BAPM

BAPM Annual Conference 2022 Presented Abstracts

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Correlation Between Motor Optimality Score and Neurodevelopmental Outcome in High Risk Infants

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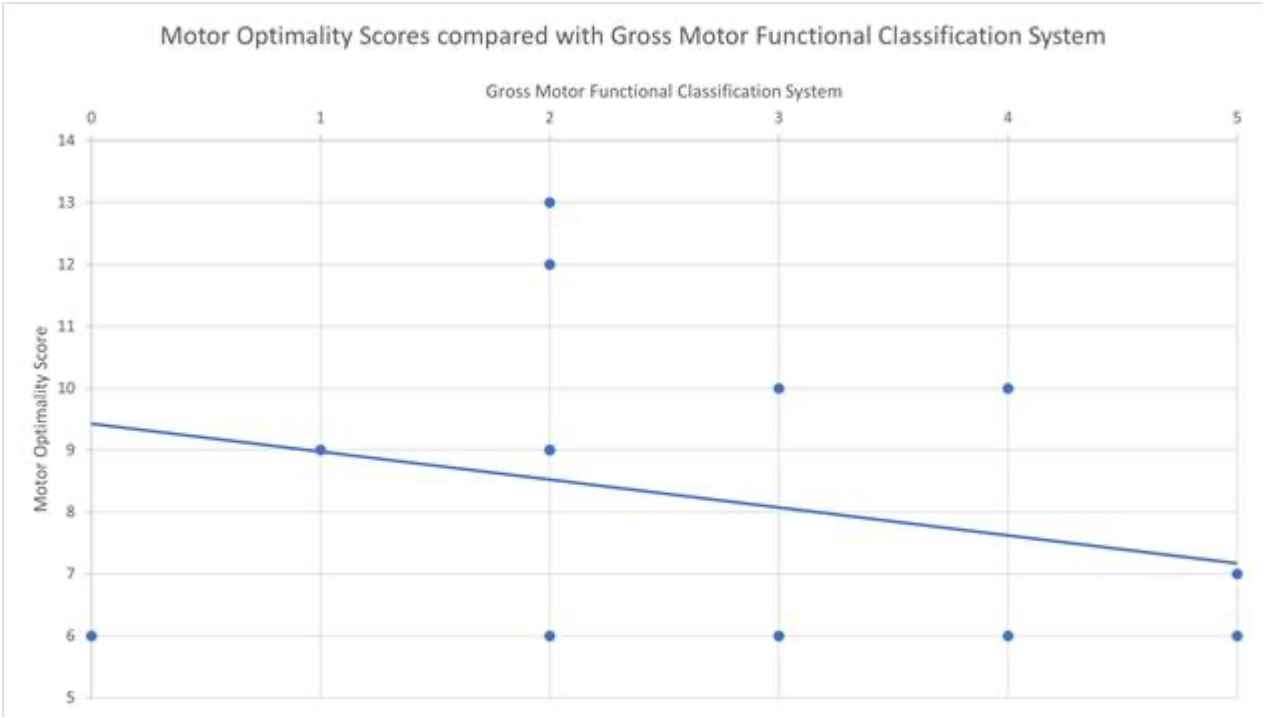
Background:
Absent fidgety movements (FM-) on Prechtl General Movement Assessment (GMA) predicts motor disability. A more detailed assessment of motor repertoire, using Motor Optimality Scores (MOS), may predict level of mobility. We compared MOS with motor outcome in our cohort.
Methods:
Infants born 2015 to 2020 with hypoxic ischaemic encephalopathy requiring cooling or <1500g and who were FM- on GMA were retrieved from neonatal databases. MOS was performed using the videos recorded for GMA. The level of motor disability was measured using age appropriate Gross Motor Functional Classification System (GMFCS).
Results:
20 infants had FM- on GMA. GMA videos were recorded between 10-20 weeks of age (corrected for gestation). MOS were retrospectively scored using these recordings. All 20 infants had GMFCS and their ages at the time of this assessment ranged from 2 to 6 years. 13 children had cerebral palsy and 7 had global developmental delay. Of the 20 infants, 8 had MOS <8. (MOS ranges from 5 to 28.) 6 of the 8 had GMFCS level of III, IV or V showing significantly reduced mobility. 1 had GMFCS level of II and 1 had no motor deficit. 12 of the 20 had MOS >8 and 10 of these had GMFCS level I or II showing a higher level of mobility. 2 children had GMFCS of III and IV, respectively.
Conclusion:
Even though the numbers in our cohort are small, our study demonstrates an association between low MOS and greater level of motor disability in a population of infants who were known to have FM- on standard GMA. As well as advocating the use of GMA for all high risk neonates, we also recommend motor optimality scoring to further predict the degree of mobility deficit in these children, thus enabling the targeting of early interventions to individual need.

Graphs


Motor Optimality Scores compared with Gross Motor Functional Classification System
Gross Motor Functional Classification System
0
1
2
3
4
5
14
13
12
11
10
9
8
7
6
5
Motor Optimality Score

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IMPLEMENTING MULTIPLE PARALLEL CHANGES ON A NICU: THE EXPERIENCE OF THE ROSIE PRETERM BUNDLE

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Background and aims
Implementing change in healthcare settings is challenging. In a drive to improve outcomes for preterm infants there are several evidence-based interventions which have either not been adopted or are provided inconsistently. Introducing changes to practice in series is time consuming and risks staff becoming disengaged.

Our aim was to develop and rapidly implement a care bundle comprising evidence-based interventions for babies less than 32 weeks' gestation, in the antenatal, perinatal and immediate postnatal period (first 72 hours), designed to reduce mortality and morbidity. 12 interventions were included in the bundle. Some interventions were already established practice and needed an updated approach such as antenatal steroids and magnesium sulphate and other interventions were new to our unit such as prophylactic hydrocortisone and probiotics. Our aim was for 85% of appropriate interventions to be delivered to eligible babies.

Methods
Driver diagrams and process mapping were used to establish the interventions to be included in the bundle. Data was collected from the electronic patient record on which interventions were received between Jan 2021 and December 2021. Staff engagement was maintained through newsletters, e-learning modules, weekly team meetings and an information board.

Results
121 eligible babies were identified in 2021. Some interventions were not appropriate for all babies (fig 1). Overall we achieved 70.3% of appropriate interventions delivered to eligible babies

Conclusions
Care bundles are an effective way to standardise care to optimise outcomes. Incorporating multiple new interventions as a care bundle has the advantage of introducing change rapidly. Interventions based on simple procedures (e.g. drug administration) performed better than more complex interventions dependent on human factors. Nevertheless, we have demonstrated that it is possible to introduce many changes in clinical practice, while maintaining staff engagement. Ongoing data collection will be required to demonstrate sustainability and ultimately improved outcomes.

Graphs

Bundle Element	Number of eligible babies	Number of babies receiving intervention (%)	
Place of birth	36	29	(80.6%)
Antenatal corticosteroids	91	69	(75.8%)
Magnesium sulphate	72	63	(87.5%)
Delayed cord clamping*	90	47	(52.2%)
Prophylactic hydrocortisone**	19	17	(89.5%)
Normothermia*	91	62	(68.1%)
Caffeine	121	115	(95.0%)
Early PN*	94	83	(88.3%)
Early colostrum*	121	36	(29.8%)
Probiotics**	67	43	(64.2%)
All elements	802	564	(70.3%)

* Existing interventions with updated approach
** New interventions

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ADENOVIRUS : A CAUSE OF NEONATAL ACUTE LIVER FAILURE

Dr Anandini Arumugam[1], Dr Lucy Green[1]
[1]*University Hospital Coventry And Warwickshire*

Background
Neonatal acute liver failure (NALF) is still a very rare occurrence. However it carries a significantly high mortality rate of about 24% in the neonatal population. Neonatal viral infections remain the second biggest cause of NALF. Most of these viral infections are entirely treatable when identified early and can prevent fulminant liver failure.

Methods
The case study reports on a preterm baby (33+2weeks gestation) who is one of the earliest neonates to develop acute fulminant liver failure due to the adenovirus subtype 41 currently causing an outbreak in the world. The case considers the need to change investigation and management practice in light of this outbreak.

Case Report
Baby was initially born by emergency section for maternal sepsis. Initial septic screen was normal. On day six of life, developed temperature with high lactates and irritable. A second CRP raised at 20umol/L with no clear source of infection triggered the need for an LP. Due to requiring a second LP attempt, a second full blood count result showed a platelet drop from 200 to 11 before any other clinical signs were present.

Low platelets triggered hepatic and clotting investigations which started to reveal liver derangement and coagulopathy. Baby was commenced on Aciclovir about 36 hours later after the initial septic screen when a combination of bloods and clinical signs were present indicating liver disorder.

The management of this baby included multiple corrections of various parts of the clotting cascade as well as the ongoing liver failure and the complications that arose from liver derangement and coagulopathy.

Conclusion
The case study discusses the need to consider screening for viruses early on as part of neonatal infection screens, as well the acute management of these babies in view of viral infections becoming more common and having much higher mortality and morbidity rates

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Unified Target for reducing Unplanned Baby Extubations (uTUBE)

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Background:
An unplanned extubation (UE) is when any of the following are not in place from the outset: 1. An intention to extubate, 2. The presence of competent staff at the bedside, 3. The preparation of suction and an oxygen delivery system in place before the patient is extubated[1]. UEs in neonates cause patient harm and are preventable.

Aim:
To reduce the rate of UEs in Aberdeen Maternity Hospital Neonatal Unit by 50% in 6 months.

Methods:
A case note analysis over 6 months (July-December 2021) was undertaken. All intubated infants were included. Data was collated on Microsoft Excel and the rate of UEs calculated. Causes, consequences of UE and quality of documentation surrounding intubations and endotracheal tube placement were also scrutinised.
Change was implemented using PDSA cycles. Education sessions including simulation and skills demonstrations were delivered; two-person care was mandated for intubated infants; bedside posters with endotracheal tube size and position were introduced; infants at risk of extubation were included in daily safety briefs; and the QI project was 'Topic of the Week'.
Data was continuously monitored (February-July 2022) with further PDSA cycles implemented, including introduction of a patient safety cross.

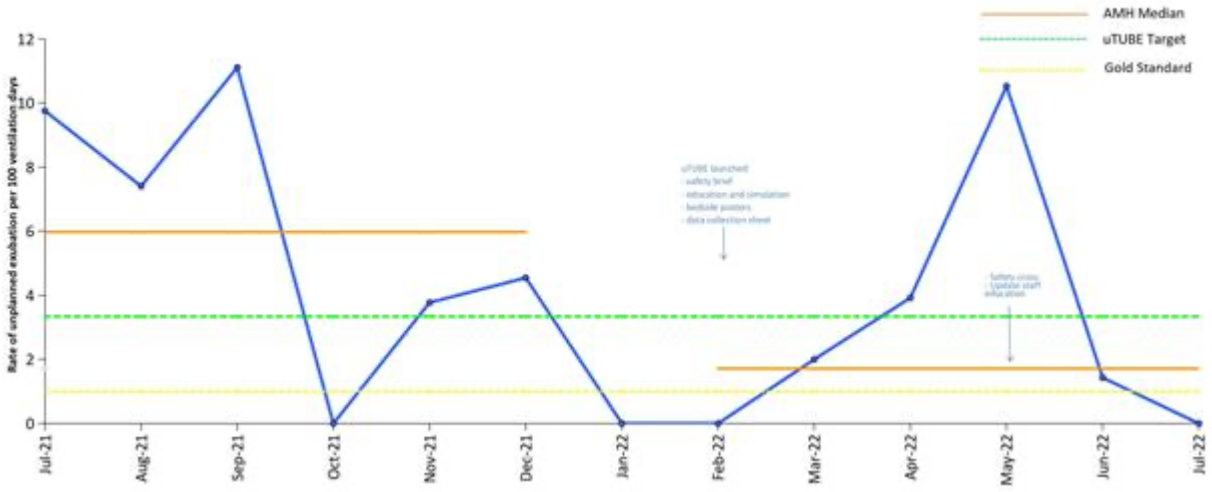
Results:
The study included 47 infants between July-December and 42 infants between February-July.
The rate of UE reduced from 6.69 to 2.64 per 100 ventilation days. Infants requiring resuscitation after UE reduced from 89% to 50%; and infants requiring reintubation from 83% to 50%.
There were associated improvements in initial intubation documentation and hourly endotracheal tube documentation.

Conclusions:
The rate of UE was reduced by 60.5%, achieving the QI project aim. Further PDSA cycles will be implemented with the ultimate aim of reducing UE to <1.0 per 100 ventilation days.

References:
1. NHS England, Paediatric Intensive Care Quality Dashboard 2019/20. Available from: https://www.england.nhs.uk/wp-content/uploads/2019/03/picu-metric-definitions-19-20.pdf

Graphs

Run Chart showing rate of unplanned extubation per 100 ventilation days



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Immune Boost Project: Exploring attitudes to early maternal breastmilk administration for preterm babies in a neonatal intensive care

Dr Anne Bean[1], Dr Jon Ince[1]
[1]*Leeds Centre For Newborn Care*

Background
The benefits of early maternal breastmilk for preterm infants are well established, and it is one of the most important interventions that this vulnerable patient group can receive. However, it is often challenging to ensure a high proportion of babies receive maternal breastmilk (MBM) early. The ability to understand the unique local challenges, complexities and attitudes to this intervention may be key to increasing the number of babies who receive early MBM.

Methods
We conducted a cross sectional survey to assess knowledge, attitudes, and local barriers to the administration of early MBM for preterm infants.

Results
We received responses from 74 members of the multidisciplinary team, 45.9% from Neonatology, 5.4% Obstetrics and 48.6% Midwifery. Despite 'colostrum packs' to support mothers with early expressing being available from the neonatal unit, 37.8% of those surveyed were unaware of them and of those who did know of their obtainability, 43.2% did not know where to find them.
Whilst all respondents felt it was either important or very important for preterm infants to receive early MBM, 43.2% had received no specific teaching on the importance of early MBM for preterm infants. The most identified barriers to babies being given early MBM included lack of staff training, lack of staff availability to support families to express milk and lack of emphasis being placed on this intervention after admission to the neonatal unit.

Conclusions
We are using the results of this survey to direct the focus for ongoing Quality Improvement work aiming to increase the rates of preterm infants receiving MBM within 6 hours after delivery. By asking staff who provide day to day care for families and encouraging them to share their thoughts, ideas and experiences we hope to lead more effective and sustainable local change.

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Isolated intrauterine femoral fracture

Dr Mostafa Elbatreek[1], Dr Anne Bean[1]
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Introduction

An intrauterine fracture of a long bone is an extremely rare finding in a fetus in the absence of evidence of underlying skeletal dysplasia or history of very severe antenatal trauma.

It is important to note that a fetal femoral fracture differs from a congenitally short femur, also known as congenital femoral deficiency, which can range from hypoplasia to complete absence of the femur.

Case

We report a case of an isolated left femoral fracture which was detected on routine obstetric ultrasound screening examination at 19 weeks gestation. No other fetal anomalies were detected and prenatal exome sequencing along with QFPCR and array testing were normal. The 31 year old mother had gestational diabetes but no other underlying medical conditions. Her baby was delivered at 39+4 weeks gestation with forceps assistance.

Postnatally the baby was examined carefully for any features consistent with a skeletal dysplasia or suggesting any other fractures and none were detected. A skeletal survey was performed which showed a healing left femoral fracture but no evidence of any other fractures and normally mineralised bone. Follow up at 3 months of age by the orthopaedic and neonatal teams has shown normal development and normal examination.

Conclusion

Whilst intrauterine fractures usually have a poor prognosis, isolated spontaneous femoral fractures can heal effectively and tend to have no significant impact on long term outcome. It is important to take a detailed family and maternal history to either rule out genetic causes or prompt further investigation. A detailed examination postnatally is vital. In cases when an infant may present after birth with an isolated fracture, a review of antenatal screening imaging should also be strongly considered as this can guide decision making around likely timing of injury.

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Targeting reduction of Vitamin D deficiency in the newborn population

Dr Grace Bradley[1], Dr Fazal Ur Rehman
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Background
Vitamin D deficiency is common in the neonatal population and is associated with both acute and lifelong sequalae. Royal College of Paediatrics and Child Health guidelines recommending universal prophylactic Vitamin D supplementation for under-5s assume a normal Vitamin D level at birth, reliant in turn on normal maternal Vitamin D level in pregnancy (as Vitamin D status in the newborn is reflective of maternal Vitamin D status).

Aims
We aimed to evaluate the Vitamin D status of the neonatal population served by a District General Hospital (DGH) in Northern England and identify which babies would benefit from early intervention.

Methods
We collected all Vitamin D levels from infants up to the age of three months sent to the laboratory of a DGH over a six-month period (n = 144). Patient characteristics were analysed, including gestation at birth, birth weight, and maternal risk factors for Vitamin D deficiency (identified at the antenatal booking appointment).

Results
The neonatal population is deficient in Vitamin D. 71% of babies in our study had Vitamin D levels <50nmol/L. The majority of these (67%) were born to mothers with risk factors for Vitamin D deficiency. 78% of mothers had risk factors for Vitamin D deficiency, most notably ethnicity and BMI over 30. Other risk factors were prematurity (72%) and low birth weight (66%).

Conclusion
Most babies born to mothers with risk factors for Vitamin D deficiency were Vitamin D deficient on testing, suggesting that targeted early intervention for these mothers may be beneficial during pregnancy. Due to the prevalence of Vitamin D deficiency in our population, we feel that checking levels for high-risk infants is warranted to ensure adequate treatment rather than prophylactic dose Vitamin D can be provided.

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Wellbeing of Rotational Doctors in a Tertiary Neonatal Centre

Dr Lisa Brown[1], Dr Jennifer Calvert
[1]*NICU, University Hospital of Wales, Cardiff*

Wellbeing of Rotational Doctors in a Tertiary Neonatal Centre

Lisa Brown, Jenny Calvert.

Neonatal Intensive Care Unit, University Hospital of Wales (UHW), Cardiff.

Aims: To review wellbeing of junior doctors and design a wellbeing package targeted at doctors rotating through the NICU in UHW.

Background: Working in the NICU environment can be a stressful time for rotational doctors. Studies of medical staff in intensive environments show a high rate of burn out and work-related stress. The recent GMC survey raised concern regarding trainee satisfaction on NICU. Wellbeing of staff likely contributes to this, and studies involving neonatal nurses and transport teams have shown that wellbeing in the neonatal setting can be improved.

Method: A survey of current working rotational doctors was performed in July 2022 to review the impact of the rotation on wellbeing. A key focus was to review access to resources of support when working on NICU.

Survey Results:
- 70% report that wellbeing has been impacted on more than on other medical rotations.
- Negative impacts: Mental health, work-life balance, sleep, work-life balance.
- 50% know where to find wellbeing resources
- 90% feel that wellbeing support can be improved

Type of support accessed:
- 40% Educational supervisor
- 20% Professional Support Unit
- 10% Unit psychologist
- 10% GP
- 90% referred to friends and family

Action and Conclusion: There is scope to improve staff wellbeing on NICU. We have created a wellbeing package for doctors rotating through the NICU. This includes a “wellbeing wheel” which provides a visual representation of areas of wellbeing, coupled links to match these areas (Fig 1). Alongside this, with the unit psychologist, regular mindfulness sessions and wellbeing discussion groups will be introduced. The success of the package will be measured in further staff and GMC surveys.

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Proper Preparation Prevents Poor Intubation

Doctor David Burnside[1], Doctor Aishath Rizma Moosa[1], Doctor Kainaz Singh[1], Doctor Afolabi Ibrahim Ayodeji[1], Doctor Noor-e-Maham Shakeel[1]
[1]*Northampton General Hospital*

Introduction: Difficult airways in neonates are not commonly encountered in practice, yet when they do occur, require efficient and effective escalation. The British Association of Perinatal Medicine (BAPM) has recently published guidance on "Managing the difficult airway in the Neonate," which lead to initiation of our project. This retrospective audit has evaluated newborn airway management on a level 2 unit before and after implementation of several changes. These include a new guideline, intubation checklist, and difficult airway box. The project has shown these simple measures can generate significant improvements in intubation safety and success.

Aims:
To assess:-
- Accuracy of documentation during intubation
- Staff awareness regarding identification and management of a "difficult airway"

Methods:
Single centre retrospective study of all neonates requiring intubation.
First cycle: 1st August 2019 to 31st July 2020
Second Cycle: 1st January 2021 to 31st December 2021
Data Sources: BadgerNet and clinical notes. Anonymised staff survey.

Intervention:
- Introduction of "difficult airway box"
- New local guideline (adapted from BAPM)
- Intubation checklist
- Education package including hands-on training for medical and nursing staff of all levels, delivered regularly across the year.

Results:
First audit cycle identified 56 eligible patients, of which 5 were excluded due to incomplete data. The second cycle identified 56 eligible patients, of which 6 were excluded due to incomplete data.

The key findings of the project are:-

1. Implementation of standardised intubation checklist improves documentation (figure 1a)

2. Education initiative improves staff awareness of difficult airway management (figure 1b)

Conclusion:
We have shown that simple measures, including checklists and clear guidelines, can have a positive effect on the quality of care delivered. These benefits can be further reinforced by regular delivery of a targeted education program. Such steps also enhance preparedness for difficult airways, should the situation arise.

