding NICU exposure data for the first 7 or 14 days improved the model's association with BPD modestly (AUC from 0.081 to 0.087). Two clinical centers had significantly higher BPD rates at 61% and 65.7%, and two had significantly lower BPD rates of 15% and 8%. Five remaining centers had medium BPD rates (31.9% to 50.9%). Significant differences were found across these three categories of centers in the D7 and D14 models (data not shown); several factors, including birth weight, intubation during stabilization, level of respiratory support, diuretics, cardiovascular medications, antibiotics, and human milk feeding, were different among the low, medium, and high centers.

Conclusion(s): Factors in the first 7-14 days of NICU stay were associated with BPD, some of which could be amenable to changes in practice. Further analyses of inter-center variation in outcomes will identify underlying factors and determine processes to improve overall outcomes.

Table 1		BPD36 (Modified Shennan's BPD^) by Clinical Center		
Clinical Center		Yes	No	Unclassified
Site A	N=35	23 (65.7%)	12 (34.3%)	0
Site B	N=63	24 (38.1%)	38 (60.3%)	1 (1.6%)
Site C	N=118	72 (61.0%)	46 (39.0%)	0
Site D	N=146	44 (30.1%)	94 (64.4%)	8 (5.5%)
Site E	N=174	73 (42.0%)	90 (51.7%)	11 (6.3%)
Site F	N=59	9 (15.3%)	50 (84.7%)	0
Site G	N=73	35 (47.9%)	38 (52.1%)	0
Site H	N=40	3 (7.5%)	35 (87.5%)	2 (5.0%)
Site I	N=57	29 (50.9%)	28 (49.1%)	0

There were significant differences by center on both univariate and multivariate analysis.
^oxygen requirement at 36w yes/no but also assigned if discharged before 36w based on O2 at discharge

Table 2. PROP Infants' Characteristics by BPD36 (modified Shennan^)

Risk Factor	BPD36 Yes (n=312)	BPD36 NO (n=431)	P value
Gestational age (weeks)*	26.2 (1.38)	27.0 (1.34)	<0.0001
Birthweight (grams)*	828 (197)	978 (233)	<0.0001
Sex*			0.0005
Male	183 (58.7%)	197 (45.7%)	
IUGR	24 (7.7%)	13 (3.0%)	0.003
Race			NS
AA*	169 (39.2%)	105 (33.7%)	
Asian	9 (2.1%)	2 (0.6%)	
CA	240 (55.7%)	193 (61.9%)	
Hawaiian	1 (0.2%)	0 (0%)	
Hispanic	10 (2.3%)	9 (2.9%)	
Multiple	2 (0.5%)	2 (0.6%)	
Native	0 (0%)	1 (0.3%)	
Stabilization – Intubation - Yes	268 (85.9%)	315 (73.1%)	0.0001
Antenatal Steroids* (any) - Yes	253 (81.1%)	383 (88.9%)	0.0039
Clinical center			<0.0001
Respiratory Support – days out of first 7			
HFNC (>2LPM) or higher	6.94 (0.484)	6.44 (1.36)	<0.0001
CPAP or higher	6.36 (1.62)	5.13 (2.36)	<0.0001
NIPPV or higher*	5.33 (2.33)	3.03 (2.66)	<0.0001
CV or higher	4.84 (2.53)	2.57 (2.54)	<0.0001
HFV	1.65 (2.33)	0.483 (1.41)	<0.0001
Cardio-Respiratory Medications – days out of first 7			
Caffeine	4.50 (2.71)	5.52 (2.09)	<0.0001
Hydrocortisone	0.151 (0.852)	0.0858 (0.636)	NS
Diuretic (any)	0.0609 (0.253)	0.0882 (0.428)	NS
CV Pressor	0.696 (1.43)	0.457 (1.26)	0.0163
Cardio/Respiratory Drug (any)	1.32 (0.768)	0.900 (0.770)	<0.0001
Surfactant	1.31 (0.763)	0.891 (0.756)	<0.0001
Vitamin A	0 (0)	0.00696 (0.0832)	NS
Nitric Oxide	0.0673 (0.537)	0.0232 (0.225)	NS
RSS on day 7 (Median, IQR)	0.25 (0, 10.2)	1.99 (0, 13.5)	<0.0001
Cumulative supplemental oxygen – amount above 21% per 24h over first 7 days*	59.0 (0, 350)	18.0 (0, 203)	<0.0001
Days on any milk feeding	3.13 (2.10)	4.00 (1.87)	<0.0001
Days on any human milk	3.02 (2.14)	3.63 (2.03)	<0.0001
Weight change over first 7 days	-16.3 (78.3)	-58.2 (77.1)	<0.0001
Respiratory Support – days out of first 14			
HFNC (>2LPM) or higher	13.7 (1.44)	12.0 (3.47)	<0.0001
CPAP or higher	12.1 (3.71)	8.69 (5.19)	<0.0001
NIPPV or higher*	10.0 (4.96)	5.16 (5.32)	<0.0001
CV or higher	8.88 (5.29)	4.19 (4.91)	<0.0001
HFV	3.42 (4.69)	0.884 (2.56)	<0.0001
Cardio-Respiratory Medications – days out of first 14			
Caffeine	9.67 (5.26)	11.8 (3.68)	<0.0001
Any steroid*	0.362 (1.61)	0.401 (1.66)	NS
Dexamethasone	0.0128 (0.179)	0.00232 (0.0482)	NS
Hydrocortisone	0.388 (1.66)	0.360 (1.60)	NS
Inhaled Bronchodilator	0.0865 (0.745)	0.281 (1.39)	0.0254
Diuretic (any)	0.615 (1.15)	0.564 (1.53)	NS
CV Pressor	1.18 (2.29)	0.838 (2.27)	0.0435
Other Cardio/Respiratory Drug (any)	1.55 (1.18)	1.09 (1.21)	<0.0001
Surfactant	1.41 (0.941)	0.914 (0.818)	<0.0001
Vitamin A	0.138 (0.729)	0.151 (0.770)	NS
Nitric Oxide	0.321 (1.28)	0.123 (0.799)	0.0101
RSS on day 14	2.39 (0, 17.6)	0.23 (0, 11.2)	<0.0001
Cumulative supplemental oxygen – amount above 21% per 24h over first 14 days*	144 (0, 741)	37.0 (0, 471)	<0.0001
Days on any milk feeding	8.42 (3.89)	9.82 (3.48)	<0.0001
Days on any human milk	8.03 (4.17)	9.08 (3.98)	0.0005
Weight change over first 14 days	81.4 (85.3)	55.9 (79.2)	<0.0001