Graphs

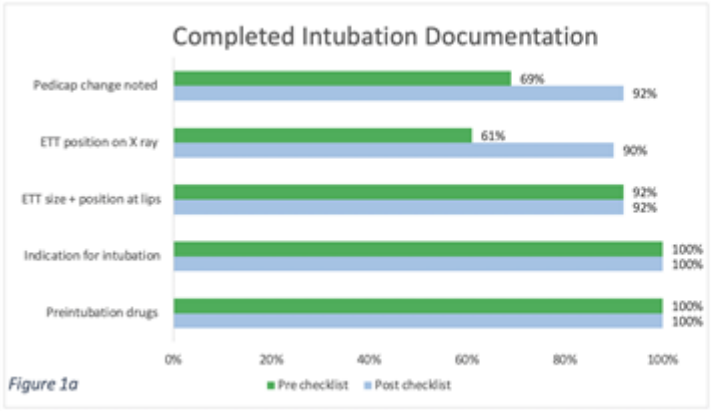

Figure 1a

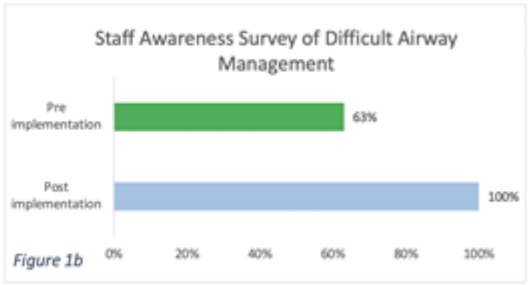

Figure 1b

Image

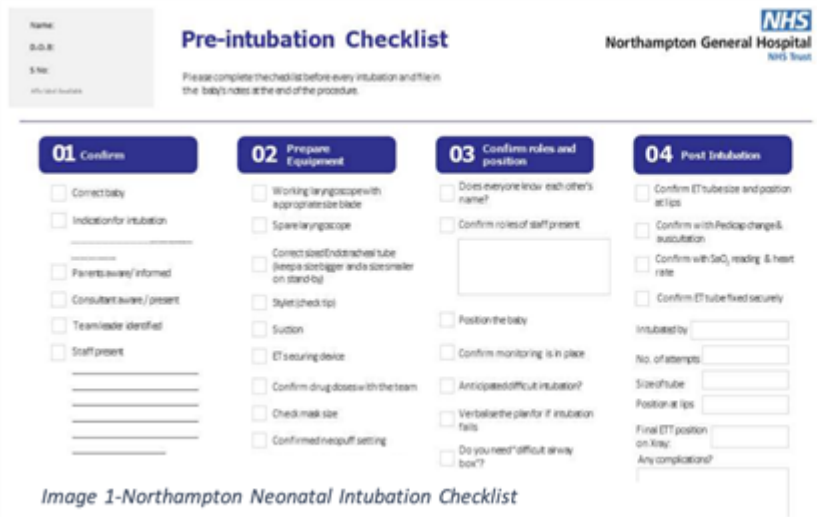

Image 1-Northampton Neonatal Intubation Checklist

Image 2- Difficult Airway Box

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Can transcutaneous bilirubin (TcB) measurements be safely utilised to assess rebound hyperbilirubinaemia following phototherapy in neonates?

Dr Frances Butterworth[1], Shona Campbell[1], Gillian Frew[1], Richard Boulton[1], Dr Helen Mactier[1]
[1]*Princess Royal Maternity*

Introduction: Neonatal jaundice can be assessed by serum bilirubin (SBR) or by non-invasive transcutaneous measurement (TcB). There is insufficient evidence to determine if TcB can replace SBR in assessing rebound hyperbilirubinaemia after phototherapy.

Objective: To investigate if TcB can be used to guide management of babies after phototherapy.

Subjects: 100 well neonates > 35 weeks' gestation and > 24 hours of age who had received inpatient phototherapy. 89 were direct Coomb's test (DCT) negative, 6 positive, 5 not recorded.

Method: Measurement of both helix (manufacturer's recommendation) and earlobe TcB coincidentally with routine SBR 12 hours after cessation of phototherapy using a Bilicare device (Gerium Medical, Yokne'am, Israel). All mothers gave written informed consent.

Results: Gestation was 35+0-41+5 (median 37+6) weeks and birthweight 2018-4566 (median 3230) grams. 53% male, 86% Caucasian. Outcomes determined by SBR included restarting phototherapy (n=0), repeat SBR next day (n=29), no follow up (n=71).

Helix TcB tended to under-estimate bilirubin compared to SBR (Bland Altman plot mean difference -50.1 (95% CI -113.9:13.6) micromols/L) whereas for earlobe TcB mean difference was 13.4 (95% CI -46.3:73.2) (over-estimate). Mean helix/earlobe TcB value overestimated SBR by a mean of 18.1 (95% CI -37:73.2).

Compared to SBR, clinical outcome was the same for 77.5% (helix TcB), 60.2% (earlobe TcB) and 77.1% (mean helix and earlobe TcB measurements) babies. Earlobe TcB erroneously indicated restarting phototherapy for 5 babies; in each case TcB was within 30 micromols/L of the intervention line. Mean TcB erroneously indicated repeat SBR in 7 babies; in each case mean TcB was <61 micromols/L below the intervention line.

Conclusions: Recommencement of phototherapy is uncommon in well babies from 35 weeks' gestation. TcB measurement has potential for management of rebound jaundice after cessation of phototherapy. Remaining as an inpatient to await repeat SBR after phototherapy may not be necessary.

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Postnatal Management of well babies with a cardiac murmur in London and Kent: Preliminary results of a trainee-led NeoTRIPs study

Dr Dominic Carr[1,2], Dr Emily Prior[2], Dr Katie Evans[1,2], Dr Catherine Longley[3], Dr Joanna O'Sullivan[4], Dr Justinas Teiserskas[5], Dr Lauren Ferretti[6], Dr Hannah Bellsham-Revell[7], Dr Cheryl Battersby[1,2], Dr Katie Evans

[1]Chelsea & Westminster NHS Foundation Trust, [2]Imperial College London, [3]Barts Health NHS Foundation Trust, [4]Kingston Hospital NHS Foundation Trust, [5]Kings College Hospital NHS Foundation Trust, [6]St Georges NHS Foundation Trust, [7]Evelina London, Guys and St Thomas' NHS Foundation Trust

Background:
1-2% of well infants have a murmur on routine newborn examination, necessitating investigation to exclude congenital heart disease. Trainees report significant unit-to-unit variation in the use of these investigations, for example four limb blood pressures (BPs) and ECGs. There is no nationally agreed guidelines or follow-up pathways.

Aims:
1. Describe and compare unit-level approaches in the management of cardiac murmurs
2. Characterise which investigations are routinely performed, their timings and utility in identifying cardiac pathology.
3. Provide evidence to rationalise investigations and follow-up pathways.

Methods:
52 trainees were recruited in 27 neonatal units across London and Kent as part of the NeoTRIPS network. Unit level information including guidelines was collected, followed by a prospective service evaluation. Between May and July 2022, data was collected on all clinically-well infants from 34 weeks gestation with a cardiac murmur on routine examination within the first 72 hours of life. Infants with antenatally diagnosed cardiac anomalies were excluded.

Results:
From 15 available guidelines, all recommend pre- and post-ductal saturations, 7 recommend BPs and 4 recommend ECG. Data are available for 138/277 infants across 23 sites. BPs were performed in 57 and ECG in 2% (3). 59 had delayed discharges due to awaiting a 24-hour review prior to further investigations. 16 babies had inpatient echocardiograms. Planned follow-up timeframes ranged from 2 to 16 weeks. No babies had critical congenital heart disease.

Conclusions:
Preliminary results of this regional study show wide variation in the approach to investigating cardiac murmurs in well babies. Performing investigations has resource implications, may prolong length of stay and should therefore be only conducted if there is an evidence-base to support their utility. A trainee-led research network can enable comparison of variable interdepartmental practices, vital for knowledge sharing and aiding future standardisation of care.

Image


Neo
TRIPS

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Shall we treat or just repeat?
– The dilemmas of hyper and hypocalcaemia in a mother and baby dyad

Dr Portia Cartwright[1], Dr Stephen W Jones[1]
[1]*Royal United Hospitals*

Parathryoid related peptide (PTHrP) is a protein most commonly produced by tumour cells. It has a similar homology to Parathyroid hormone, acts on the same receptor, and subsequently causes hypercalcaemia. More recently it has also been found to have a major physiological role at the growth plate, and to be produced by non-tumour cells, including the placenta. In the placenta it has been proposed that PTHrP has a role in calcium transportation, making calcium available for the growing fetus.

In this case an expectant mother presented with symptomatic hypercalcaemia at 33 weeks gestation. After extensive investigations the hypercalcaemia was found to be secondary to a raised PTHrP of presumed placental origin. The mother was treated with IV fluids and diuretics but on stopping this treatment her calcium rose again to 3.2 mmol/l. Treatment with bisphosphonates was considered but at 36 weeks gestation the baby was delivered by EmCSS due to fetal bradycardia. Following delivery placental origin of the raised PTHrP was confirmed and her calcium levels normalised within 24 hours of placental delivery.

The neonate had an initial calcium of 3.19 mmol/l. The neonate was jittery, but ECG and heart rate were normal. The calcium level fell to 2.11 mmol/l at 14hrs and reached a nadir of 1.63 mmol/l and an ionised calcium of 0.869 at 72 hours. At this point IV calcium gluconate was given followed by enteral calcium supplementation for 3 days. On day 6 her calcium supplements were stopped, and her calcium levels remained stable and within normal range.

We go on to discuss the other case reports of PTHrP from the placenta being the rare cause for maternal and neonatal hypercalcaemia, and proposed thresholds for treatment and management of both the subsequent hypercalcaemia and hypocalcaemia in the neonate.

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Ultra-Low Field Magnetic Resonance Brain Imaging for Newborn Infants

Dr Paul Cawley[1,2], Dr Francesco Padormo[1,3], UNITY Consortium[4], Jennifer Almalbis[1,2], Dr Alessandra Maggioni[1,2], Dr Dan Cromb[1,2], Dr Miguel De La Fuente Botell[1,2], Dr Massimo Marenzana[1], Professor Steve Williams[4], Professor Serena Counsell[1], Dr Tomoki Arichi[1], Professor Joseph V. Hajnal[1], Professor Mary Rutherford[1], Professor A. David Edwards[1,2]

[1]The Centre for the Developing Brain, King's College London, [2]Neonatal Intensive Care Unit, Evelina Children's Hospital, Guy's & St Thomas' NHS Foundation Trust, [3]Hyperfine, Inc., [4]Centre for Neuroimaging Sciences, King's College London

Background

Ultra-Low Field (ULF) Magnetic Resonance (MR) scanning is a novel and potentially transformative technology, utilising permanent magnets to facilitate bedside MR imaging. ULFMR systems have been created for use in adult practice, but maturational differences in neonatal brain tissue necessitate markedly different MR sequence parameters compared to those used in adults. We present our findings of ULFMR utilising the 64mT Hyperfine Swoop® portable MR system with image acquisition sequences optimised for newborn infants.

Methods

Participants were recruited as part of two NHS UK REC approved studies (12/LO/1247, 19/LO/1384). Paired MR brain scans were acquired using the 64mT Hyperfine MR scanner and a reference standard Philips Achieva 3T MR scanner. Physiological monitoring and hearing protection were used for all scans.

Results

ULFMR 64mT neuroimaging was performed on 86 infants. Age at scan ranged from 1 to 130 days (median 10 days) with post-menstrual age range 31+3 to 51+4 weeks (median 39+6). The scanned cohort included infants receiving thermal support, invasive ventilation, intra-venous infusions and inotropic support. There were no adverse events.

Standard adult sequences provided inadequate differentiation of neonatal white matter, grey matter and CSF, and poor identification of brain macro-structures. Optimised neonatal sequences were able to: 1) Detect developmental pathologies including those affecting the cortex, white matter, brainstem/mesencephalon and posterior fossa; and 2) Identify acquired brain injuries including hypoxic-ischaemic injury, cerebral atrophy and infarction.

Figure 1 shows example 64mT images in a normally formed term (1a) and preterm (1b) brain, a left parieto-occipital infarction (1c -with paired 3T MR imaging), and congenital CMV leading to occipital cysts and polymicrogyria (1d –with comparative cranial ultrasound).

Conclusions

64mT MR neonatal scanning with acquisition sequences optimised for the developing brain can detect clinically relevant cerebral abnormalities, suggesting that portable point-of-care MR could provide useful diagnostic information for the care of newborn infants.

Image

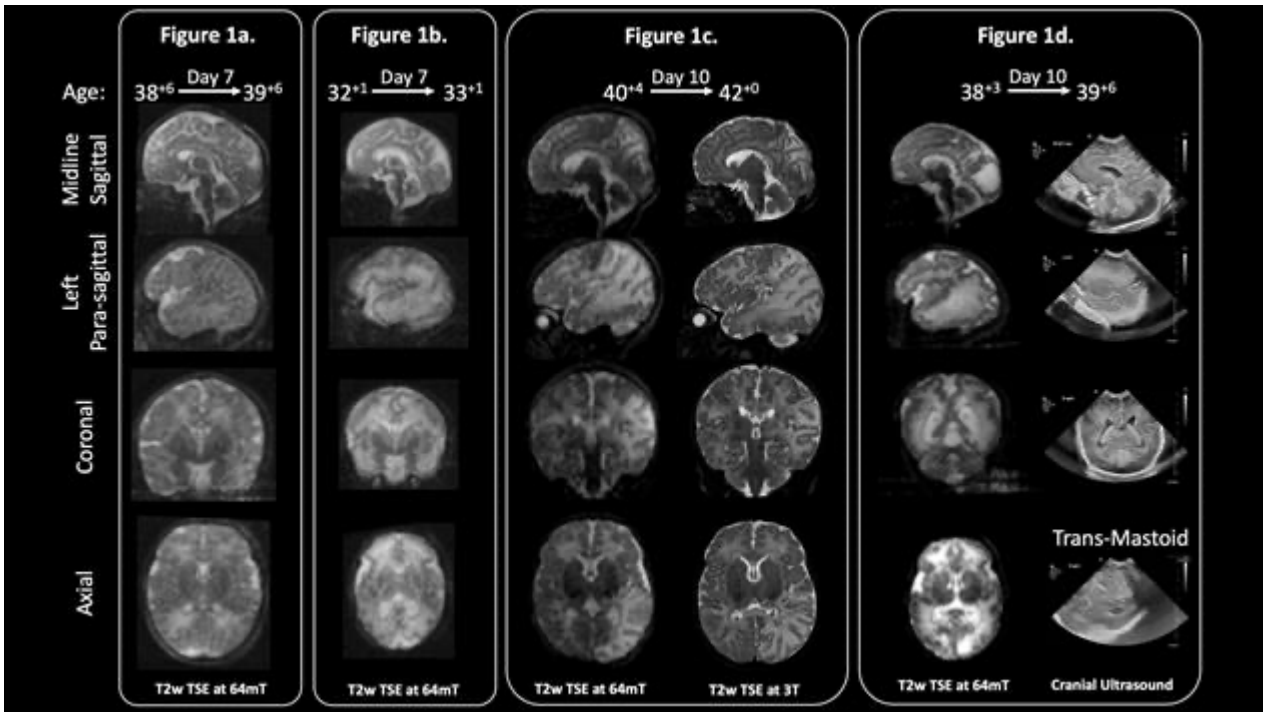
Figure 1a.
Figure 1b.
Figure 1c.
Figure 1d.
Age:
38+6 Day 7 39+6
32+1 Day 7 33+1
40+4 Day 10 42+0
38+3 Day 10 39+6
Midline Sagittal
Left Para-sagittal
Coronal
Axial
Trans-Mastoid
T2w TSE at 64mT
T2w TSE at 64mT
T2w TSE at 64mT
T2w TSE at 3T
T2w TSE at 64mT
Cranial Ultrasound

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Quality improvement initiative to enhance delivery room and early management of the preterm infant

Dr LiYan Chow[1], Dr Catherine Douch[1], Dr Ei Hnin Kyu[1], Dr Natasha Saunders[1], Dr Jessica Burgess-Shannon[1], Dr Nilesh Agrawal[1], Dr Shu-Ling Chuang[1], Dr Deena-Shefali Patel[1]
[1]*Chelsea and Westminster Hospital NHS Foundation Trust*

Background:
Effective delivery room management significantly improves outcomes in very preterm babies. The positive impact that delayed cord clamping (DCC) and admission normothermia has on mortality has been well documented in the literature.

Aim:
To develop and implement a bundle to standardise and optimise care provided to babies born less than 32 weeks.

Methods:
A checklist (Figure 1) outlining optimal care of the preterm baby before, immediately after and within the first few hours of birth was designed.

Practices were imbedded using targeted simulation and drop-in practical sessions on minimally invasive surfactant therapy (MIST) and DCC with the use of the LifeStartTM platform. Delivery room cuddles and early colostrum expression was supported by the Baby Friendly Initiative team on the unit.

A multimedia training programme of videos, posters, infographics, guidelines, and verbal presentations for intra and inter-departmental meetings was delivered.

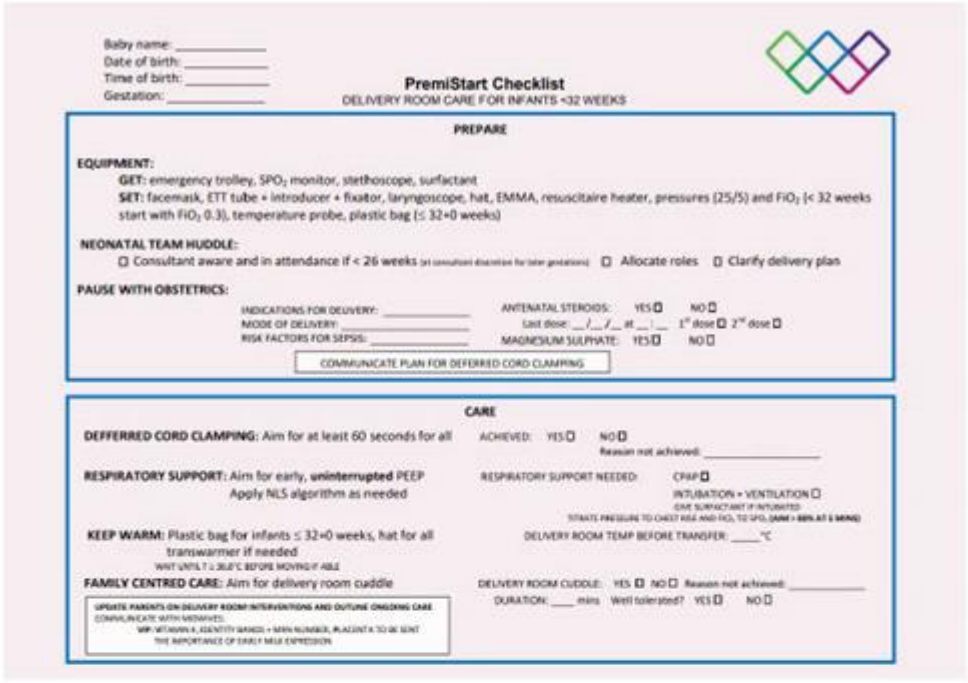
Quality outcome data was collated from electronic patient records before and after the introduction of the interventions.

Results:
Infants born at less than 32 weeks between September 2020 to February 2021 (n=36) and January to June 2022 (n=48) were compared. Improvements in admission normothermia (69% vs. 83%), DCC (31% vs. 46%) and delivery room cuddles (8% vs. 13%) were found. Chronic lung disease (oxygen at 28 days) was lower in the post-intervention epoch (63% (n=35) vs 51% (n=41)) as was grade I/II intraventricular haemorrhage (IVH) (28% vs. 16%). The number receiving maternal colostrum at <24 hours of age (39% vs. 37%) remained static.

Conclusions:
The introduction of a care bundle with the PremiStart checklist with education and training improved rates of admission normothermia, DCC and delivery room cuddles. Whilst data may suggest that these interventions have a positive impact on CLD and IVH prevention, further work is required to clarify this.

Image

Figure 1:



Baby name: _____
Date of birth: _____
Time of birth: _____
Gestation: _____

PremiStart Checklist
DELIVERY ROOM CARE FOR INFANTS <32 WEEKS

PREPARE

EQUIPMENT:
GET: emergency trolley, SPO_2 monitor, stethoscope, surfactant
SET: facemask, ETT tube + introducer + fixator, laryngoscope, hat, EMMA, resuscitaire heater, pressures (25/5) and FiO_2 (< 32 weeks start with FiO_2 0.3), temperature probe, plastic bag (≤ 32+0 weeks)

NEONATAL TEAM HUDDLE:
☐ Consultant aware and in attendance if < 26 weeks (at consultant discretion for later gestations) ☐ Allocate roles ☐ Clarify delivery plan

PAUSE WITH OBSTETRICS:
INDICATIONS FOR DELIVERY: _____
MODE OF DELIVERY: _____
RISK FACTORS FOR SEPSIS: _____
ANTENATAL STEROIDS: YES☐ NO☐
Last dose: __/__/__ at __:__ 1st dose☐ 2nd dose☐
MAGNESIUM SULPHATE: YES☐ NO☐
COMMUNICATE PLAN FOR DEFERRED CORD CLAMPING

CARE

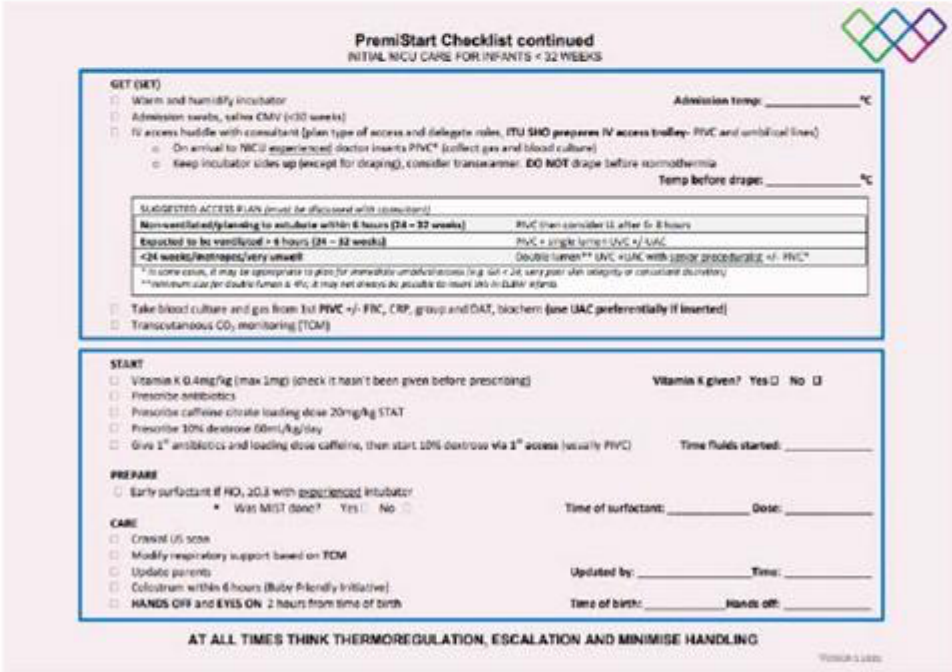
DEFFERRED CORD CLAMPING: Aim for at least 60 seconds for all
ACHIEVED: YES☐ NO☐
Reason not achieved: _____

RESPIRATORY SUPPORT: Aim for early, **uninterrupted** PEEP
Apply NLS algorithm as needed
RESPIRATORY SUPPORT NEEDED: CPAP☐
INTUBATION + VENTILATION☐
GIVE SURFACTANT IF INTUBATED
STRATE PRESSURE TO CHEST RISE AND FiO_2 TO SPO2 (AIM > 80% AT 5 MINS)

KEEP WARM: Plastic bag for infants ≤ 32+0 weeks, hat for all
transwarmer if needed
WAIT UNTIL T ≥ 36.0°C BEFORE MOVING IF ABLE
DELIVERY ROOM TEMP BEFORE TRANSFER: ____°C

FAMILY CENTRED CARE: Aim for delivery room cuddle
DELIVERY ROOM CUDDLE: YES ☐ NO ☐ Reason not achieved: _____
DURATION: ____ mins Well tolerated? YES☐ NO☐

UPDATE PARENTS ON DELIVERY ROOM INTERVENTIONS AND OUTLINE ONGOING CARE
COMMUNICATE WITH MIDWIVES:
WP: VITAMIN K, IDENTITY BANDS + MRN NUMBER, PLACENTA TO BE SENT
THE IMPORTANCE OF EARLY MILK EXPRESSION



PremiStart Checklist continued
INITIAL NICU CARE FOR INFANTS < 32 WEEKS

GET (SET)
☐ Warm and humidify incubator — **Admission temp:** _____°C
☐ Admission swabs, saliva CMV (<30 weeks)
☐ IV access huddle with consultant (plan type of access and delegate roles, **ITU SHO prepares IV access trolley**- PIVC and umbilical lines)
- On arrival to NICU experienced doctor inserts PIVC* (collect gas and blood culture)
- Keep incubator sides up (except for draping), consider transwarmer. **DO NOT** drape before normothermia

Temp before drape: _____°C

SUGGESTED ACCESS PLAN (must be discussed with consultant)	
Non-ventilated/planning to extubate within 6 hours (24 – 32 weeks)	PIVC then consider UL after 6- 8 hours
Expected to be ventilated > 6 hours (24 – 32 weeks)	PIVC + single lumen UVC +/- UAC
<24 weeks/micropes/very unwell	Double lumen** UVC +UAC with senior practitioner +/- PIVC*

*In some cases, it may be appropriate to place an immediate umbilical access (e.g. GA < 24, very poor skin integrity or consultant discretion)
**Minimum size for double lumen is 4Fr, it may not always be possible to insert UAs in EXTREMELY infants

☐ Take blood culture and gas from 1st **PIVC** +/- FBC, CRP, group and DAT, biochem **(use UAC preferentially if inserted)**
☐ Transcutaneous CO_2 monitoring (TCM)

START
☐ Vitamin K 0.4mg/kg (max 1mg) (check it hasn't been given before prescribing) — **Vitamin K given? Yes☐ No ☐**
☐ Prescribe antibiotics
☐ Prescribe caffeine citrate loading dose 20mg/kg STAT
☐ Prescribe 10% dextrose 60ml/kg/day
☐ Give 1st antibiotics and loading dose caffeine, then start 10% dextrose **via 1st access** (usually PIVC) — **Time fluids started:** _____

PREPARE
☐ Early surfactant if RD, ≥0.3 with experienced intubator
- Was MIST done? Yes☐ No ☐

Time of surfactant: _____ **Dose:** _____

CARE
☐ Cranial US scan
☐ Modify respiratory support based on **TCM**
☐ Update parents — **Updated by:** _____ **Time:** _____
☐ Colostrum within 6 hours (Baby Friendly Initiative)
☐ **HANDS OFF and EYES ON** 2 hours from time of birth — **Time of birth:** _____ **Hands off:** _____

AT ALL TIMES THINK THERMOREGULATION, ESCALATION AND MINIMISE HANDLING

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Keep It Sweet: MDT approach to management of Neonatal Hypoglycaemia at a District General Hospital

Dr Nicole Chua[1], Dr Aishath Rizma Moosa[1], Dr Emmeline Parfitt-Roche[1], Dr Kainaz Singh[1]
[1]*Northampton General Hospital*

Background: Neonatal hypoglycaemia is among the leading causes of avoidable term admissions. Early recognition of babies 'at-risk' of hypoglycaemia is important as low blood sugars in infants adversely affects neurodevelopment. This necessitates close monitoring and early prompt treatment of 'at-risk' babies.

Aims:
1. Retrospectively evaluate the current management of hypoglycaemia in term babies in post-natal ward against the local guidelines; in line with British Association of Perinatal Medicine (BAPM) framework.
2. Create a multi-disciplinary team (MDT) Education bundle

Method: A retrospective study included term infants born between 1st September 2021 to 31st October 2021 in Northampton General Hospital. Sixty patients met the inclusion criteria and were analysed. Additionally, a short-anonymised survey was initially undertaken to understand the staff's confidence in the management of hypoglycaemia. Following on implementation of the Education bundle, spot check analysis was completed (PDSA cycle 1).

Result: The survey revealed that the majority were not confident in managing hypoglycaemia in post-natal wards with 11% could identify the 'at-risk' babies effectively. The common risk factor for "at-risk" babies was maternal diabetes. Figure 1A shows a representation of audit standards used and the outcomes of spot-check (PDSA cycle 1) following implementation of the recommended Education bundle.
Education Bundle included (Figure 1B):
- E-learning package for management of hypoglycaemia and regular teaching sessions to be delivered to midwifery and neonatal team
- Locally adapted flowchart for management of hypoglycaemia in term and late preterm infants on the post-natal ward
- Parental information leaflet

Conclusion:
Collaborative working with the midwifery and obstetric team to create Education Bundle was most beneficial in improving the quality of care. The initial spot check audit showed an improving outcome. We are continuing to reinforce the Education Bundle into local practice and plan to conduct a formal audit in the future to evaluate the results.

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Early Milk for Early babies: improving time to first maternal milk for babies born <32/40

Dr Rebecca Clements[1], Ms Danielle Llabres[1], Dr Fauzia Paize[1], Ms Michaela Davis[1]
[1]*Liverpool Women's Hospital Neonatal Unit*

Background

Preterm infants fed their mothers milk have lower morbidity and mortality. Early expressing is essential to prevent delay in the onset of lactogenesis II, allowing babies to receive early maternal milk, with the protection it provides, and maximising milk availability.
NNAP data shows we are below the national rate for breastmilk feeding at day 14 and at discharge. We recognised a delay in the commencement of enteral feeds in infants <32/40 and designed a quality improvement project to address this.

Aims

1)To reduce the time between birth and receipt of first maternal colostrum in inborn <32/40 babies.
2) To support mothers to start expressing as soon as possible after birth

Methods

Utilising 'Plan, Do Study, Act' methodology we initially identified barriers to babies receiving maternal milk within 6 hours of birth and assembled a multidisciplinary quality improvement team.

Intervention: a multidisciplinary education programme (brief teaching, journal club, practical skills update), development of a Buccal Colostrum guideline, standardisation of documentation, infant feeding team presence at the labour ward huddle and antenatal expression where delivery is inevitable.

Results

The intervention was launched at the end of quarter 1 (Q1) 2022. Mean time to first maternal milk fell by 65% from 44.7 hours preintervention to 15.7 hours in the first quarter following implementation. Median time was reduced from 18.5hours to 7 hours. In Q2 2022 40% of inborn <32/40 babies received their mothers milk within 6 hours of birth and 80% within 24 hours. Amongst the most preterm babies (<27/40), 61% received their mothers milk within 6 hours and 89% within 24 hours of birth.

Conclusions

The multi-focal intervention led to a significant reduction in time to first maternal milk.
Next Steps: include 32-34/40 infants, increase antenatal expressing, investigate the impact of early expressing on maternal milk received at D7 and D14.

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Family Integrated Care (FiCare): 'You Said... We Did...' – Listening to Families

Dr Rebecca Clements[1], Ms Deborah Edwards[1], Dr Emily Hoyle[1], Ms Nicola Leicester[1]
[1]*Liverpool Women's Neonatal Unit*

Background
FiCare is a model of care endorsed by BAPM and others as the optimum model of care for neonatal units. Since March 2021, we have been working with families to implement and sustain Ficare on our tertiary NICU.

Essential to this is regular family feedback to help us refine and develop our model of care.

Aims
*Utilise family feedback to develop sustainable Ficare

*To identify and implement actions in response to our 'implementation phase' parent feedback

*To communicate feedback and actions to families

Methods
Multiple improvement initiatives were devised following 'implementation phase' feedback and these were communicated via a 'You Said...We did' parent communication board (see Table 1). A discharge survey was developed and made available on tablets for families to complete. We reviewed all feedback over a 3-month period for ongoing development of our neonatal family experience.

Results
43 responses were received during this period, with 43% of these from dads/partners. 70% of mums and 61% of dads/partners had delivery room cuddles. Feedback on our 'Baby Steps' cards was overwhelmingly positive with parents describing "a sense of achievement", "having them as memories" and giving a "positive focus in a difficult time". There was also positive feedback about the art installations and reintroduction of visitors. Feedback included "It's obviously a place nobody wants to be but you really have made the best out of a very difficult situation".

Conclusions:

Ficare continues to be embedded in our tertiary NICU with positive feedback from families. We will continue to listen to the family voice to ensure ongoing improvements to provide exceptional care.

Ongoing plans include creating an online parent programme with improved accessibility for all families, pathway development for journey through the neonatal unit, increased availability of peer support/counselling services, and regular parent feedback surveys to enable PDSA cycles for improvement.

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Neonatal Flashcards for Junior Trainees – Can An Aide Memoir Improve A Trainee's Confidence in the Neonatal Unit?

Doctor Victoria Collis[1], Doctor Arthi Lakshmanan[1], Doctor Sarah Ellis[1], Doctor Steven Abbey[1], Doctor Salma Dawood Shehabi[1]
[1]*University Hospital Coventry And Warwickshire*

Background:

As a junior trainee, placement in the Neonatal Unit can be a challenging and daunting experience. The aim was to create a tool that would give trainees the confidence to thrive in the neonatal unit and maximise their learning experience.

Methods:

A collection of laminated flashcards and an online document were designed and rolled out to trainees. Each card contained a summary of key local guidelines and drug doses.
After each six-month placement feedback through a survey was obtained and the cards modified accordingly.
Since September 2020, the flashcards have been rolled out every six months to four cohorts of trainees.

Results:

The trainees ranged from ST1-ST5+ paediatric trainees and included clinical fellows.
The analysis of the feedback showed that 6 out of the 20 trainees had never had any previous neonatal experience.
100% of trainees used the flashcards and 19 out of 20 trainees found they used the flashcards in preference to the online document.
6 out of 20 trainees said they used the cards everyday with the rest using them a few times a week, once a week or a few times a month.
100% of trainees said the cards gave them more confidence in the neonatal unit and 100% of trainees would like similar flashcards available in future neonatal jobs.
Feedback from the unit also highlighted that nursing staff have shown an interest and have started using the flashcards.

Conclusion:

The feedback was overwhelmingly positive and highlighted that an aide memoir can provide trainees with a handy and informative resource. It can improve their confidence in the neonatal unit and positively contribute to patient safety.
The idea has the potential to be implemented in other units both locally and nationally and could be adapted to other members of the team such as nursing staff and midwives.

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Implementing Family Integrated Care (FICare) on the Neonatal Unit: Changing culture through staff education

Elaine Wood[1], Rebecca Chilvers[1], Francesca Carey[1], Helen Metcalf[1], Charlotte Howse[1], Dr Nicola Crowley[1], Dr Paul Crawley[1]
[1]*Neonatal Unit, Evelina London Children's Hospital*

Background

The ELCH Neonatal Unit adopted FICare as the sole model of care in May 2021. The purpose of FICare is to integrate parents into the care team, fully involving them in their baby's care. To successfully change the model of care, a change in unit culture was needed. Staff needs were identified through a questionnaire. The study day was codesigned with parent and staff champions around these needs and implemented for the whole neonatal MDT.

Aims

There were 3 aims of the study day: 1. Increase staff knowledge of FICare; 2. Enable staff to empower parents; 3. Increase knowledge of FICare resources.

Methodology

All neonatal staff across disciplines were allocated to attend a one day study day to introduce them to the philosophy and practice of FICare. At the start and end of each day staff were asked to complete a pre and post course questionnaire to score their knowledge and confidence around FICare. 14 study days were delivered over 4 months. 77% of nursing staff attended. The feedback was used to iterate and adapt consequential study days to ensure staff needs were continually met.

Results

See graphs. All 130 responses showed an improvement after the study day in how confident they felt at: knowing with FICare is, empowering parents to be the primary care giver and using the FICare resources as part of their everyday care.

Conclusion

A high percentage of staff reported being more confident overall at the end of the day, however translating this into practice continues to require support from the FICare team in the clinical areas.
The second FICare study day is underway and again staff have been allocated to attend as part of their roster. We continue to codesign all teaching and resources, to ensure future parent and staff needs are continually met.

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Optimising Breastmilk fortification- accuracy over estimation.

Mrs Gail Ryan[1], Mr Colm Darby[1]
[1]*Southern Health And Social Care Trust*

Title: Optimising Breastmilk fortification- accuracy over estimation

Introduction:
Accelerated absorption and accumulation of nutrients occurs in the late stage of pregnancy for the fetus, for which preterm infants miss out. Maximising nutritional support from birth is vital in improving survival, growth, metabolism, and immunity. Breastmilk feeding in preterm infants is crucial but breastmilk cannot meet the nutritional needs of premature infants who are born in a state of nutritional deficit and need to catch-up to ensure optimal growth and development. Breast milk fortifier (BMF) has been used as an intervention to meet preterm nutritional needs.
Aim:
Using a Quality Improvement PDSA cycle we looked at the following processes:
1. Review BMF process
2. Audit fortification calculation skill and delivery
3. Review fortification training.
4. Develop fortification calculation sheets
5. Compare BMF practice across NI

Methods:
The approach of calculating fortifier amount prior to the audit used an estimation approach rather than a calculation through measurement of BMF weight. Audit of 25 staff on fortification skills with set volume amounts and informed to administer the appropriate BMF amount.

Results
- Audit results showed that the 84% of fortification was insufficient.
- No formal fortifier training was in place at the time of the audit.
- Regional audit of practice across other 5 neonatal/SCBU units showed inconsistency in practices and accuracy of measurement.
- Virtual education session on dietetics and nutrition was held looking at fortifier use and administration.
- Calculation sheet on amount of fortifier required for amount of milk volume was developed and displayed.
- Individual weighing scales were purchased and a standard operative procedure was greater to instruct healthcare staff on their use.

A recycling of a PDSA cycle showed improved knowledge and skills of staff on the importance of accuracy with BMF - 97% achievement in optimal fortification.

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Improving compliance with optimal cord management for preterm infants using Lifestart trolley and 'bite-size' face to face training package in a UK neonatal service

Dr Aniko Deierl[1], Dr Jayanta Banerjee
[1]*Imperial College Healthcare NHS Trust*

Background:
Imperial Neonatal service implemented optimal cord management using Lifestart trolley and developed a face to face 'bite-size training' module for obstetric/ maternity/ neonatal staff in our neonatal intensive care unit (Queen Charlotte's and Chelsea hospital) and local neonatal unit (St Mary's Hospital) over the past 6 months period.

Aims:
The aim was to improve compliance with a minimum one-minute delayed cord clamping while initial stabilisation is started with Lifestart trolley for infants born < 34 weeks' gestation.

Methods:
Lifestart trolleys were delivered and training started in December 2021. A face to face 30 minute 'bite-size' training package was developed ,which contained information on benefits of delayed cord clamping, cardiovascular changes at birth with early clamping and if stabilisation started with open cord and finished with equipment training on the Lifestart trolley and short simulation training with preterm manikin if time was available.
Results:
Results between December 2021 and June 2022 around 200 perinatal team members were trained. Compliance with minimum one-minute delayed cord clamping presented in Table 1 below. Compared to the 2020 NNAP data, over the past 6 months period, significant improvement was achieved in compliance with optimal cord management, and this includes a high number of extremely preterm infants born in our NICU.

Conclusions:
The approach using Lifestart trolley and delivering face to face 'bite-size' teaching module to maternity, obstetric and neonatal staff has significantly improved compliance with optimal cord management for preterm babies born in our NICU and LNU.

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Implementing BestPrem, a 12-element perinatal optimisation care bundle in a UK neonatal service

Dr Aniko Deierl, Dr Jayanta Banerjee, Dr Lidia Tyszczuk
[1]*Imperial College Healthcare NHS Trust*

Aims:
Imperial Neonatal service is working on the implementation of BestPrem perinatal optimization care bundle in our neonatal intensive care unit (Queen Charlotte's and Chelsea hospital) and local neonatal unit (St Mary's Hospital) in collaboration with the Periprem project. The aim of this project is to achieve > 90% compliance with applicable care bundle elements for infants born < 34 weeks' gestation to improve survival without significant morbidity.

Methods: The 12 elements selected for this care bundle are shown in Figure 1. All elements were implemented (last element was the probiotics implementation March 2021) and compliance prospective monitored. Parent information materials designed. Both NNAP and VON parameters are used to monitor clinical outcomes.

Results and conclusion: While we are not yet able to share relevant data on outcome, we can share learning from the implementation of this perinatal optimization care bundle and initial compliance with care bundle elements.

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A Bone of Contention: Striving to improve diagnosis and management of Metabolic Bone Disease of Prematurity

Dr Amraj Dhami[1], Dr Ilana Levine[1], Mrs Mar Moreno[1], Dr Zoltan Molnar[1]
[1]*John Radcliffe Hospital Neonatal Unit*

Background: Metabolic Bone Disease of Prematurity (MBDP) is caused by reduced antenatal calcium/phosphorus transfer and high skeletal growth rate. Management consisted of routine phosphate supplementation and ALP monitoring. In October 2020, a new local guideline was introduced based on recent literature recommendations to include routine PTH measurements. Infants with PTH >7pmol/L were supplemented with calcium until PTH concentration returned to normal. Vitamin D monitoring was also encouraged, with instruction on treating deficiency or insufficiency, as appreciated in the attached MBDP guideline flowchart. Routine phosphate supplementation was discouraged. A service evaluation was completed after the guideline's implementation and historic cohorts were used to detect resulting biochemical impacts.

Methods: The eligible population (born <28 weeks or <1.5kg) were identified through Badgernet. Cohorts were analysed before (October 2019-June 2020) and after (October 2020-October 2021) the new guideline introduction. Laboratory staff provided all relevant blood results.

Results: Following new guideline implementation:
• Most of the eligible babies had their PTH checked, of which 75% fulfilled criteria for calcium supplementation (PTH >7pmol/L at first testing). PTH concentration was normal in 58% of cases at final assessment.
• There was no reduction in final, maximal or time integral ALP activity between cohorts.
• The incidence of calcium >2.8mmol/l during an entire stay increased from 44% to 79%.
• 27% of babies had suppressed PTH at some point during stay (<1.6pmol/L).
• 83% had insufficient (30–49nmol/l) or deficient (<30nmol/L) vitamin D.
• Vitamin D level remained low in most babies despite supplementation.

Conclusions: Introducing routine PTH measurements revealed a high proportion of preterm babies with elevated PTH (suggesting global calcipenia) and resulted in a significant change in the management of MBDP. We noted a higher incidence of hypercalcemia in the post-guideline cohort, but no change in ALP activity. Vitamin D deficiency/insufficiency was prevalent, and refractory to treatment.

Image

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The introduction of multidisciplinary perinatal simulation and lessons learned

Dr Catherine Douch[1], Dr Li Yan Chow[1], Miss Eleanor Sein[1], Ms Anne-Sophie Bayer[1], Dr Deena Patel[1]
[1]*Chelsea and Westminster Hospital*

Emergency perinatal medicine is invariably a multidisciplinary team (MDT) event as multiple teams work in unison to provide time-critical care for two (or more) patients. The Ockenden report (2020) highlighted failures in perinatal training and care, recommending that teams working together should train as an inter-team unit.

Aim:
In the wake of the Ockenden Report (2020) a perinatal simulation programme was introduced at a National Health Service teaching hospital in the UK. The aim was to highlight the importance of non-technical skills such as communication and understanding between teams to improve patient care.

Methods:
Learning outcomes and simulation scenarios were developed by teaching fellows and consultants with an interest in simulation training, from anaesthetic, midwifery, neonatal and obstetric teams. A total of three simulation scenarios were developed and implemented on the labour ward. These included an emergency caesarean section and an extreme preterm birth requiring advanced neonatal life support. Debriefs were facilitated by the team immediately after each scenario. Learning objectives focused on inter-disciplinary communication and human factors.

Results:
Key learning points and resultant change outcomes (Table 1) were determined from the simulations and debriefs in agreement with participants and faculty, and were widely distributed to perinatal staff.

Over the course of the simulations, there has been an increase in interest and motivation of staff, to a consultant level, to participate in the sessions. Simulation has become an established training method in our departments and has led to a culture change and shared understanding of the importance of human factors in perinatal emergencies.

Conclusions:
MDT simulation has increased cross discipline understanding, uncovered latent errors and become engrained into the culture of our department and has thus led to an enhancement of perinatal care. Where multiple teams work together regularly, in perinatal emergencies, co-training the MDT should be considered a priority.

Image

Key learning point	Outcomes
Communication: - A shared understanding of urgency - Junior staff feeling capable of speaking up - Information sharing between the MDT - Neonatal team feeling unable to speak up re: DCC in theatre	- The Surgical Safety checklist was revised with prompts for the neonatal team relating to concerns or DCC and for any maternal concerns - Staff have been trained on the importance of using the surgical safety checklist for all emergency deliveries
Roles: - Understanding the roles and expectations of other teams - Considering who has an overview during perinatal emergencies	
Environmental factors: - Noise and the effect of chaotic environments on staff - Equipment including preparing rooms for expected emergencies of resuscitations - The lack of availability and position of gas ports on the walls in labour rooms led to issues with the use of equipment such as the LifeStart™ platform	- A room plan was introduced to earmark and prepare the largest rooms for expected preterm and unwell deliveries - A visual guideline relating to the movement of extremely preterm babies from delivery to NICU admission was circulated - Highlighting to the team in room that airway procedure commencing to allow quiet so communication can be effective - The LifeStart™ gas supply was changed to portable cylinders with a system set up for replacement.