Data are presented as N)%) or mean (SD) and as median (IQR) for continuous non-normally distributed variables
P values derived by chi-square for categorical variables and t-test or Wilcoxon rank sum test for continuous variables
**Remains significant after Multivariate Logistic Model with Center as Random Effects, after Elastic-Net Variable Selection*
^oxygen requirement at 36w yes/no but also assigned if discharged before 36w based on O2 at discharge
LPM, liters per minute; HFNC, high-flow nasal cannula > 2 LPM; NIPPV, non-invasive positive pressure ventilation; CV, conventional ventilation; HFV, high-frequency ventilation, RSS, respiratory severity score (FiO2 x mean airway pressure), IQR, interquartile range

Title: Can we Use Radiographic Measurements to Predict Need for Intervention in Neonatal Pneumothorax*?*

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Background: Pneumothorax (PTX) develops in 1-2% of neonates leading to significant morbidity and mortality and requiring providers to be comfortable with management. However, few studies have examined what factors predict the need for interventions such as thoracentesis (TC) or chest tube (CT) placement versus conservative management in the treatment of newborns with PTX.

Objective: To evaluate whether radiographic measurements of PTX size can be used to predict the need for procedural intervention in neonates.

Design/Methods: A retrospective chart review was conducted, identifying a convenience sample of 62 patients (Figure 2) diagnosed with neonatal PTX between March 2016 and October 2024. Most babies (46) were born in 2023-2024 when our electronic health record could more easily identify these infants. PTX size was evaluated using radiographs by calculating the ratio of the widest transverse measurement of the PTX on both anteroposterior (AP) (Figure 1) and, when available, lateral decubitus (DECUB) views (Figure 1), divided by the widest transverse measurement of the hemithorax above the diaphragm. Clinical data were collected, and statistical analysis was performed using need for intervention (TC, CT, or both).