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Where do we drive? A decision making tool for ambulance crews called to threatened preterm birth

Dr Samantha Edwards[1], Mrs Dawn Kerslake[2]
[1]Ashford And St Peter's Nhs Trust, [2]South East Coast Ambulance NHS Trust

There is a national driver to increase the number of extremely premature infants delivered in tertiary centres, with a KLOE target of 85%; and being a key component of perinatal optimisation, as seen in the South West Periprem project. The evidence for this is clear, with a number needed to treat of 8.
Within our local geography, there are several hospitals of differing neonatal provision. A patient story inspired us to change. A mother in threatened preterm labour was offered choice of where to be transferred without any information to support this decision. She chose to go to the level one unit, and subsequently both her and baby were subject to ex utero transfer. We realised an opportunity to improve care and potentially reduce harm for other families.
Working with South East Coast Ambulance Service (SECAMB), a decision making tool was designed. This was developed from the concept of their existing Major Trauma Decision Making Tool – which uses clinical information to help the crews decide on destination. We undertook a training programme, particularly focussed on the Critical Care Paramedics who would be supporting crews in the field. We attended LMNS and ODN meetings to seek buy in for the project across Kent, Surrey and Sussex. Ratification was given by SECAMB, and all crews now have access to this tool whilst on the road.
This work is part of a greater piece around birth in the right place for the South East; including network wide in-utero transfer guidance. Many women alternatively access support via maternity advice lines rather than 999 – and we are looking to expand our decision making support into this sphere. We believe this tool is unique and highly transferable to other networks and ambulance trusts, and would be keen to share our experiences.

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Is telemedicine suitable for supporting the acute care of newborns in local neonatal units?

Dr Gemma Edwards[1], Dr Joyce O'Shea[1]
[1]*Royal Hospital for Children*

Background:
Decline in airway management competency occurs within months of attending a neonatal life support course and is more marked in clinicians attending less than one resuscitation per month. Very preterm delivery in non-tertiary units is associated with a significantly increased likelihood of death. Could telemedicine provide an opportunity for support from tertiary neonatologists to be provided to local units in acute situations?

Methods:
A search was performed using OVID including MEDLINE and EMBASE. Initial search with the chosen keywords identified 42 articles which were reviewed. A narrative review was chosen to obtain a broad overview of a topic which has only recently begun to be explored in neonatology.

Results:
- No randomised controlled trials were found. Nine small pilot studies and manikin studies were identified.
- Telemedicine has been shown to reduce time to successful ventilation, enhance the quality of newborn resuscitation, and promote use of non-invasive respiratory support rather than mechanical ventilation.
- Rural and tertiary neonatal units internationally have shown through pilot studies that they are ready and able to embrace telemedicine for acutely unwell newborns, including the extremely preterm.
- Smaller units can be safely supported in caring for appropriate infants rather than transferring to another unit.
- Significant potential economic benefits could be achieved through avoiding unnecessary emergency retrieval of infants.
- Telemedicine could preserve cots in tertiary NICUs for the most unwell infants requiring specialist care and prevent unnecessary separation of mothers and babies.
- Effective consultation can be established using commercially available mobile devices and tablets.

Conclusion:
Telemedicine in acute neonatology looks to be a very promising area, with potential to improve quality of care and save tertiary cots for the sickest infants. Developing a larger trial of telemedicine for acute care in neonatology and review long term outcomes would be beneficial.

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Closer To Home - seamless repatriation for families

Lisa Leppard, Mrs Sarah Edwards[1], Diane Gray
[1]*TVW ODN*

This poster showcases the work completed by the TV&W Repatriation Group, to ensure the seamless repatriation of families closer to their homes for continued Neonatal care.
The poster explains the journey from the identification of the need, to improving this pathway for families and neonatal staff members across the Network.
The initial scoping carried out by the Lead Care Coordinators, following their appointment, identified issues with how families were repatriated, and the planning and communications between neonatal units and families; these being poor communication, planning and little family involvement. We also identified the need for education around repatriation and the language used, as this had led to mistrust between teams and parents.
We wanted to ensure the mental wellbeing of parents and staff was addressed, and improved, within this workstream.
The working group, established in October 2021, was a multidisciplinary group with our Network PAG at the heart of all our work.
We reviewed and re wrote the current Repatriation Framework, designed communication proformas for staff-to-staff communication and Repatriation Link Nurse communication with families. We also designed a new Parent information leaflet to explain repatriation.
The role of the Repatriation Link Nurse is a new role which we are piloting across some of our TV& W neonatal Units. The aim of this role is for our LNU's and SCU's to link with families as soon as they are aware of their transfer for tertiary care, to develop relationships with the families, answer questions and begin their preparation for transfer back to their local unit, when the baby's condition allows.
Working in partnership with V Create and the PAG, to produce a Repartition Video for families to view as part of their preparation has been a real pleasure.

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IMPLEMENTING A PERINATAL PALLIATIVE MULTI-DISCIPLINARY TEAM MEETING - EXPERIENCE AND OUTCOMES

Dr Sharon English[1]
[1]*Leeds Children's Hospital*

Background:
Families expecting a baby, or who have a baby, with a potentially life-threatening diagnosis should have access to specialist multi-disciplinary palliative care teams. Ensuring early identification and referral to support care planning improves the quality of care for these families and their babies.

Methods:
A monthly perinatal palliative MDT meeting was launched in October 2020. The team comprises consultants in neonatal medicine, paediatric palliative care, fetal medicine and fetal cardiology, specialist midwives, paediatric cardiology nurses, neonatal bereavement nurse and hospice doctors and nurses. The MDT meets virtually with the aim of improving early identification, hospice referral, and access to specialist care planning.

Outcomes:
Between October 2020 and July 2022, 132 cases were identified - 93 antenatally and 39 in the neonatal period.
Antenatal referrals: 20 cases remain in utero. 56/73 (77%) resulted in fetal demise or neonatal/infant death. 7 pregnancies were terminated, 11 resulted in antepartum in-utero death and 6 in intrapartum stillbirth. Of 49 babies born alive, 32 subsequently died (mean age at death 5 days, range 0-55 days). 4 babies remain in hospital, and one is receiving palliative care in the community. 12 babies have moved to an active treatment pathway.
Neonatal referrals: 29 (74%) babies died (mean age at death 63 days, range 0-340 days). One baby remains an inpatient and 4 are receiving palliative care in the community. 5 babies have moved to an active treatment pathway. Only 4 of the neonatal referrals could potentially have been identified antenatally.

Discussion
The majority of babies who died were identified as requiring palliative care antenatally, giving families the opportunity to be supported by hospice or hospital palliative care teams throughout pregnancy, delivery, and neonatal care. The number of antenatal referrals is increasing, suggesting that cases are being identified earlier through the MDT.

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Safety and Feasibility for Delivery Room Cuddles in Infants with Antenatally Diagnosed Surgical Defects

Dr Rebecca Evans[1], Dr Thomas Hogan, Dr Ranganna Ranganath
[1]*Health Education North West*

Background: Delivery Room Cuddles (DRC) is a growing practice in many tertiary neonatal centres with proven benefits for maternal infant bonding, improved breastfeeding rates and reduced infant stress responses. There is little published information regarding DRC practiced in surgical babies and its safety in this cohort. In October 2020 we implemented a Quality Improvement Project (QIP) at St. Mary's neonatal unit Manchester, with the aim of offering DRC for all babies (where safe) before admission to the neonatal unit, including babies with antenatally diagnosed surgical defects.
Aim: This case series reviews the efficacy of the QIP and its safety and feasibility in infants with surgical defects. We aimed to improve the uptake of DRC in infants with surgical defects and to investigate whether DRC is associated with an increase in the number of babies receiving breast milk.
Methods: Data was collected for all babies admitted to the neonatal unit from pre-implementation of the QIP for one month, and then for eight months following implementation. We reviewed the rates of DRC and were monitoring for any adverse or beneficial effects. Chi-squared tests were performed to look for statistically significant association between DRC and breast milk feeding rates.
Results: 41 babies were admitted with antenatally diagnosed surgical defects between October 2020 - May 2021. 56% of these had DRC, including intubated babies with congenital diaphragmatic hernias, and babies with open surgical defects. In the month before the QIP, no surgical babies had a DRC. More babies who had a DRC received breast milk (79%) than those who did not have a DRC (73%) but this was statistically insignificant. (p=0.2451). There were no adverse incidents associated with DRC.
Conclusion: Our case series demonstrates that DRC can be safely practiced in babies with surgical defects.

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Training, experience, and confidence in neonatal intubation: results of a national trainee survey.

Dr Katie Evans[1], Dr Kathryn Macallister[2,10], Dr Hagop Krikorian[3], Dr Sidaarth Vasanth Kumar[4], Dr Jennifer Waspe[5], Dr Eleri Adams[6,7], Dr Cheryl Battersby[1,8,9]

[1]Chelsea and Westminster NHS Foundation Trust, [2]St Michaels' Hospital, University Hospitals Bristol NHS Foundation Trust, [3]London North-West University Healthcare NHS Foundation Trust, [4]King's College Hospital NHS Foundation Trust, [5]Sheffield University Hospitals NHS Foundation Trust, [6]Oxford University Hospitals NHS Foundation Trust, [7]BAPM President Elect, [8]Imperial College London, [9]BAPM Data and Informatics Lead, [10]BAPM Trainee Representative

BACKGROUND:
Increased use of non-invasive respiratory techniques has reduced opportunities for development of this potentially life-saving skill. A previous survey from 2019 demonstrated that only 18% of trainees feel completely confident at neonatal intubation (Belkhatir et al, 2021).

AIM:
This national survey aimed to update our knowledge regarding neonatal intubation exposure of paediatric trainees in 2022 in England, in view of the removal of endotracheal intubation from the RCPCH level 1 curriculum. It comprised three main aspects; training, intubation experience and barriers to developing intubation skills.

METHODS:
A 20-question survey was conducted via an online platform and key stakeholders, including neonatal, paediatric and anaesthetic trainees contributed to question design. National dissemination took place in February 2022 via BAPM, RCPCH trainee representatives and social media. Structured answers were invited in pre-selected domains for quantitative analysis and also in free text to identify important themes.

RESULTS:
There were 210 participants balanced across all levels of training. The most common training method was observation of a term intubation (85%) followed by intubation of a mannikin (83%). There is a wide range in number of supervised and un-supervised intubations (table 1) and it is notable that only two-thirds of senior ST6-8 trainees have independently intubated more than ten times. 36% of trainees surveyed did not feel adequately prepared prior to undertaking their first independent intubation with only 16% feeling very well prepared. Common suggestions from the free text responses to improve intubation success rates included formal structured teaching, signposting to intubation resources, video laryngoscopy and access to anaesthetic theatre lists.

CONCLUSIONS:
Most paediatric trainees do not feel confident in neonatal intubation and would welcome more structured training on airway management. Our findings from this group of key stakeholders should be useful to inform the scope of the planned national neonatal airway framework.

Image

TABLE ONE:

		ST1-3	ST4-5	ST6-8	All grades
Number of intubations (under direct supervision)	0	14%	3%	0%	5%
	1-2	31%	9%	5%	13%
	3-5	19%	34%	24%	26%
	5-10	27%	27%	29%	28%
	>10	9%	26%	44%	28%
Number of intubations (independently)	0	88%	35%	5%	37%
	1-2	7%	15%	9%	10%
	3-5	0%	18%	8%	9%
	5-10	3%	15%	15%	12%
	>10	2%	15%	63%	31%
How well prepared did you feel for your first un-supervised intubation?	Very unprepared	18%	11%	5%	8%
	Quite unprepared	35%	25%	30%	29%
	Quite well prepared	35%	47%	50%	47%
	Very well prepared	12%	17%	15%	16%

45

ThermoSTAT: a QI project to improve preterm normothermic admission rates

Dr Sarah Farquharson[1], Ms Lindsey Dewar[2], Ms Karen McFarlane[2], Dr Dominic O'Reilly[2]
[1]*Royal Hospital For Children,* [2]*Forth Valley Royal Hospital*

Background: Preterm normothermia on neonatal unit admission reduces neonatal mortality and morbidity. Local data pre-project highlighted only 60% of preterm admissions were within the target range of 36.5-37.5 degrees Celsius.

Aim: To improve admission normothermia rates for preterm infants to the neonatal unit from the delivery suite.

Methods: The "Thermo-STAT' quality improvement (QI) project was created in February 2020 in Forth Valley Royal Hospital, a local neonatal unit of approximately 3000 deliveries/annum. A paediatric trainee "Temperature Champion" conceptualised this project, together with the neonatal nursing QI lead, and this role has continued throughout trainee rotations. Consultation involved the wider maternity multidisciplinary team.

Thermo-STAT encourages checking the infant's temperature at:
- Stabilisation
- Transfer
- Admission
- Time >1 hour from admission (if necessary)

Focus areas were: creation of "warm bundles" for use at deliveries, expansion of use of plastic bags (all deliveries <34 weeks) and transwarmers, introduction of continuous temperature probes, and staff education. A named person responsible for temperature regulation was allocated at all deliveries, and temperature management methods were documented on audit forms.

Results: Normothermic admissions of <32 week infants increased steadily following project commencement.

Table 1:

Beforehand, 32% (n=22) had a delivery room temperature documented (Sept 2019 - Feb 2020), increasing to 91% in the four months following study commencement. Increased hypothermic admissions in May 2020 were associated with pandemic-related "COVID" theatres; subsequently environment changes were made and increased theatre staff education was undertaken.

Hypothermic admissions have fallen; conversely all four admissions in 2021 outwith target range were hyperthermic (37.6-38.0). Continuing completion of audit forms has been challenging, largely due to staffing pressures, however staff involvement has been maintained.

Conclusions: Admission normothermia rates have improved and been maintained. Staff education, plus environmental and equipment changes facilitated this; and engagement of the entire maternity team has been key.

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Bringing joy to neonatal unit - one door sign at a time.

Dr Maggie Frej[1]
[1]*Simpson's Centre for Reproductive Health, Royal Infirmary Of Edinburgh / NHS Lothian*

Background
Art has the potential to improve the hospital environment, relieve anxiety and bring joy to both staff and patients. This topic was studied previously in mental health and paediatrics settings, however, the study of the impact of artwork on staff and parents in neonatal units is limited.

Aim

The aim was to develop new door signs for Simpson's Neonatal Unit to improve navigation and make a positive impact on the NNU environment and staff's and parents' well-being during the COVID pandemic.

Methods

30 door signs were painted by a Paediatric Trainee from 08.2020-07.2022. Artwork themes were intentional and included Edinburgh landscapes, animals, bonding between a parent and a newborn, and supporting each other at challenging times. A common theme was a starry sky, aiming to create a sense of escapism and unifying artwork into one distinctive collection. Feedback was collected using an online questionnaire. 67 responses from staff and 10 from parents were received.

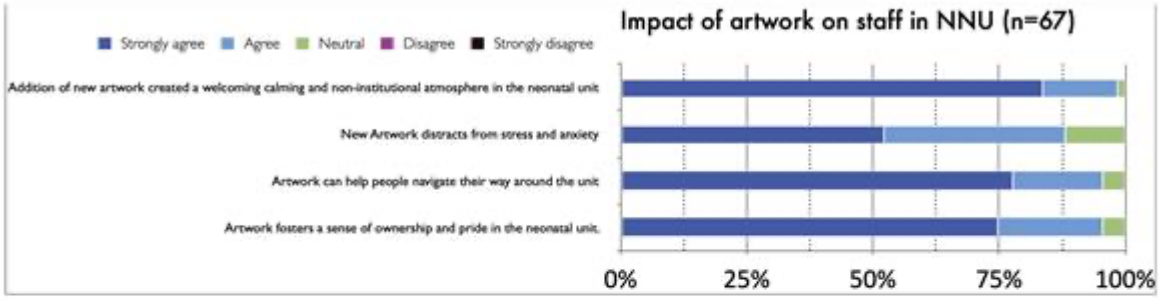
Results

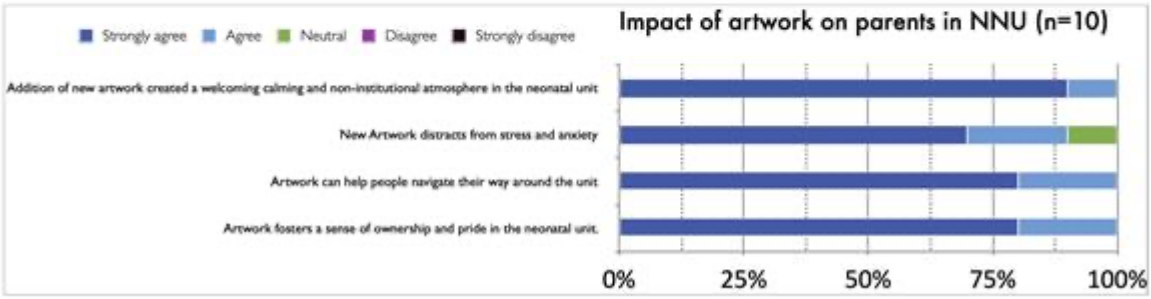
98.5% of staff agreed that artwork created a welcoming and non-institutional atmosphere at NNU. Parents replied that 90% strongly agree and 10% agree. 88% of staff agreed that artwork can distract from stress and anxiety, whereas 11.9% felt neutral about this statement. 90% of parents agreed, and 10% felt neutral. 95.5% of staff agreed that artwork can help navigate the NNU, and 4.5 % remained neutral. 95.5% of staff agreed that artwork fosters a sense of ownership and pride in the NNU.100% of parents agreed with the two latter statements.

Conclusion

Artwork portraying themes of nature, animals and human connection improved the environment, relieved anxiety and stress and created a welcoming and non-institutional atmosphere in NNU. Using door signs incorporated sensitive artwork into neonatal settings at a low cost.

Graphs


Impact of artwork on staff in NNU (n=67)
Strongly agree
Agree
Neutral
Disagree
Strongly disagree
Addition of new artwork created a welcoming calming and non-institutional atmosphere in the neonatal unit
New Artwork distracts from stress and anxiety
Artwork can help people navigate their way around the unit
Artwork fosters a sense of ownership and pride in the neonatal unit.
0%
25%
50%
75%
100%


Impact of artwork on parents in NNU (n=10)
Strongly agree
Agree
Neutral
Disagree
Strongly disagree
Addition of new artwork created a welcoming calming and non-institutional atmosphere in the neonatal unit
New Artwork distracts from stress and anxiety
Artwork can help people navigate their way around the unit
Artwork fosters a sense of ownership and pride in the neonatal unit.
0%
25%
50%
75%
100%

Image


NEONATAL
COMMUNITY
TEAM

80

The implementation of transcutaneous carbon dioxide monitoring on a tertiary neonatal unit

Miss Alison Gaythorpe[1]
[1]*Leeds Teaching Hospitals*

Background:
Infants admitted to a Neonatal Intensive Care Unit commonly require respiratory support, including invasive mechanical ventilation to support their clinical vulnerability. With any infant requiring respiratory support comes the need for monitoring of carbon dioxide (Aly et al 2016).

Abnormal PCO2 levels in premature infants, both high and low are reported by Aly et al (2016) to indicate respiratory insufficiency which can also have severe neurological implications.

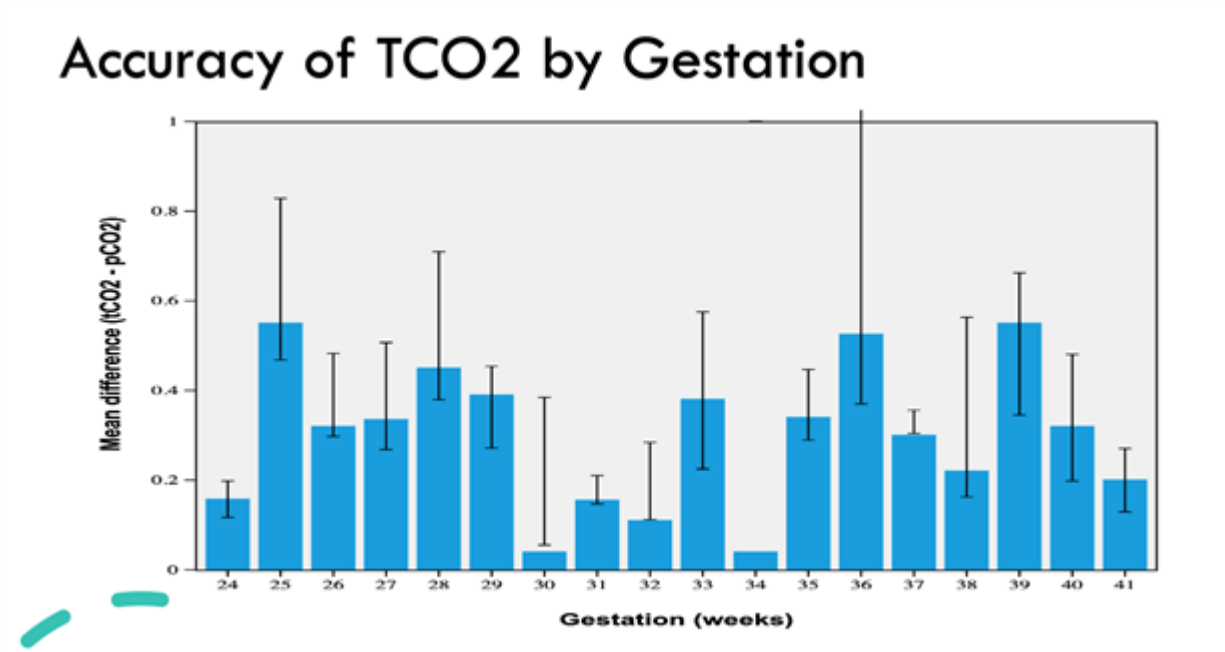
Transcutaneous CO2 monitoring is a safe and effective alternative for term and preterm neonates giving a continuous reading. TPCO2 sensors work by applying heat locally causing an increase in microcirculatory blood flow thus allowing for CO2 diffusion and values to be measured at the skin surface (Wetringen et al 2020).

Method
A plan, act do cycle was utilised. A comprehensive implementation and teaching package was devised to overcome staff resistance. A team of nurses was created to help implement change. Following implementation of 10 Sentec TCO2 monitors, an audit was conducted, and the data was independently, statistically analysed. Regular staff questionnaires were produced and analysed over 6 months showing an increase in staff compliance and trust in the monitors.