Results: The data indicated that a larger PTX size ratio, measured in the AP ($P < .0001$) or DECUB view ($P < .008$) was highly associated with need for intervention in this cohort of infants with PTX. Only 33% of PTXs required intervention; 13/14 (93%) cases who underwent TC ultimately required a CT (Figure 2). PTX was more prevalent in males, but sex was not associated with needing intervention. Average gestational age (GA) was 36 5/7 weeks, with only 12% being < 34 weeks GA. Univariate analysis indicated that lower GA and birth weight were risk factors for intervention. There was a trend ($P = 0.075$, by Fisher's exact test) suggesting that infants with both respiratory distress syndrome (RDS) and PTX may be more likely (60%) to require intervention (no RDS, 29% intervention).

Conclusion(s): The ratio of the transverse measurement of the PTX/hemithorax size from radiographs was highly predictive for need for intervention in a cohort of primarily term infants with PTX. Smaller and lower GA infants were at a higher risk for requiring procedural intervention. Nearly all infants who had TC, also needed a CT. These findings could inform clinical strategies for managing neonatal PTXs, especially in identifying appropriate personnel availability if a TC is to occur. We are continuing to investigate the PTX size ratio and establish a cutoff value that may help in predicting the need for intervention.

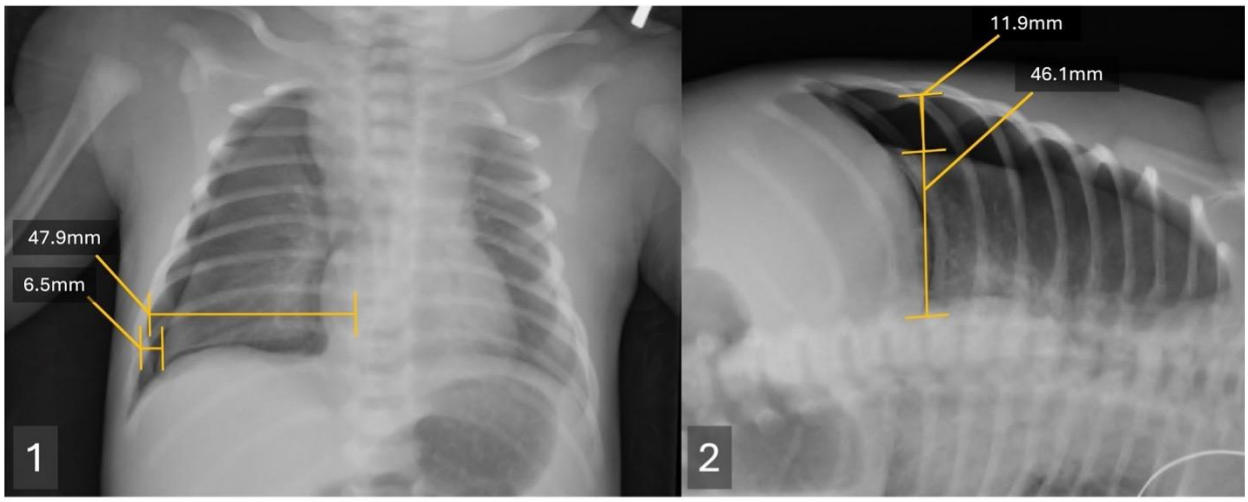

Figure 1: Example of pneumothorax (PTX) measurements. Transverse lines at the widest part of the PTX and the widest part of that hemidiaphragm are drawn and measured on both an AP film (left panel) and similarly on a decubitus film if available (right panel). A simple ratio is created of the PTX/hemidiaphragm measurements.