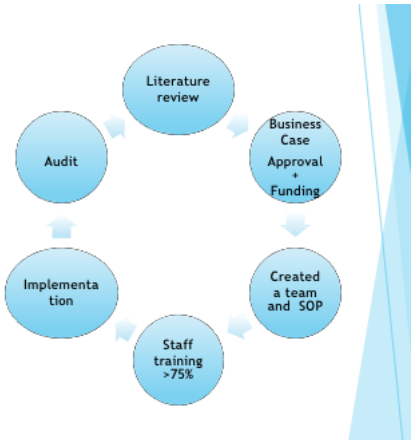
Results
A total of 1136 pairs of data from 113 neonates were compared over a 6 month period. 23 <28/40 and 90 >28/40. The data showed an average difference of CO2 in <30/40 as <0.5kpa and >30/40 <0.4kpa. With all gestations/ weights and conditions (including cardiac) considered the mean difference was <0.6kpa. Number of blood draws were reduced and the screen trend was used to guide clinical management.

Conclusion
TCO2 is safe and effective for use in neonates including those of extreme gestations.

Graphs


Accuracy of TCO2 by Gestation
Mean difference (tCO2 - pCO2)
1
0.8
0.6
0.4
0.2
0
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
Gestation (weeks)

Image


Literature review
Business Case Approval + Funding
Created a team and SOP
Staff training >75%
Implementation
Audit

97

PADDINGToN Study - Parent co-Designed Drug Information for parents and Guardians Taking Neonates home

Miss Andrea Gill[1], Dr Louise Bracken[1], Mrs Janet Clarke[1], Miss Cara Sutton[1], Dr Kathryn Johnson[2], Mr Neil Caldwell[3], Prof Brian Cleary[4,8], Prof Naomi McCallion[4,8], Ms Fiona Gaffney[4], Prof Mark Turner[5,6], Dr Elaine Neary[5], Prof Bernie Carter[7], Mrs Catrin Barker[1], Ms Rachel Corry[1], Ms Julie Lawlor[1], Janet Clark, Dr Fiona OBrien[8]

[1]Paediatric Medicines Research Unit, Alder Hey Children's Nhs Foundation Trust, [2]Leeds Teaching Hospital NHS Trust, [3]Wirral Hospital, [4]The Rotunda Hospital, [5]Liverpool Women's Hospital, [6]University of Liverpool, [7]Edge Hill University, [8]Royal College of Surgeons of Ireland

Background

PADDINGToN is a multi-centre study aimed at the co-design of medicines information for parents and carers when discharged home with neonates. Its aims are:

1. To survey parents and carers online and recruit parents to focus groups to generate information for the co-design of medicines information resources.
2. To investigate the perceptions of healthcare professionals (HCPs) of the current provision of information about medicines for parents

Methods

Parents were recruited via social media, parent support groups, inpatient or clinic settings. E-surveys were circulated and focus groups held with parents/carers of babies recently discharged from neonatal units. An e-survey was developed and circulated to HCPs involved in the care of neonates and shared on social media.

Results

Parents and carers:

87 parents/carers completed the e-survey and 17 parents participated in focus groups. Of the 87 respondents 72% parents/carers had no, or very little experience of giving medicines to children prior to their baby's hospital stay. 48% were administering 4 or more medicines on discharge but only 53% received information about medicines prior to this. 24% of parents/carers reported feeling stressed about giving medicines. Challenges with medicines following discharge were reported by 47% of respondents including significant issues obtaining medicines following discharge.

HCPS:

155 HCPs responded : 41% nurses, 34% pharmacists, 11% doctors. The majority had over 5 years' experience. 58% were aware of medicines information at their hospital, the most popular being face to face information given individually, followed by written information.

Conclusions

The results show there are significant shortfalls in the existing provision of medicines information to parents/carers of neonates. The next stage of the study will be to use these findings in the co-design of new information resources about medicines.

105

Exploring Practice in Re-establishing Feeds Post NEC - A Survey of Current Practice in Irish Neonatal Units

Ms Roisin Gowan[1], Ms Roberta McCarthy[1], Dr Nurul Aminudin[2]
[1]Dietetics Department, National Maternity Hospital, [2]Neonatology Department, National Maternity Hospital

Necrotising Enterocolitis (NEC) is a serious, potentially lethal bowel disease (in very low birth weight (<1500g preterm neonates). The rate of severe NEC requiring surgery remains high (20-50%). As part of NEC management, enteral feeds are stopped for a period of time. Re-establishing feeds afterwards can be challenging.Nutritional recommendations to prevent NEC are well established, albeit approach to re-feeding post-NEC differs.

To observe the differences in practice in the establishment of enteral feeding after medical and surgical NEC.
A prospective survey among neonatologists, surgeons and dietitians was conducted to explore the approach in re-establishment of enteral feeding after NEC. Following ethical approval, an online questionnaire was sent to dietitians, surgeons and neonatologists (n= 53). All responses were anonymised and reviewed. Data from 6 questions were coded. Data from one question was analysed using 'text analysis'.
19 clinicians (77% dietitians, 40% surgeons, 26% neonatologists) completed the survey. 52% (n=10) stated "severity of the NEC and the clinical condition" influenced their decision on restarting feeds post-medical NEC, 63% (n=12) stated "upper GI losses and stoma function" influences their decision restarting feeds post-surgical NEC. 63% would advance the rate of feeds by 15-20mls /kg/d. 50% (n=9) chose donor breast milk as a substitute to maternal breast milk post-NEC whilst 32% (n=6) chose formula. 57% (n=11) would add breast milk fortifier (BMF) at 80-120mls /kg/d, 15% (n=3) once feeds were established and 15% (n=3) would never add BMF to feeds. "Feed tolerance" and "clinical condition" influenced the responders when advancing enteral feeds.

We demonstrated variations in practice in refeeding post-NEC. The difference in practice when restarting feeds remains multifactorial. A higher responder rate would make results more generalisable. As the first survey of this kind to be conducted in Ireland, the results provide useful information in re-establishing feeds post-NEC and potentially support future practice.

85

Use of a standardised proforma for transfer between Neonatal Intensive Care and surgical theatres to improve handovers

Dr Zachary Green[1], Dr Rebecca Jackson[1], Dr Gemma Phillips[1], Dr Rachel Hayward[1]
[1]*University Hospital Of Wales*

Background

Transfer between a tertiary-level neonatal intensive care unit (NICU) and theatres poses many challenges. Patients are often critical and transferred out of hours. With multiple teams involved in their care, there is potential for miscommunication and error. This project employed quality improvement methodology to improve handovers between theatres and NICU at the University Hospital of Wales (UHW), through the implementation of a universally accepted proforma.

Methods

Surgical, anaesthetic and neonatal teams completed a survey on transfer practices. A proforma was subsequently devised based on this information. 9 months after its implementation, user opinion was surveyed, and use of the proforma audited.

Results

The primary survey received forty responses. This noted the importance of handover with 68% (n=27) in agreement that they had "received information that would alter their management of the patient." 88% (n=35) agreed that "handovers could be improved."
Respondents suggested formatting the proforma systematically (A to E) including weight, corrected gestation, ET tube size, IV access, recent gases, sedation and temperature support. Staff retrieving patients requested post-operative plans, intra-operative changes (fluid management/ access) and thermoregulation details. All agreed that the proforma should be succinct.
A repeat survey was conducted 9 months after the proforma's introduction, with 23 respondents. 78% (n=18) responded that quality of handover was "good," demonstrating improvement from initial survey (58%). 60% (n=14) agreed with the statement that "the proforma contains the relevant information to handover effectively. 65% (n=15) agreed with the statement that "the surgical proforma has improved the quality of handovers."

Conclusions

- Handover of patients to and from theatres is a critical step in patient management and is fundamental to decision making.
- A universally accepted proforma has demonstrated improvement in quality of handover. This may have the subsequent benefit of improving inter-specialty care and standardisation of services.

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SAFE INFANT GUIDED NUTRITION(SIGN): A PROMISING WAY FORWARD TO ACHIEVE SUCCESSFUL BREAST AND/OR BOTTLE FEEDING: A QUALITY IMPROVEMENT PROJECT

Poster or Oral presentation

Dr Madhusudan Guin[1], Dr Shaveta Mulla[1]
[1]*William Harvey Hospital, Ashford*

Background: Independent breast or bottle feeding without any cardiorespiratory compromise is a criterion for discharge of a preterm infant from NICU. Nipple feeding is a complex neuromotor task, which an infant acquires as he/she grows older. Preterm feeding practice amongst neonatologists is inconsistent and variable. Most of the clinicians prefer a fixed volume-based feeding, undermining the infant's cue for responsive feeding. Recent studies show, infant driven feeding regimen establishes early nipple competency in preterm infants, decreasing the duration of hospital stay and medical expense.

Objective: A baseline audit showed, many preterm infants in our unit, attain bottle feeding (NF) late, well after term equivalent age. There has been no individualized infant feeding protocol, resulting undue delay in initiating and establishing breast and/or bottle feeding. Most important aspect of SIGN protocol is the safety of infant, whilst promoting responsive feeding involving the nurses and the parents.

Method: This QIP relies strongly on inter-team communication, education, knowledge sharing in understanding the cue-based feeding in a very systematic and uniform way. The project has just started and in the first phase, nurses in liaison with breast-feeding facilitators, oriented to recognize the feeding cues and signs of refusal in a newborn. This is an algorithm-based feeding advancement plan, which critically emphasizes multiple steps involved in Infant driven feeding and successful nipple competency in preemies. SIGN algorithm is a user-friendly tool which provides a predictable and qualitative feeding plan. Parents are encouraged and educated to actively involve and develop their role as active caregivers.

Results: The first phase of evaluation will be conducted in the July 2023.

Conclusion: Cue based feeding is emerging as one of the promising evidence informed practices in recent times. Eating in SIGN is the simplest way for the preterm infants to learn a more complex task of nipple feeding.

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Development of the Foundation in Neonates Programme for International Nurses

Mrs Michaela Halfhead[1], Mrs Rosie Milbourne[1]
[1]*Northwest Neonatal Operational Delivery Network,* [2]*NWNODN*

Background
Recruitment drives in neonatal nursing are attracting International Recruits (IR) with valuable neonatal experience who are required to evidence their knowledge through Qualification in Specialty (QiS). The first element of QiS in the NWNODN is 6-month Foundation in Neonates (FIN) programme however it has become evident that often their knowledge exceeds the training provided on the FiN.

Aim
To develop a shorter FiN programme for International Recruits which evidences their experience and focuses on the specific training of neonatal nurses new to the country in a timely way.

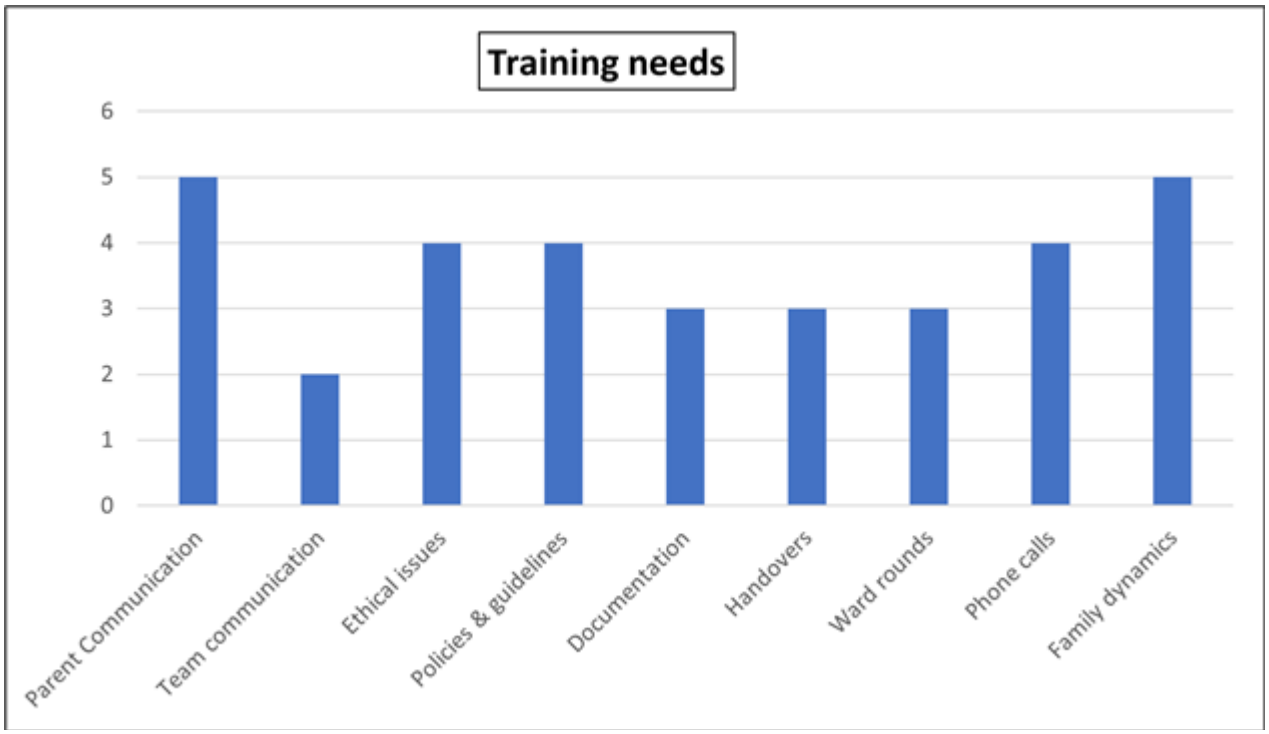
Methods:
Initially 6 international nurses were asked what they would want from a training programme. All were experienced neonatal nurses from India, Saudi, Philippines, Australia and Hong Kong, and had been in the UK between 3-9 months. The training needs identified are shown in Appendix 1.

A pilot of the programme ran over 12 weeks, with 6 virtual study days, with 17 international recruits from 4 of the 22 units across the network. The recruits' knowledge was tested to confirm they did not require the full FiN programme.
The live sessions on the study days were predominantly scenarios promoting discussion, with an underlying theme capturing knowledge and clinical skills. Learners were given a clinical competency book to complete and had 2-4 weeks supernumerary time within intensive care with the full support of a mentor.

Results
The course has been a success with IRs reporting that their cultural and communication skills had significantly improved and feedback from NNU Education and Service Leads stating that IRs have found confidence in their ability to deliver care and to have their voice heard as part of the MDT.
From this programme there are some IRs who are enrolled at to HEIs to complete their final element of QiS.

Appendix 1

Graphs


Training needs
6
5
4
3
2
1
0
Parent Communication
Team communication
Ethical issues
Policies & guidelines
Documentation
Handovers
Ward rounds
Phone calls
Family dynamics

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Infantile Hypertrophic Pyloric Stenosis (IHPS) in a preterm-Atypical presentation

Dr Ebtehal Hamed[1], Dr Dylan Wills[1], Dr Angela D'Amore[1], Ms May Bisharat[1]
[1]*Cambridge University Hospital NHS Foundation Trust*

IHPS is a common cause of gastric outlet obstruction in young infants and typically presents at 2 to 4 weeks of age with nonbilious projectile vomiting. It is exceedingly rare in preterm infants and is scarcely reported in the literature.
We present a female infant born at 28+6 weeks gestation to consanguineous parents (1205g). AXR on day 1 demonstrated a large gastric bubble. Nasogastric aspirates persisted. On day 4 a blood gas showed metabolic alkalosis and hypochloraemia (details as below). Examination revealed scaphoid abdomen with epigastric fullness without any palpable olive. Day 6, AXR showed persistent large gastric bubble. Day 10, upper GI contrast study was performed (figure 2). Abdominal ultrasound showed elongated pylorus 15mm with circumferentially thickened wall 1.9mm. Day 11, Exploratory laparotomy revealed IHPS and sealed ileal perforation approximately 13cm proximal to terminal ileum, with no evidence of NEC. Pyloromyotomy and resection anastomosis of the ileal perforation were performed. Aspirates continued post-operatively whilst on tropic feeds. Day 21, contrast meal and follow through showed poor gastric outflow. Continuous feeds were commenced on day 23 with proton pump inhibitors and prokinetic erythromycin. She achieved full enteral feeds by 6 weeks of life. She was fully breast fed with no reported complications at 3 months of age.

Conclusion:
To our knowledge our patient is the youngest preterm infant with atypical IHPS presentation.
Our diagnosis was made on 2 imaging modalities and clinical correlation. In ultrasound, pyloric muscle thickness PMT 3- 4mm, length PML 15- 19mm, and diameter 10- 14mm are upper limit of normal ranges for term infants and are not reliable in low birthweight premature infants.
IHPS should be considered in very preterm infants with feeding intolerance, persistent aspirates and persistent dilated gastric bubble on AXR. Contrast studies can aid the diagnosis in the absence of inconclusive sonographic findings.

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Tiny Cuddles – facilitating delivery suite cuddles for very preterm infants

Dr Jen Harkness[1]
[1]*Royal Wolverhampton NHS Trust*

Background: Early physical contact between mum and baby is known to increase early breast milk production and improve bonding, yet is not consistently achieved for extremely premature babies. This is often due to fear about endotracheal tube displacement or the baby becoming hypothermic, but with proper care this need not be the case. It must also be recognised that mortality remains high in babies born at the extremes of prematurity, and the delivery suite cuddle may be the only cuddle parents have before care is reorientated.

Method: A retrospective audit of delivery suite cuddles was performed over a 2 year period in a level 3 neonatal unit, looking at all babies born between 22+0 to 29+6 weeks. Half way through the study period, staff were educated on the importance of delivery suite cuddles and this became an expected part of delivery suite care for all stable preterm infants, regardless of gestation or birth weight.

Results: 110 babies were included in this audit (54 pre-intervention and 56 post-intervention). The rate of delivery suite cuddles improved significantly from 44% to 74%. The rate of cuddles in cases where the baby did not survive improved from 27% to 91%. The most premature baby to receive cuddles was 22+5 weeks, and the smallest just 465g. No endotracheal tubes were dislodged during cuddles, and there was no difference in admission temperature in the two groups (20% <36.5C in each group).

Conclusion: Delivery suite cuddles need to become routine for all babies born prematurely, and we have seen a significant improvement over the past 2 years. We still need to work on ensuring normothermia for these babies, and have addressed this with further staff education, heated mattresses and a new transport incubator.

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Umbilical Venous Catheter E-learning: An initiative to improve the radiological assessment of neonatal devices and increase awareness of complications.

Dr Jill Harrison[1], Dr Claire Granger[3], Dr Leigh McDonald[2], Dr Kathryn Siddle[2], Dr Emma Riley[2], Dr Garan Riley[2]
[1]Liverpool Women's Hospital, [2]Great North Children's Hospital, [3]Royal Victoria Infirmary

Background:
Medical devices such as UVCs are associated with significant morbidity and mortality, and radiological assessment of position and identification of complications often falls to less experienced team-members. Paediatric and Radiology trainees share many learning outcomes and, although not widely adopted, inter-speciality training is well-established as an effective teaching model. Training together prepares specialities to work together through respect and understanding, leading to safer patient care.

Method:
The UVC module was developed jointly by experienced Radiologists and Neonatologists, with trainee input throughout, and supported by the Royal Colleges of Radiologists (RCR) and Paediatrics & Child Health (RCPCH). The structure, content and objectives of the module were based on training requirements. It included sections on the anatomy and insertion, assessment of placement, identification of misplacement and awareness of common complications. It concludes with a quiz assessment and case vignettes with discussion.

Results:
The module has been reviewed by trainees and has gone through educational processes, including expert reviews by both the RCR and the RCPCH. It is endorsed and recognised as CPD by both colleges. It is hosted on the RCR Learning Hub and is freely accessible to all Health Professionals.

Conclusion:
This has been a successful joint initiative using shared expertise to target training across specialities. The umbilical artery E-learning module will be released shortly, with plans to extend into other neonatal and paediatric devices.

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Assessing prenatal alcohol exposure; Does phosphatidylethanol measured from day five newborn blood spot cards have any value? An observational, population-based study.

Dr Elizabeth Henderson[1], Professor David Tappin[1], Mr David Young[2], Dr Donata Favretto[3], Dr Helen Mactier[4]
[1]Royal Hospital for Children, [2]University of Strathclyde, [3]University Hospital of Padova, [4]Princess Royal Maternity

Introduction: Prenatal alcohol exposure (PAE) places children at risk of fetal alcohol spectrum disorder (FASD). Alcohol consumption in pregnancy is commonly underreported and difficult to ascertain. Targeted intervention in children with FASD is associated with reduction in secondary complications making early and accurate diagnosis beneficial. The alcohol biomarker phosphatidylethanol (PEth) can be measured in dried blood spot cards (DBS) with reported specificity of 100% for PAE. We sought to examine if PEth measured from DBS cards correlates with maternal self-report of alcohol consumption in later pregnancy.

Design: Observational population-based study.

Participants: All singleton mother-infant dyads delivered during each fourth consecutive 24- hour period in a large maternity unit in Glasgow, Scotland.

Interventions: Mother: confidential immediate postnatal interview utilising a modified time-line follow back method to record alcohol consumption in pregnancy. Baby: extra DBS collected coincident with routine newborn screening if bleeding continued.

Results: 92.5% of eligible mothers agreed to participate. 510 DBS were obtained of which 502 were successfully analysed. 13.8% of mothers self-reported alcohol consumption after 20 weeks' gestation, generally of modest amount. 216 (43%) DBS contained PEth at a concentration of ≥8 ng/ml and 148 (29.5%) at ≥20 ng/ml. The sensitivity of PEth in identifying women who self-reported alcohol use in the latter half of pregnancy was 47.8% (≥8ng/ml) and 28.4% (≥20 ng/ml). Specificity was 57.3% (≥8ng/ml) and 70.1% (≥20 ng/ml). Positive predictive values of PEth ≥8 ng/ml and ≥20 ng/ml for alcohol consumption after 20 weeks' gestation were 14.8 and 12.8% respectively.

Conclusion:
PEth assayed from newborn DBS cards obtained coincident with routine newborn screening at 96-120 hours of age has low sensitivity and specificity for self-reported modest alcohol consumption after 20 weeks' gestation. PEth measured retrospectively from stored UK newborn blood spot cards cannot be recommended as a reliable indicator of PAE in later pregnancy.