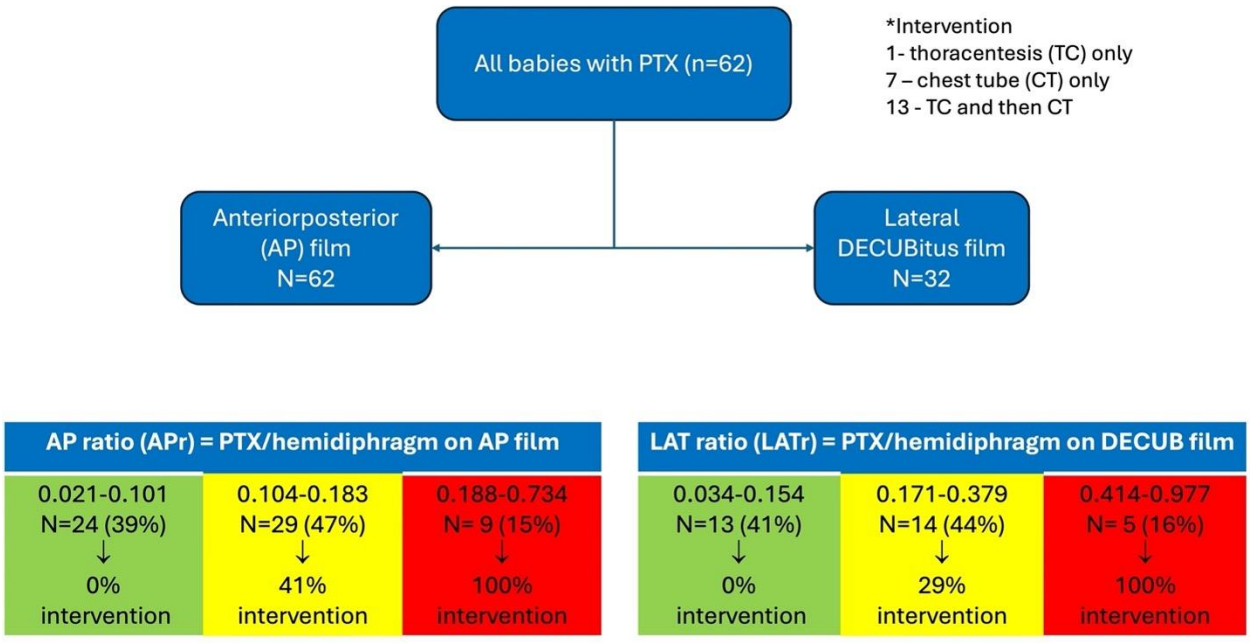

Figure 2: Patients were identified via inquiry to the electronic health record. We obtained all records available at that time (n=62). The patient flow diagram shows the outcome of intervention (thoracentesis and/or chest tube) vs. no intervention and the resulting radiograph-derived ratios categorized by outcome.

Title: Resuscitation qualifications and experience in CHI NCHDs

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Background: Non-consultant hospital doctors (NCHDs) working in Paediatrics are required to complete certified training in Basic Life Support (BLS) and Advanced Paediatric Life Support (APLS) as part of mandatory training. Paediatric resuscitation skills are essential for all doctors working with paediatric patients, yet we could not find any statistics on the qualification and certification of non-consultant hospital doctors (NCHDs) working with paediatric patients in Ireland. Most senior paediatric emergency medicine (PEM) clinicians did not have the opportunity to perform a single critical procedure within a 12-month period.[1] Ensuring the upkeep of skills and proficiency it is recommended to do yearly practice of resuscitation skills with simulation as the preferred method for most skills.[2] The use of mannequins was the preferred method for invasive skill training. We measured the resuscitation course certification status of NCHDs working in Childrens Health Ireland (CHI) and aimed to identify barriers to attaining certification.

Methods: We designed an electronic survey and sent it out to NCHDs working in CHI In-patient department and Emergency department from August 2024-October 2024. The survey asked respondents to indicate which resuscitation courses they have completed and the validity of certification. We also asked the respondents to identify barriers to attaining resuscitation certification. We asked how many times they have been involved in resuscitation situations and had to use resuscitation skills (including intraosseous insertion, cardio-pulmonary resuscitation and major trauma management).

Results: 32 Respondents completed the survey, 65% of them were Senior House Officers, 22% were Registrars and 13% were Specialist Registrars. Our results indicated a 97% level of prior BLS (Basic Life Support) certification, of which 97% were valid through BLS/APLS (Advanced Paediatric Life Support) or PILS (Paediatric Intermediate Life support). 40% of respondents have done APLS and 25% PILS. We identified a lack of educational leave and finances as the biggest factors to low levels of attending these resuscitation courses. We also found low levels of resuscitation skills used with paediatric patients with 44% that has never been involved in a paediatric cardiac arrest resuscitation. These results were expected.

Conclusion: We concluded that there is good Basic Life Support certification but there is an overall lack of advanced resuscitation certification in doctors working in the inpatient paediatric department as well as the emergency department and that the biggest factors for this is a lack of educational leave and funds. We will use this data to advocate for improved access to educational leave for NCHDs and timely access to Trainee support scheme funds.

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