33

Delivery Room Cuddles Initiative at Bradford Teaching Hospitals: Safety and Parental Experience

Dr Natalie Henry[1], Dr Aishin Lok
[1]*Bradford Teaching Hospitals Foundation Trust,* [2]*Bradford Teaching Hospitals Foundation Trust*

Aim: Bradford Teaching Hospital's Neonatal Unit introduced a delivery room cuddles (DRC) initiative in January 2022, alongside a guideline and flowchart to support implementation. DRC is defined here as 'supervised first cuddle between parents and their newborn in the delivery room' (1).
The aim of this study is to ensure this process is safe, and whether this is having a positive impact on babies and families.

Methods: We have reviewed clinical records of all babies admitted from delivery suite to NNU between 23/01/2022 to 13/06/2022. Qualitative data were obtained from interviews conducted with parents to explore their experiences and views on delivery room cuddles.

Results: 25% of all babies admitted to NNU from delivery suite received DRC. 42% of the extreme preterm (<28 weeks), and 22% of the very preterm (28-32 weeks) cohort who were eligible for DRC received them. Reasons for no DRC included baby not in a stable condition, equipment issues, and Mum having general anaesthetic.
Only 1 baby had an admission temperature outside the acceptable range of 36.5-37.5.
Of the parents who chose to breastfeed (33%) received EBM on day 1 of life, and 100% received EBM by day 4 of life.
13 of these (81%) had normal sugars, 3 (19%) had low sugars (<1.9). Of these, two had risk factors (maternal GDM on metformin, maternal PET on labetalol).
Parental feedback included 'it was nice to be able to get that chance to bond' and 'If anything happens to her, you know you've had a cuddle'.

Conclusion: This data suggests that DRC are feasible, safe and promote positive contact with baby from as early as possible. However, with a sample size of just 25% of admissions, further study is required. Having a standardized flow chart supports staff to ensure safety and mitigate risks factors associated with DRC

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A Systematic Review of Optical Monitoring in Neonatal Seizures

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Background: Neonatal seizures remain a significant cause of morbidity and mortality worldwide. Optical monitoring such as cerebral near-infrared spectroscopy (NIRS) and broadband NIRS (BNIRS) can provide non-invasive continuous real-time monitoring of changes in brain metabolism and haemodynamics. The aim of this study was to perform a systematic review of optical biomarkers to identify changes in cerebral haemodynamics and metabolism during the pre-ictal, ictal, and post-ictal phases of neonatal seizures.

Methods: A systematic search was performed in eight databases combining three broad categories: (neonates) AND (NIRS) AND (seizures) using the stepwise approach following PRISMA guidance. Searches were limited to English.

Results: Fifteen papers described clear haemodynamic and/or metabolic changes during neonatal seizures. In four preclinical studies, oxyhaemoglobin (HbO2) decreased, deoxyhaemoglobin (HHb) increased, and the total haemoglobin (HbT) decreased concurrently, reflecting a decrease in cerebral blood volume (CBV). Eleven clinical studies showed variability in haemodynamic changes between studies but remarkably similar changes for infants within the same study. In the pre-ictal phase, an increase in HbO2, HHb and HbT occurred in the majority of neonates in three studies, however, NIRS optodes were not positioned at the seizure foci. When positioned over the seizure focus, haemoglobin difference (HbD), reflecting decreased cerebral oxygen delivery, and HbT decreased. Following seizure onset, cytochrome-c-oxidase increased to a maximum, before decreasing and HbO2 decreased whilst HHb and HbD increased in one study. In three other studies, HbO2 and HHb increased to a maximum, before decreasing towards baseline values. Two studies reported transient haemodynamic events occurring hours after seizure offset.

Conclusion: Clear changes in cerebral haemodynamics and metabolism were noted during neonatal seizures. To understand the differences in these changes and their relationship to underlying pathology, further studies using a multimodal brain monitoring approach that considers EEG alongside optical measurements of cerebral blood flow, oxygenation and metabolism are necessary.

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Minimising separation of mother and babies: An opportunity to get your act together

Dr Satish Hulikere[1], Dr Delyth Webb[1], Dr Christopher Bentham[1], Dr Premkumar Martin[1]
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Background:
Evidence shows that separation of mother and babies soon after birth interrupts the normal bonding process (NHS England). Reducing unnecessary term admissions is paramount. In 2017/18, 314 (11.3%) term babies were admitted to our local neonatal unit (LNU).

Aim:
To reduce term admissions to neonatal unit and achieve national target of less than 6% by 2022.

Methods:
An evaluation of the badgernet data in 2018 and local audits, showed avoidable term admissions relating to presumed sepsis, jaundice, hypothermia and hypoglycaemia.
The collaborative multidisciplinary approach was launched to reduce unnecessary term admissions. The awareness was raised on safer care for full-term babies patient safety alert (NHS England February 2017). The staff were encouraged to complete the ATAIN eLearning (e-lfh.org.uk). Postnatal ward management for babies with mild/moderate jaundice, asymptomatic hypoglycaemia, presumed sepsis was implemented. Hypothermia prevention and targeted support were provided to staff. Sepsis pathway and antibiotics in postnatal ward for well babies was introduced in March 2019. The Transitional care in postnatal ward was inaugurated in January 2021 followed by Transitional care ward rounds. Atain leads were appointed who introduced weekly MDT reviews of term admissions and lessons learnt were shared.

Results:
The number of term admissions trend showed steady decline from 11.3% (314 term babies admitted) of live births in 2017/18 to 7.1% (190 term babies admitted) in 2018/2019 and 5.9% in 2021/2022 (157 babies admitted). There were 574 deliveries in the first quarter of 2022/23 and 24 term babies required admission, which is 4.5% of live births.

Conclusions:
We have achieved 50% reduction of term admissions in our local neonatal unit by establishing transitional care in the postnatal ward. Minimal separation of mother and term babies can safely be achieved through appropriate pathways, MDT Atain reviews, leadership and transitional care facilities.

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Raising standards for initiating therapeutic hypothermia for improving care and outcomes in a local neonatal unit

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Background:
All Local Neonatal Units (LNUs) should be able to assess infants and initiate therapeutic hypothermia using aEEG and servo- controlled cooling equipment (BAPM 2020). The initiation of active cooling in an LNU prior to transfer to tertiary NICU contributes to effective achievement of target temperature (Northwest ODN guidelines).

Aim:
To standardise the initiation of therapeutic cooling and get formal recognition by the Northwest neonatal Operational Delivery Network (NWNODN) as a unit to undertake initiation of active cooling.

Methods:
The patients for the retrospective annual audits were identified from electronic/clinical coding and data taken from the clinical notes.
All the annual retrospective audits performed between the years 2017-2021 (January -December of each calendar Year) looked at specific criteria which were measured against standards set by BAPM as well as local guidelines. The data from annual audit reports and the audit actions from each year were reviewed for completeness :
1. Did the active cooling treatment start within 6 hrs after birth?
2. Was the target temperature achieved before transfer?
3. Did all babies who underwent cooling have an CFM and MRI investigation?
4. Did all babies who underwent cooling have appropriate clinic follow up after discharge from the hospital?

Results:
The audit actions of each year identified were reviewed for completeness
1) Purchasing of rectal probe (2018) for appropriate monitoring of temperature
2) Achieving target temperature by availability of servo controlled active cooling mattress (2019)
3) Cerebral Function Monitoring (CFM) in 2021 – Improving appropriateness of referral
4) Strengthening guidelines, pathways, and training

Conclusions:
Identifying areas to address by regular annual audits and completing the audit action plans has supported our LNU in receiving formal accreditation in 2022 for initiation of cooling for HIE babies. The audit also ensured improving appropriate local follow up following discharge from the tertiary units.

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The Ei SMART approach: smart care in and beyond NICU

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Background:
The Ei SMART framework approaches early intervention (Ei) through supporting an infant's sensory (S), motor (M), attention and regulation (A), and relational (R) development with healthcare professionals and parents working together (T). The implementation of Ei SMART supports infants in all interactions and interventions from birth, throughout neonatal care and beyond.
The aim of this project was to develop a comprehensive training programme for neonatal staff to apply this new evidenced based approach in the Neonatal Unit (NNU) and to cascade this new knowledge to parents and carers.

Method:
The training programme was co-developed by a specialist multidisciplinary team including parents with lived experience of having a baby on a NNU. It focussed on: Ei SMART's 6 core principles, how to implement the Ei SMART approach in practice, and how to share these skills and knowledge with parents to help families feel confident supporting their infant's development in the NNU and after discharge. The training was delivered to 36 staff in one ODN, over a 7-week period using 'live' teaching, interactive tutorials, and pre-recorded sessions.

Results:
Initial feedback from the Ei SMART pilot training programme showed overwhelmingly positive responses. The benefits of implementing the Ei SMART framework during the daily care of babies in NNU was highlighted. Participants reported a shift in mind set in relation to their understanding of neurodevelopment and how to best support neonates on the NNU using the Ei SMART framework. Increased awareness of longer-term neurodevelopment outcomes was also reported.

Conclusion:
Despite advances in neonatal care, neurodevelopmental outcome remains a challenge and improvements in early intervention are needed. Ei SMART is a novel, integrated approach which spans the continuum of neonatal care to optimise developmental outcome. Participants in this programme reported the involvement of parents in the co-production and delivery of the training was transformational.

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Reducing Device Related Pressure Ulcers, an ANNP lead QIP

Ms Caralyn Jarvis[1], Ms Genevieve Glover[1]
[1]*St Georges*

Background: Neonatal device related pressure ulcers represent an ongoing challenge. The combination of immature skin, poorly fitting interfaces and limited evidence to guide practice is problematic. DRPU represent the majority of neonatal skin injuries with substantive associated costs. Including infection risk and facial scarring with possible psychological impacts for the infants and their families. DRPU's are categorised I-IV or unstageable, often occurring in regions with minimal soft tissue and can rapidly progress. Pre-existing local strategies included varying mask prong interface and skin pressure breaks.

Aim: Elimination of DRPU for infants receiving non-invasive respiratory support via continuous or bilevel positive pressure.

Methods: A baseline audit was conducted to identify neonatal DRPU incidents on non-invasive respiratory support. This identified local high-risk patients as infants weighing 500g-1000, 0-7 days of NIV, on week 2 to 3 of life. A literature review was conducted, other units practice considered, tissue viability services engaged and device manufacturer's guidance reviewed to identify possibilities for improvement. Staff engagement was key with questionnaires to identify perceived DRPU challenges, with ongoing multidisciplinary discussions. NIV tubing weight was frequently identified as a concern. Repositioning patients receiving NIV to offset tubing weight was implemented, sharing monthly data collection.

Results: Intervention implementation significantly reduced DRPU, with a total decrease of 70% compared to the previous year. With no nasal bridge injuries or deep tissue injuries since the intervention. Monthly NIV days=311-451 with no correlation between NIV days and number of injuries.

Message/conclusions: Raising the focus on DRPU's and turning the babies position around in the incubator has eliminated nasal bridge injury over the past nine months. The project is ongoing with the next PDSA cycle focus on reducing the nasal septum ear and cheek injury.

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A qualitative report on maternal experience of Home Phototherapy

Dr Neeta Kumari, Dr Richard Mupanemunda
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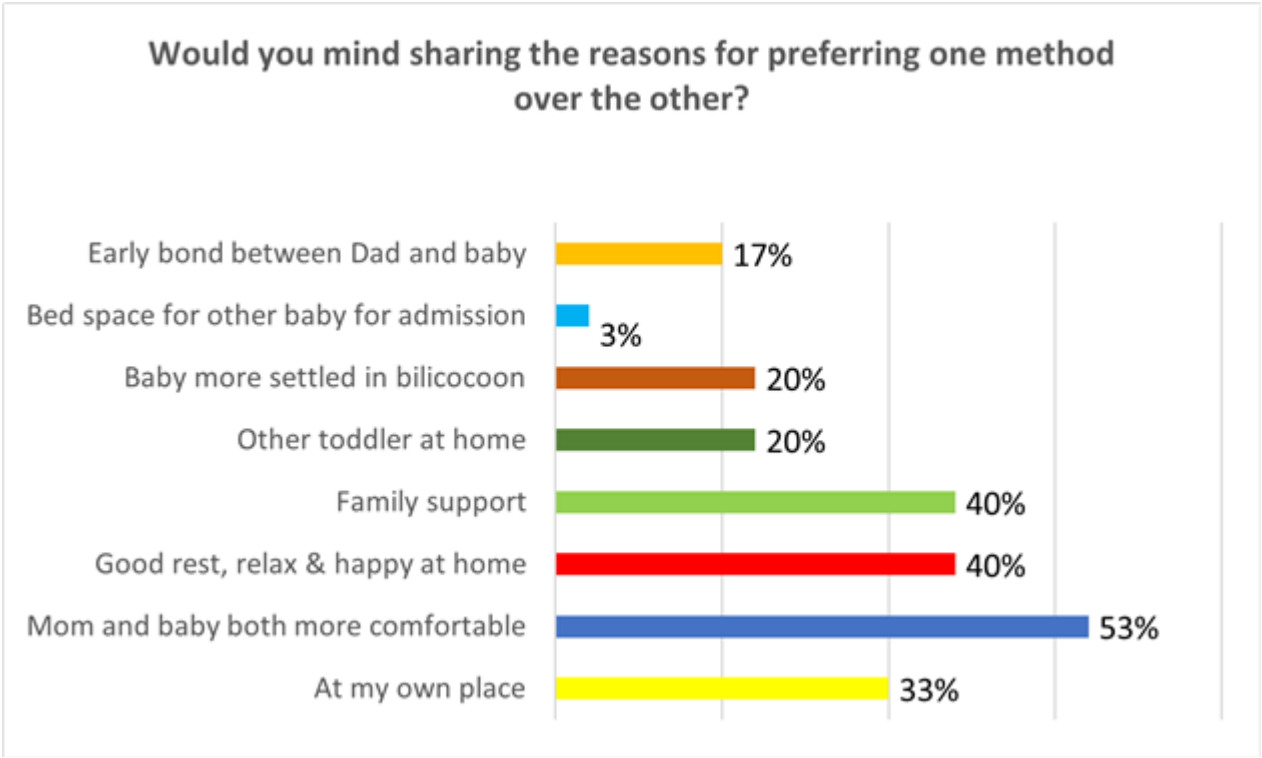
Background and aims:
-Neonatal jaundice is common in newborns. Treatment with phototherapy often prolongs hospital stays for mothers or requires readmission.
-After a successful pilot of home phototherapy in 2018, Home Phototherapy was introduced in 2019 providing a 7-day service covering the two major maternity units in Birmingham. This is now an established service provided by our neonatal community outreach team (NCOT) for infants with hospital-initiated and community-initiated phototherapy and approximately 700 infants have used the service. We obtain feedback from parents who use the service, and this has been overwhelmingly positive.
-Our goal was to explore maternal reflective experiences of home phototherapy from mothers who experienced both in-hospital and home phototherapy.

Methodology:
-Retrospective data on 30 infants who received both in-hospital and home phototherapy between July 2021 and January 2022. Following discharge, mothers were contacted via telephone to obtain their feedback using a set questionnaire which included 6 closed-ended questions and 9 open-ended questions.

Results:
-All mothers expressed satisfaction with 1) demonstration of the equipment, (2) ease of use, 3) contact with NCOT.
Most mothers gave extremely positive feedback on their interaction with the home phototherapy team and the service provided.
-94% experienced stress due to their infants developing jaundice and having home phototherapy markedly reduced their stress.
-They expressed overwhelming preference for home phototherapy (94%) with various reasons proffered (see figure8). Most infants coped well with home phototherapy.
Mothers reported the positive impact of home phototherapy on their infants, infants' siblings, fathers, and the extended family.

Conclusion:
All mothers expressed overwhelmingly positive feedback on their experience of home phototherapy. The service was well explained, easily administered, and well tolerated. Mothers preferred home phototherapy with benefits of improved infant bonding, reduced maternal stress, home comforts and earlier resumption of normal family life with support from the extended family.

Graphs


Would you mind sharing the reasons for preferring one method over the other?
Early bond between Dad and baby
17%
Bed space for other baby for admission
3%
Baby more settled in bilicocoon
20%
Other toddler at home
20%
Family support
40%
Good rest, relax & happy at home
40%
Mom and baby both more comfortable
53%
At my own place
33%

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Measuring the impact of early screening and treatment of Ureaplasma on respiratory outcomes in preterm babies less than 30weeks gestation; a 4 year analysis in a single UK tertiary level neonatal unit

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Background
Ureaplasma can exist as normal commensals in the female reproductive tract and can be transmitted to babies at birth. Ureaplasma has been implicated in the pathogenesis of preterm labour and neonatal morbidity.

Aim
The aim of this project was to measure the impact of early screening and treatment of ureaplasma on respiratory outcomes following a 4 year analysis of reviewing the benefits of adhoc screening and treatment of preterm babies less than 30 weeks gestation.

Methods
An observational study was carried out using retrospective data collected between November 2017 to December 2021 to review the number of preterm babies less than 30 weeks gestation that were screened and treated for ureaplasma infection and the impact on their respiratory outcomes at discharge. The first cohort was taken between November 2017 to December 2020, whilst the second cohort was measured between January 2021 to December 2021. The cases were identified using Badgernet. Comparison was made between the first cohort of cases who were screened adhoc and treated for ureaplasma if ventilation was prolonged or ureaplasma positive on endotracheal or nasal secretions and the second cohort who were screened on day 1 of life and treated if positive for ureaplasma infection in endotracheal or nasal secretions.
Results
Comparative results are demonstrated in table 1.

Conclusion
Early screening for Ureaplasma provided target treatment for the positive cases identified only. There was no significant difference in the outcomes at discharge between the ureaplasma positive and negative cases which may infer no benefit in ureaplasma treatment to respiratory outcomes in preterm babies. However, the numbers studied were too small to conclude this. More studies with larger numbers are required to investigate the relationship between ureaplasma and bronchopulmonary dysplasia in preterm babies less than 30 weeks' gestation.

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Investigating the Predictors of Early Maternal Breast Milk Administration within a PERIPrem Cohort

Devi Bridglal[1], Miss Dorae Lee[1], Ericka Mejia Farias[1], Joshua Poulter[1], Rosalind Freestone[2], Dr Sarah Bates[2], Devi Bridglal
[1]*King's College London,* [2]*Great Western Hospital*

Background:
For premature infants, exposure to maternal breast milk (MBM) is associated with neurodevelopmental benefits, and significant reductions in mortality risk, necrotising enterocolitis, respiratory and gastrointestinal infections in early life (1). Early MBM is a key part of national perinatal optimisation quality improvement work (2).
The PERIPrem care bundle aims for 85% of infants born at ≤34 weeks' gestation to receive MBM within 6-hours of birth (3). However, this target has not yet been met at Great Western Hospital (GWH).
This project aimed to investigate predictors of early MBM administration within the 6-hour PERIPrem target in the GWH PERIPrem cohort.

Methods:
A retrospective cohort study design was performed to analyse existing health data from infants born between April 2020 and January 2022 at ≤34 weeks' gestation. Logistic regression analyses for exposures of interest were used to investigate predictors of early MBM administration (within 6-hours of birth). Odds ratios (OR) and p-values were calculated. Analyses were performed in R (Version 4.1.3).

Results:
The cohort comprised 97 neonates, with a median gestational age of 31+5 weeks (range 25+6 – 34 weeks) and median birth weight of 1,670g (range 870-2,735g).
Preliminary analyses identified antenatal breast milk expression (OR=3.08, p=0.010) as a positive predictor of early MBM. Conversely, absence of early skin-to-skin contact (OR=0.009, p=0.027) was a negative predictor. No statistically significant associations were found between antenatal patient advice, mode of delivery, or gestational age on early MBM.

Conclusions:
We identified antenatal expression and early skin-to-skin contact as significant predictors of early MBM. Integrating these interventions perinatally may represent a practical and effective approach to increase early MBM as a vital part of perinatal optimisation to improve outcomes for premature infants.

References:
1. Boquien C-Y; Front. Pediatr. (2018) 6:295
2. Maternal Breast Milk Toolkit. (2020). <https://www.bapm.org/pages/196-maternal-breast-milk-toolkit>.
3. PERIPrem Bundle - Process Mapping. (2020) <https://www.weahsn.net/wp-content/uploads/2020/08/02681-A4-Bundle-Process-Mapping-HIGH-RES.pd>.

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Improving Administration of Early Maternal Breast Milk for Preterm Neonates: A Quality Improvement Project

Miss Dorae Lee[1], Ericka Mejia Farias[1], Joshua Poulter[1], Rosalind Freestone[2], Dr Sarah Bates[2], Joshua Poulter
[1]King's College London, [2]Great Western Hospital

Background:
Early maternal breast milk (EMBM) has been shown to reduce risk of neonatal diseases including necrotising enterocolitis. The PERIPrem target is for 85% of preterm neonates to receive EMBM within 6-hours of birth. This had not previously been achieved at Great Western Hospital (GWH).

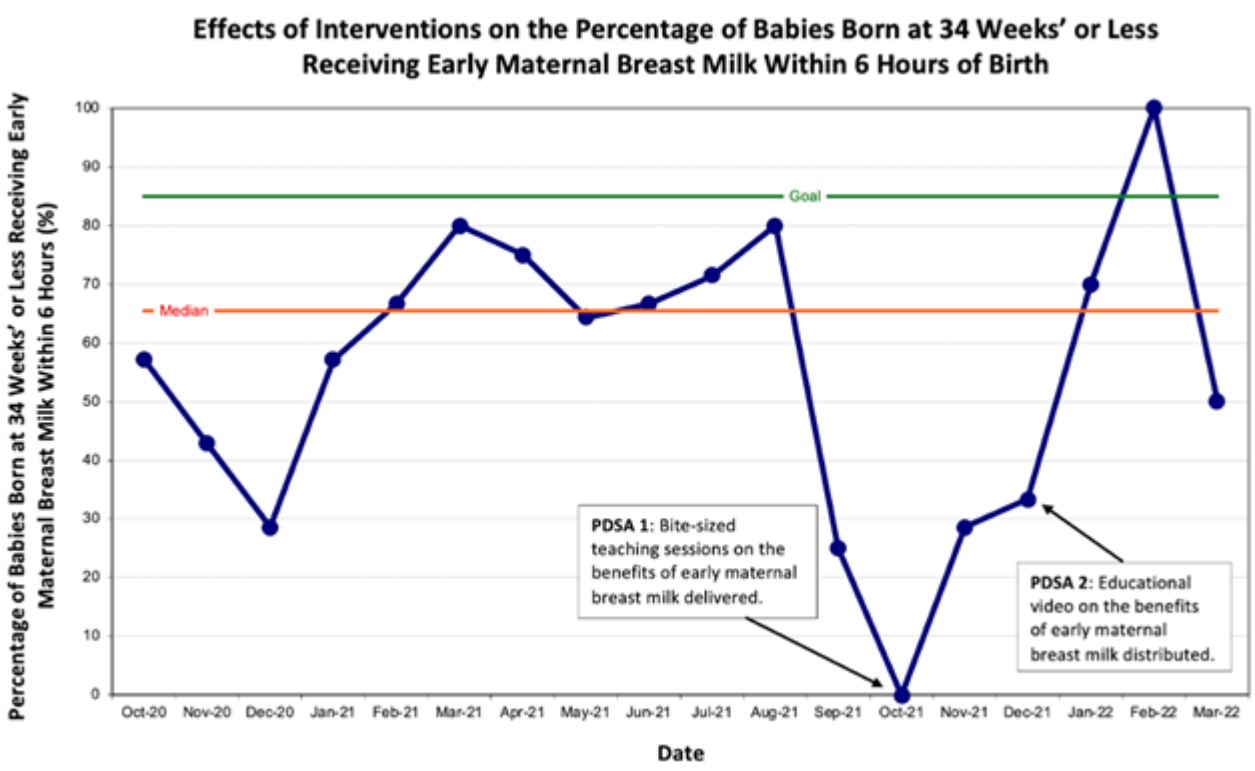
We aimed to increase the proportion of preterm infants born at ≤34 weeks receiving EMBM within the PERIPrem target of 6-hours to 85% from October 2021 to March 2022.

Methods:
PDSA1: Bite-sized in-person presentations delivered to perinatal staff explaining the benefits of EMBM.
PDSA2: EMBM educational video created and distributed to perinatal staff with an embedded survey.
Results were collected monthly by GWH PERIPrem coordinator.

Results:
PDSA1 and PDSA2 reached 108 staff combined, the majority were hospital-based midwives.
Data collected between October 2020 and September 2021 established a baseline median of 65.48%.
We observed a run of values below the median between September and December 2021, including during PDSA1 and PDSA2 cycles. The percentage transitioned upward to above the median in January 2022 and surpassed the 85% target in February, however decreased to 50% the following month.

Conclusion:
Here we met our target of 85% of preterm infants receiving EMBM within 6-hours, however this positive change was not sustained (Graph 1). Sample size represented a significant limitation, averaging only 6 eligible births each month between October 2020 and March 2022 at GWH. The follow-up period may be insufficient to observe the delayed impact of antenatal education on women who are yet to deliver. Finally, our interventions did not address external and systemic factors including staff shortages exacerbated by the ongoing COVID-19 pandemic, medical contraindications and maternal barriers. Despite a lack of sustained improvement, PDSA2 has the potential to be both sustainable and scalable. Future directions may include its integration into regular mandatory staff training.

Graphs


Effects of Interventions on the Percentage of Babies Born at 34 Weeks' or Less Receiving Early Maternal Breast Milk Within 6 Hours of Birth
Percentage of Babies Born at 34 Weeks' or Less Receiving Early Maternal Breast Milk Within 6 Hours (%)
100
90
80
70
60
50
40
30
20
10
0
Goal
Median
PDSA 1: Bite-sized teaching sessions on the benefits of early maternal breast milk delivered.
PDSA 2: Educational video on the benefits of early maternal breast milk distributed.
Oct-20
Nov-20
Dec-20
Jan-21
Feb-21
Mar-21
Apr-21
May-21
Jun-21
Jul-21
Aug-21
Sep-21
Oct-21
Nov-21
Dec-21
Jan-22
Feb-22
Mar-22
Date

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Timing of complementary feed introduction for premature infants in England over the decade 2010 to 2020 – using large representative national cohorts

Dr Ilana Levene[1], Dr Sian Harrison[1], Professor Fiona Alderdice[1], Dr Frances O'Brien[2], Professor Mary Fewtrell[3], Professor Maria Quigley[1]

[1]National Perinatal Epidemiology Unit, University of Oxford, [2]Oxford University Hospitals NHS Trust, [3]Institute of Child Health, University College London

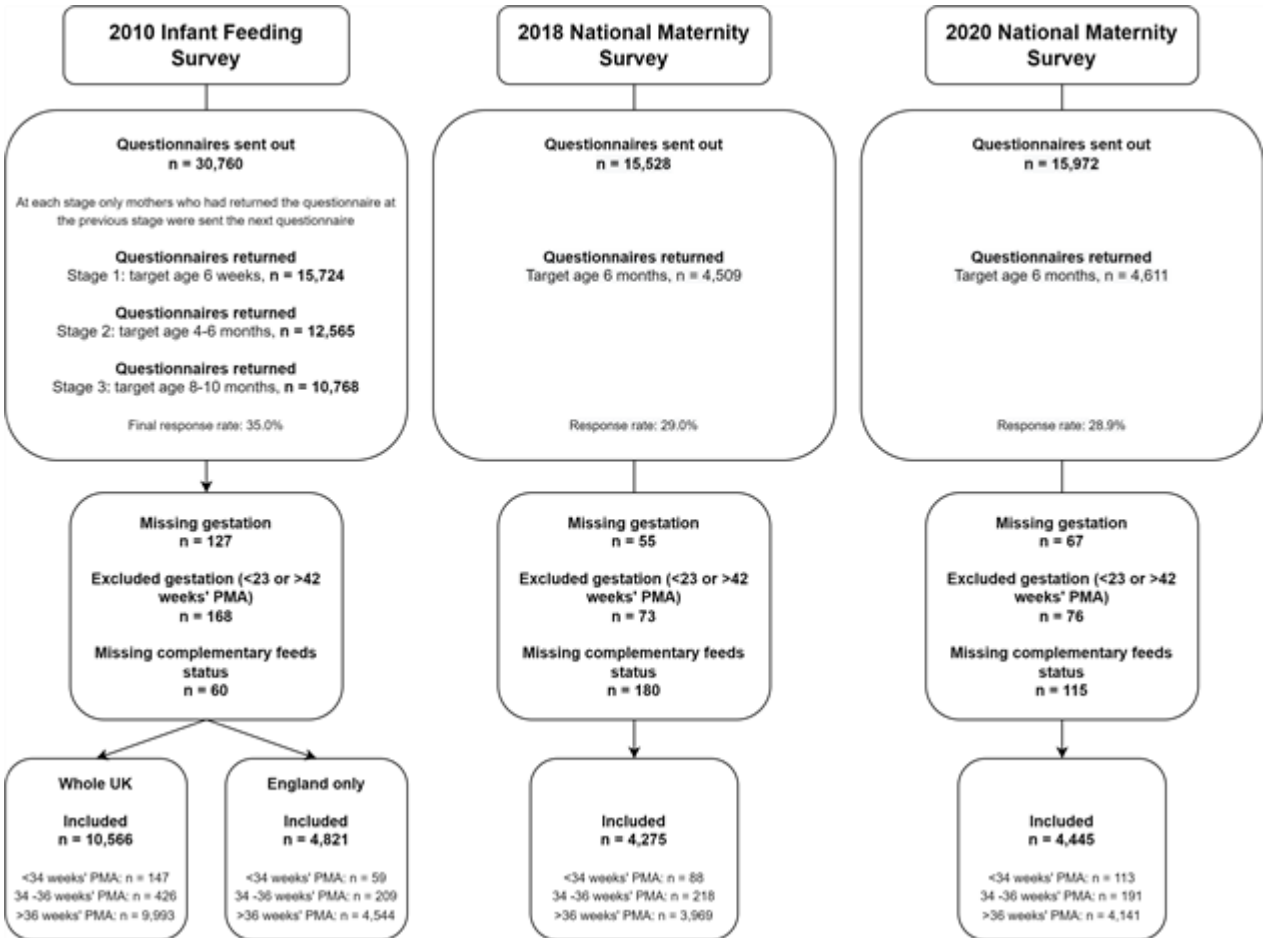
Background: There is no clear guidance for when premature infants should start complementary feeds, because there is minimal evidence in this area. 13 weeks' corrected age has been proposed as a potential safety threshold. This study aimed to describe the timing of introduction of food by gestational age at birth.

Methods: Data were extracted from national surveys in 2010 (Infant Feeding Survey), 2018 and 2020 (National Maternity Surveys). All identified representative samples of births via national birth registration. The proportion of infants introducing food at set timepoints and its timing are compared between years using chi-square and logrank tests.

Results: 4,821 English infants were included in 2010, 4,276 in 2018 and 4,445 in 2020. Of these, 268 (5.5%), 306 (7.2%) and 304 (6.8%) were premature respectively. Figure 1 shows the participant flowchart. All infants started food at older ages in successive cohorts, although not statistically significant for those born <34 weeks' (Table 1). In 2010 and 2020 late preterm infants (gestation 34-36 weeks) and those born <34 weeks' started food later than term infants (in 2020, median age 24 weeks for term infants and 26 weeks for both categories of preterm infants; log rank $p<0.001$). In 2018 there was no significant difference. Late preterm infants given food before 13 weeks' corrected decreased from 27% to 9% between 2010 and 2020 ($p<0.002$) whereas those born <34 weeks' did not show significant reduction (46% to 35%).

Conclusion: Infants have had complementary feeds introduced at older ages in successive cohorts between 2010 and 2020, and premature infants are given food at later ages than term infants. The magnitude of the delay is associated with the extent of prematurity. Despite improvement over time in some areas, a third of infants born <34 weeks' are given food before 13 weeks' corrected, which may be inappropriate.

Graphs


2010 Infant Feeding Survey
Questionnaires sent out
n = 30,760
At each stage only mothers who had returned the questionnaire at the previous stage were sent the next questionnaire
Questionnaires returned
Stage 1: target age 6 weeks, n = 15,724
Questionnaires returned
Stage 2: target age 4-6 months, n = 12,565
Questionnaires returned
Stage 3: target age 8-10 months, n = 10,768
Final response rate: 35.0%
Missing gestation
n = 127
Excluded gestation (<23 or >42 weeks' PMA)
n = 168
Missing complementary feeds status
n = 60
Whole UK
Included
n = 10,566
<34 weeks' PMA: n = 147
34 -36 weeks' PMA: n = 426
>36 weeks' PMA: n = 9,993
England only
Included
n = 4,821
<34 weeks' PMA: n = 59
34 -36 weeks' PMA: n = 209
>36 weeks' PMA: n = 4,544
2018 National Maternity Survey
Questionnaires sent out
n = 15,528
Questionnaires returned
Target age 6 months, n = 4,509
Response rate: 29.0%
Missing gestation
n = 55
Excluded gestation (<23 or >42 weeks' PMA)
n = 73
Missing complementary feeds status
n = 180
Included
n = 4,275
<34 weeks' PMA: n = 88
34 -36 weeks' PMA: n = 218
>36 weeks' PMA: n = 3,969
2020 National Maternity Survey
Questionnaires sent out
n = 15,972
Questionnaires returned
Target age 6 months, n = 4,611
Response rate: 28.9%
Missing gestation
n = 67
Excluded gestation (<23 or >42 weeks' PMA)
n = 76
Missing complementary feeds status
n = 115
Included
n = 4,445
<34 weeks' PMA: n = 113
34 -36 weeks' PMA: n = 191
>36 weeks' PMA: n = 4,141

Image

Table 1: Complementary feeding characteristics (weighted, England only)

	2010	2018	2020
	n=59 <34 weeks' n=209 34-36 weeks' n=4544 ≥37 weeks'	n=89 <34 weeks' n=218 34-36 weeks' n=3974 ≥37 weeks'	n=113 <34 weeks' n=192 34-36 weeks' n=4142 ≥37 weeks'
First complementary feed in weeks of absolute age; median (IQR)			
<34 weeks' PMA	24 (18 – 27)	25 (22 – 26)	26 (22 – 26)
34-36 weeks' PMA*	21 (17 – 26)	24 (22 – 26)	26 (22 – 26)
≥37 weeks' PMA*	21 (17 – 24)	24 (22 – 26)	24 (22 – 26)
First complementary feed in weeks of corrected age; median (IQR)			
<34 weeks' PMA	13 (10 – 18)	15 (11 – 17)	15 (9 – 18)
34-36 weeks' PMA*	16 (12 – 21)	20 (16 – 21)	20 (18 – 22)
Complementary feeds started before 17 weeks' actual age; n (%)			
<34 weeks' PMA*	12 (21%)	2 (3%)	0
34-36 weeks' PMA*	53 (25%)	7 (3%)	11 (5%)
≥37 weeks' PMA*	917 (20%)	130 (3%)	93 (2%)
Complementary feeds started before 26 weeks' actual age; n (%)			
<34 weeks' PMA	36 (61%)	47 (56%)	54 (47%)
34-36 weeks' PMA*	174 (74%)	137 (58%)	95 (44%)
≥37 weeks' PMA*	3636 (81%)	2485 (63%)	2224 (54%)
Complementary feeds started before 13 weeks' corrected age; n (%)			
<34 weeks' PMA	27 (46%)	27 (32%)	40 (35%)
34-36 weeks' PMA*	63 (27%)	15 (6%)	20 (9%)
Complementary feeds started before 17 weeks' corrected age; n (%)			
<34 weeks' PMA	36 (62%)	55 (64%)	79 (69%)
34-36 weeks' PMA*	117 (50%)	61 (26%)	43 (20%)

*$p<0.002$ – testing differences between years. PMA = post-menstrual age

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Less-invasive surfactant administration: experiences from a neonatal intensive care unit

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[1]*Birmingham Women's and Children's Hospital NHS Foundation Trust*

Background

Less-invasive surfactant administration (LISA) is a method of surfactant delivery which removes the requirement for intubation. LISA is known to reduce the time on a ventilator, mortality and development of bronchopulmonary dysplasia.

We analysed LISA use on a tertiary neonatal unit in the West Midlands. Local guidelines recommend LISA in babies ≥26/40 gestation, <24 hours old and in nCPAP≥6cm with FiO2≥ 30%.

Methods

Badgernet notes were retrospectively reviewed for babies who received surfactant from January 2018 - December 2021, excluding those receiving initial surfactant doses by any method other than LISA and those intubated at birth. 81 babies were included.

Results

Mean gestation was 31/40 (24+0-37+6). 3 patients were 24-25/40. Mean weight was 1700g (740-4150g). In 85.4% LISA was performed at <24hrs age (Median age was 5 hours). Mean FiO2 pre-LISA was 48.4%; post-LISA was 32.5% (mean absolute reduction 15.9%).

Mean time on respiratory support was 14.5 days (0–120). Mean number of days ventilated was 2, NIPPV 0.2, CPAP 4.5 and Highflow 8.9. 13% required oxygen at 36/40 and 3.8% died (unrelated to LISA).

Complications were present in 22 patients (27%). 15 patients (18.5%) had desaturations/bradycardia during the procedure, 3 (4%) required an escalation in respiratory support, a pneumothorax was discovered shortly after LISA in 1 patient and one other patient had surfactant spilling out of the trachea into the larynx mid procedure. 15 (18.5%) required intubation within 48hrs of LISA.

Only 1 of the 3 patients <26/40 had a complication (intubation 24 hours post-LISA following NIPPV nasal damage).

Conclusions

Current local guidelines recommend babies of ≥26/40, should receive LISA. This audit suggests LISA may be delivered safely to babies <26/40, avoiding complications associated with intubation and ventilation. Desaturation and bradycardia is a common complication during the procedure. A significant proportion still require intubation within 48hrs post LISA.

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Multi-centre, RCT comparing gestation Vs “other” methods of estimating ETT length – a pilot study

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Introduction: Endotracheal tube (ETT) placement at delivery remains necessary for many neonates. Weight-based methods of ETT length estimation (Tochen’s method) are widely used, but weight is often unavailable and there are concerns about its accuracy in extremely premature babies. To our knowledge gestation based methods have not been evaluated in RCTs in the delivery suite setting.

Methods: Block randomisation utilising sealed opaque envelopes and allocation concealment, recruiting babies <29/40 in two neonatal units in Greater Manchester. From previous work, we knew that about 60% of ETT needed readjustment to achieve the desired position (T1-T2). For a 50% absolute reduction, with an 80% power for a two-sided test of 5% we would need 40 infants in each group. Babies intubated using clinicians usual method of estimating length or gestation based method suggested by Kempley.[1] ETT position assessed by the clinician and by a blinded, independent radiologist. Results analysed using odds ratios. Ethical approval for retrospective consent obtained.

Results: Recruitment target was not achievable because of competition with other RCTs in region and loss of equipoise as a mobile workforce moved towards routine use of gestation-based methods. Using clinician interpretation of the first CXR, ETT were more likely to be correctly sited using gestation-based method, odds ratio 18 (95% CI 1.5-216.6) p = 0.023. The same trend was supported by the findings of the blinded radiologist reviewing the initial CXRs at the conclusion of the study. Studies complications also appear to have a lower frequency in the gestation-based group (see table).

Discussion: This study suggests gestation-based methods might be superior in predicting ETT lengths in delivery suite for extremely premature babies. Adequately powered, funded, multicentre RCTs are necessary to definitively confirm this and lead to improvements in care for extremely premature babies.

1. Kempley et al (2008) Resuscitation 77, 369-373.

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Refractory seizures in a neonate - A rare case of PCH6.

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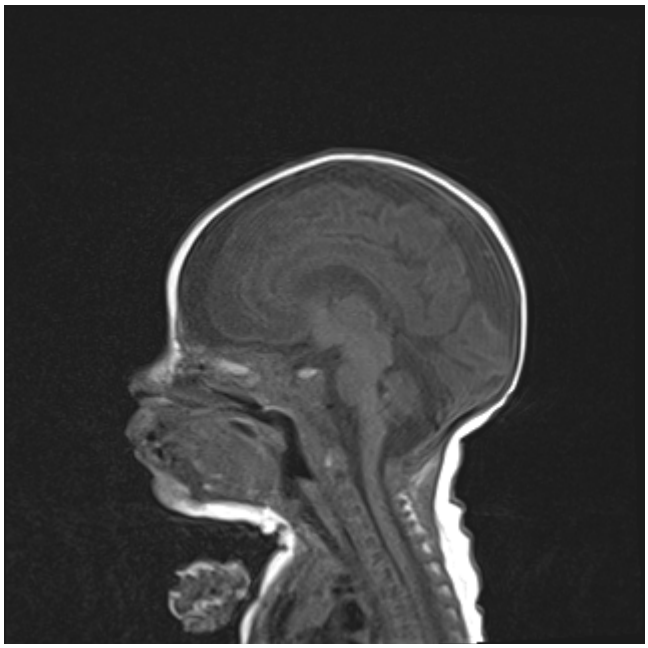
Pontocerebellar Hypoplasia (PCH) is a rare group of autosomal recessive disorders characterised by progressive microcephaly, global developmental delay and seizures. Imaging demonstrates hypoplasia and atrophy of the ventral pons and cerebellum. PCH6 subtype results from mutations in the nuclear encoded mitochondrial arginyl-tRNA sythetase gene (RARS2) and is beset by early onset seizures, lactic acidosis and mitochondrial respiratory chain defects.

We report the case of a boy born at 36 weeks and admitted to NICU due to low birth weight (1835g). He developed hypoglycaemia and lactic acidosis, prompting a metabolic workup. Initial investigations were normal and R63 panel was sent looking for mitochondrial gene defects. TORCH screen demonstrated congenital Cytomegalovirus (CMV) and valganciclovir was commenced. Baby remained clinically well until day 20 when he developed apnoeas and seizures needing ventilation. EEG demonstrated severe encephalopathy with frequent subclinical seizures originating from both hemispheres. MRI brain showed cystic areas in left temporal lobe with impression of microcephaly, pachygyria, delayed myelination and a small cerebellum (Figure 1). Though unusual, CMV encephalitis was considered to be his working diagnosis after discussion with Infectious Disease, Neurology and Metabolic teams. Refractory nature of ongoing seizures prompted further discussions with Geneticist and Neurologist and R56 was suggested for epilepsy gene panel. Finally, R14 Trio exome sequencing demonstrated a known mutation in paternal RARS2 and a novel previously unreported mutation in maternal RARS2 copy consistent with PCH6.

After discussions with parents in view of ongoing clinical deterioration and increasing seizure burden baby was transferred to hospice for palliative care. He had increasing apnoea's and passed away with his family by his side.

This case highlights the importance of continual reevaluation of working diagnosis in light of progressing signs and symptoms to achieve the correct genetic diagnosis of PCH6, a life limiting condition with implications for future pregnancies for parents.

Image



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Keep your eyes peeled! An unusual cause of ophthalmia neonatorum

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[1]Antrim Area Hospital, [2]Antrim Area Hospital, [3]Antrim Area Hospital

Background:
Ophthalmia neonatorum is a conjunctival infection which occurs during the first month of life. Two major causes of ophthalmia neonatorum are neisseria gonorrhoea and chlamydia trachomatis. The clinical presentation and management of these infections are well documented, however there is a lack of awareness and understanding of how to manage newborns with ophthalmia neonatorum secondary to other bacterial organisms, especially those associated neonatal sepsis.

Case presentation:
A baby girl born at term via normal vaginal delivery presented at 36 hours of age. On examination she had copious purulent discharge from her right eye with conjunctival inflammation and palpebral swelling. She was otherwise clinically well and afebrile with no signs of systemic disease. Inflammatory markers and baseline bloods were normal. Eye culture, PCR for N. gonorrhoea and C. trachomatis were obtained and initial gram stain results showed gram negative rods. Following the commencement of IV cefotaxime her eye rapidly improved and she was discharged home to complete a course of topical chloramphenicol.

Discussion:
The incidence of ophthalmia neonatorum has significantly reduced following the introduction of screening pregnant women for chlamydia and gonorrhoea infection. This has led to an increase in alternative bacteria causing ophthalmia neonatorum and the treatment for these cases is unclear. Gram negative rods such as pseudomonas aeruginosa has been linked to orbital abscess and klebsiella pneumonia has been linked to corneal perforation in otherwise healthy neonates. More awareness is needed for other potential causes of ophthalmia neonatorum and guidelines are required to ensure appropriate investigations and treatment is provided.

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The case for a novel approach to the follow-up of moderate pre-term babies: establishing a NHS follow-up group and the unexpected outcomes

Miss Fiona McKeown, Mrs Hilary Cruickshank, Hilary Cruikshank

Background: The discrepancy between research and treatment for early and moderate pre-term infants is drastic. Traditionally, research has focused on pre-term infants born before 32 weeks. Little research has considered the long-term impact or support for moderate preterm infants (32+0-34+0 weeks). The enhanced follow-up for high risk babies is not available to those moderate pre-term infants, and local follow-up in virtual consultant clinics is sub-optimal. This is despite the knowledge that there is increased frequency of speech delay, language-related problems, attention deficit, gross motor delay and a wide range of learning difficulties for this group compared to the general population. The “Wee Wonders-Moderate Pre-term group” is designed to educate and support parents. A full MDT delivers a package of education and practical sessions. Infant assessments are also carried out to identify any concerns and provide early intervention. Prechtl General Movement assessment provides “gold standard” care for infants.

Aim: Provide parental support and education to reduce parental anxiety and increase knowledge. Offer early enhanced assessment to identify motor disorders at 3 months CGA and provide early intervention to optimise outcome for moderate pre-terms.

Results: 33% of babies who attended were provided with advice for mild developmental problems, 10% continue to be followed up in the high-risk follow up clinic due to evolving Cerebral Palsy, not identified via Consultant clinic. Parental feedback and mental-health questionnaires highlighted improved parental confidence and well-being.

Conclusion: Moderate pre-term group follow-up provides a quality service for patients and parents. It provides improved mental well-being for parents and peer-support. Parents feel empowered and have increased confidence in supporting their child’s development. Babies with evolving difficulties can be identified sooner allowing for earlier intervention and consequently improved long-term outcomes. The group setting, and reduced need for consultant input, also provides a more cost effective follow-up service.

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Case of Calcinosis cutis in a neonate

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A Case of Calcinosis cutis in a neonate

Background

Calcinosis cutis is a condition characterized by deposition of calcium salts in skin and subcutaneous tissue. It is commonly seen in autoimmune connective tissue disorders amongst middle and elderly age group. However, it is a rare entity in neonates and can easily be misdiagnosed as cellulitis or osteomyelitis.

We present an interesting case of a term neonate with calcinosis cutis.

Case

A term baby girl was admitted to NICU due to severe Hypoxic Ischemic Encephalopathy with multi-organ failure requiring extensive intensive care and received therapeutic hypothermia. On day 22, she was reviewed due to concerns of swelling of her right hand. This was firm, tender swelling with no redness of the overlying skin. Antibiotics were commenced for suspected cellulitis; however, the septic screen was negative. Parents were anxious as the swelling increased over next 4-7 days. X-ray hand and wrist revealed irregular calcification around soft tissue and no involvement of bony tissue thus ruling out osteomyelitis. Further history revealed that she had extravasation injury in the right hand and received IV Calcium gluconate corrections through peripheral IV access for hypocalcaemia on Day 4 of life. The diagnosis of calcinosis cutis of iatrogenic origin was made. She was managed conservatively and parents were reassured.

Conclusion

Calcinosis cutis is rare in neonate, and almost certainly due to iatrogenic cause secondary to calcium extravasation in the soft tissue. It becomes evident 2-3 weeks later and often clinically mimic cellulitis, osteomyelitis or fracture.

X-ray findings are confirmatory and appear within 1-3 weeks; the clinical and radiological findings subside by 2-6 months.

Treatment of calcinosis cutis includes conservative management; debridement and antibiotics may be required in cases of necrosis and secondary infection.

It is important to be aware of such a complication of calcium extravasation injury.

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CONGENITAL NASAL PYRIFORM APERTURE STENOSIS(CNPAS) – A RARE CAUSE OF RESPIRATORY DISTRESS IN NEONATES AND ITS IMPLICATIONS.

Dr Vijaykumar Mundeshi[1], Dr Nandita Chinchankar[1], Dr Alok Sharma[1]
[1]*Royal Hospital for Children and Young People/ NHS Lothian*

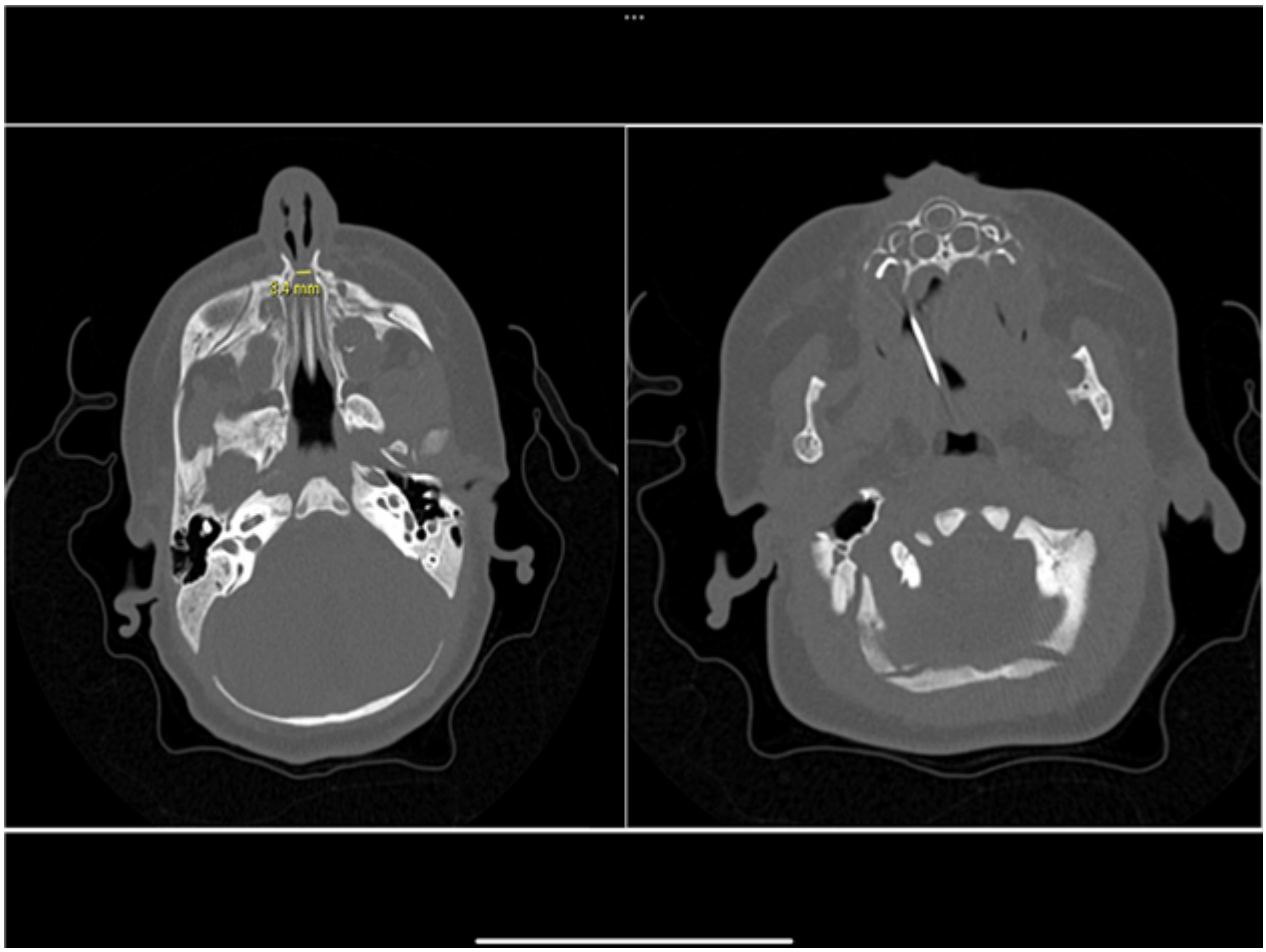
BACKGROUND:
Respiratory distress is a common presentation in neonates with anatomical airway anomalies and present early in life due to being obligate nasal breathers. Here we present a case respiratory distress due to Congenital Nasal Pyriform Aperture Stenosis, a rare finding which has diagnostic implications.

CASE PRESENTATION:
Term baby with no antenatal or perinatal concerns presented on day 1 of life with a cyanotic episode and increased work of breathing. Baby was initially managed as suspected sepsis; however, it was noted that there was difficulty passing nasogastric (NG) tube and work of breathing transiently improved with airway repositioning. Initial ENT examination suggested possibility of deviated nasal septum. Baby persisted to have respiratory distress and obstructive upper airway noises which transiently improved with nasal CPAP. CT scan of Facial / Nasal Bones showed narrowing of pyriform aperture (3-4mm) and presence of Central Megainscisor. Baby underwent investigations to rule out associated anomalies.
Baby was initially managed conservatively but persisted to have respiratory distress and cyanotic episodes. Balloon dilatation of nasal aperture was done on day 7, subsequently weaned off respiratory support and discharged with feeding support with anticipation that baby may need further intervention.

DISCUSSION:
CNAPS is rare cause of respiratory distress and another entity called Solitary Median Maxillary Central Incisor (SMMCI) is commonly seen with CNAPS, is a malformation with defects of midline structures including nasal bones, Pituitary, Holoprosencephaly, Ocular Coloboma or Chromosomal abnormalities.

MESSAGE: Upper airway anomalies is one of the causes of neonatal respiratory distress and differential diagnosis commonly include choanal atresia when there is difficulty to pass NG tube. CNAPS should be considered and investigated early. A diagnosis of CNAPS should prompt to look for SMMCI, as it is associated with serious anomalies and warrants a multidisciplinary management and may have poor outcomes with presence of other anomalies.

Image


3.4 mm

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Reducing rates of unplanned extubation in the neonatal intensive care unit.

Dr Rebecca Naples[1], Dr Claire Granger[1], Dr Gayle Bishop[1], Dr Robert Tinnion[1]
[1]*Royal Victoria Infirmary*

Background

Unplanned extubation (UE) is associated with significant complications in the neonate: events can rapidly lead to include cardiovascular instability and re-intubation is associated with considerable morbidity and mortality.

Factors that contribute to UE events include incorrect use of endotracheal tube fixation devices, and disturbance during handling or procedures.

Aims

We aim to reduce our rate of UE to 1 event per 100 ventilator days, as has been benchmarked in many NICUs across the country.

Method

To first identify the scale of the problem we undertook six months prospective data collection of all UE from May to October 2021. An audit form was completed contemporaneously following each UE as a “hot debrief” with the team on shift, and a datix completed.

Results

Initial findings showed that the majority of our UEs occur in our smallest babies with smallest endotracheal tubes. Two thirds of infants who had an UE were re-intubated in the following 24 hours, and one infant required cardiac compressions and adrenaline.

Following this prospective audit, we have implemented an education package increasing staff awareness of the problem and worked collaboratively with nursing and allied health professionals to identify strategies to reduce UE events. This includes visual aids at the infant’s bedside, mandating two person handling for infants <30 weeks gestation and/or <1kg in weight, and regularly updating staff regarding current UE rates.

With these changes, we have increased the visibility of UE as a concern within NICU. In the eight months since introducing these changes, we have shown a 20% reduction in UE from a baseline rate of 4 events per 100 ventilator days, to a post-implementation average of 3.2 per 100 ventilator days.

Conclusions

Work is ongoing, but we have shown with commitment, education and regular review, sustained reduction in UE and associated harm can be achieved.

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Effect of weaning nasal high flow on diaphragm electrical activity in preterm infants.

Dr Rebecca Naples[1], Dr Malcolm Brodlie[2], Dr Christopher O'Brien[2], Dr Sundeep Harigopal[1]
[1]Royal Victoria Infirmary, [2]Great North Children's Hospital

Background

Weaning high flow (HF) in preterm infants is largely a trial-and-error process. Electrical activity of the diaphragm (Edi) is an objective measure of respiratory muscle effort that may be useful to guide weaning. This study aimed to determine how Edi changes when weaning nasal HF therapy in preterm infants according to a standardised protocol.

Methods

Preterm infants born at <32 weeks gestation receiving HF as part of routine clinical care were recruited. HF was weaned at set intervals according to specific clinical criteria, namely FiO2 ≤0.35, pH >7.25 and absence of recurrent apnoea requiring intervention. Edi was measured using a modified gastric feeding tube serially at four time-points from baseline (pre-wean) to 24-hours post-weaning. Parameters measured included the minimum Edi during expiration (Edi min) reflecting the tonic diaphragm activity required to maintain functional residual capacity, maximum Edi (Edi max) during inspiration, and the amplitude of the Edi signal (Edi delta) reflecting inspiratory effort.

Results

Forty preterm infants with median birth gestation 26.4wk (IQR 25.0-27.3) and corrected gestation of 31.2wk (IQR 29.5-32.7) were recruited. Data from 156 weaning steps were analysed, 91% of which were successful. No change in any Edi parameter was evident following flow rate reduction steps, but Edi max and Edi delta increased significantly following discontinuation of HF from 2L/min (median increase in Edi delta immediately post-discontinuation 1.68μV [IQR 0.5-3.8]) and at 24-hours 1.86μV [IQR 0-4.9]). No significant difference in any Edi parameter was observed between successful and unsuccessful weaning steps.

Conclusions

Edi does not change with reducing HF rate, but inspiratory effort significantly increases with discontinuation of HF from 2L/min. The high success of the weaning protocol used in this study and the accompanying Edi data support reducing flow rate in 1L/min decrements, and provides a useful framework for refining HF weaning protocols in preterm infants.

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Designing, Developing and Implementing an Optimisation Data Tool

Mrs Catherine Nash[1]
[1]*Nwnodn*

Background
In the NW a network approach was adopted to support Trusts in implementing local QI projects to maximise optimisation for preterm infants. This included designing, developing and implementing a monthly data tool.

Aim
The aim was to standardise data collection across the region and save clinicians from having to generate monthly data. Specific measures were identified and mapped to the relevant fields on Badgernet. Data downloaded by the network analyst is collated as an SQL file to produce and up-date the tool monthly. It is simple to use, includes only relevant information and highlights achievement of interventions.

Method
The initial template was produced, and data added for 12months, providing a baseline for future comparison once projects were implemented. There are filters for monthly, quarterly and yearly data, split into localities and units. Reports continue to be circulated monthly. Feedback was encouraged so the tool could be improved further. Training slides to aid Badger field completion were circulated.

Results
The tool has been implemented for 20 months. Units use it to identify missing data, highlight data inputting issues and to explore areas for QI. Initially missing data wasn't highlighted but following feedback additional columns were added and data completeness is improving. Measures have been up-dated and are in-line with ODN dashboards and BAPM optimisation definitions. The tool is visual and provides a summary for each baby at unit, locality and regional level. There is also an infographic to share with multidisciplinary teams. Data for over 5000 babies has been collated since it was introduced in 2020.

Conclusion
A simple tool for units to use when collating Optimisation QI data. Missing data and areas for improvement are easy to identify. It could be replicated in other regions and a similar method adopted for identifying missing data for other initiatives, including NNAP.

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A systematic review exploring the association between birth location and short-term outcomes for babies with gastroschisis, congenital diaphragmatic hernia and oesophageal fistula.

Dr Behrouz Nezafat Maldonado[1], Dr LiYan Chow[2], Dr Dougal Hargreaves[3], Dr Chris Gale[1], Dr Cheryl Battersby[1]

[1]Neonatal Medicine, School of Public Health, Faculty of Medicine, Imperial College London, Chelsea & Westminster Hospital campus, [2]Neonatal Medicine Department, Chelsea and Westminster NHS Foundation Trust, [3]Mohn Centre for Children's Health and Wellbeing, Imperial College London

Background:
Neonatal surgical care is commonly centralised, meaning infants with surgical conditions born in non-surgical centres require postnatal transfer. Best practice models advocate for co-located maternity and surgical services to prevent potential complications that may occur related to postnatal transfers or surgical delays.

We aim to explore associations between place of delivery and short-term outcomes in newborns with gastroschisis, congenital diaphragmatic hernia (CDH), oesophageal atresia with or without tracheoesophageal fistula (TOF/OA)

Methods:
We searched MEDLINE, CINAHL, Web of Science and SCOPUS. We included all studies from high income countries reporting on infants with gastroschisis, CDH or TOF/OA, reporting place of delivery and outcomes. Outcomes of interest were survival, length of stay (LOS), age of first feed, comorbidities, duration of parenteral nutrition and separation between mothers and babies. We assessed quality using the Newcastle-Ottawa scale. PROSPERO registration:CRD42022329090. We present a narrative synthesis using vote counting based on direction of effect.

Results:
From 1299 records we included 16 cohort studies (14 multicentre and 2 single-centre). Whilst some studies found that being born in a co-located centre was associated with improved survival, others found higher mortality, potentially due to clinical severity differences. Birth in non-surgical centres had a negative effect on LOS for CDH and gastroschisis. No studies reported on impact of mother-baby separation. Figure 1 shows the direction of effect and quality for included studies; broadly high-quality studies showed a negative effect of birth in a non-surgical centre on outcomes.

Seven studies performed case-mix adjustment finding overall negative effects of birth in non-surgical centre.

Conclusions:
There is evidence that delivery in co-located maternity-surgical services may be associated with shortened LOS and reduced mortality. However, we found few studies and findings were limited by case-mix adjustment. In the UK, there is opportunity to utilise routine population data to explore these uncertainties.

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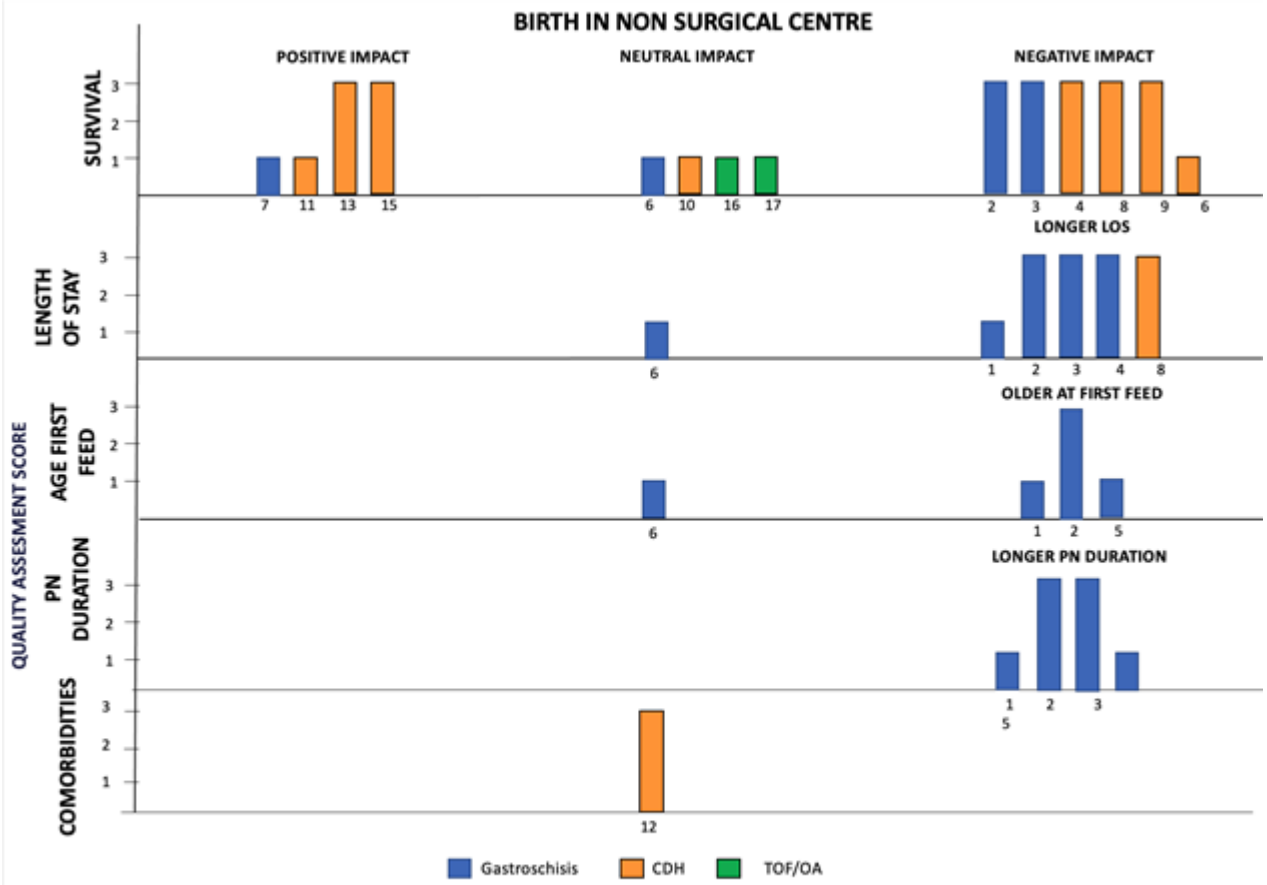

Figure1: Harvest plot (height depicts overall quality judgement (3 = low risk of bias; 1 = high risk of bias), colour depicts surgical conditions (blue = gastroschisis; orange = CDH; green=TOF/OA), numbering represent the reference of the studies.

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Community neonatal Nurse-led Home Oxygen Weaning leads to significant reduction in time on Oxygen

Dr Anshuman Paria[1], Mrs Gaynor Lovatt[1]
[1]*Lancashire Women and Newborn Centre*

Title: Community neonatal Nurse-led Home Oxygen Weaning leads to a significant reduction in time on Oxygen

Authors: Anshuman Paria, Gaynor Lovatt

Institution(s): Lancashire Women and Newborn Centre, Burnley

Background: The lack of evidence-based guidelines in weaning neonates on home oxygen has led to a wide variety of practices across the UK. However, in most units, overnight saturation downloads from babies on Home Oxygen are obtained by community nurses and then sent over to the named Neonatal consultants to interpret and advise-leading on unnecessary delay and non-uniform weaning of Home Oxygen.

Methods: A QI initiative was launched in mid-2020 at the LWNC Neonatal unit, in which an SOP of Community neonatal Nurse-led Home Oxygen Weaning was devised, and training was given to the team to interpret Overnight saturation studies and take SOP-based actions. Retrospective Home Oxygen-related data from 2019-2020 (23 babies with an average weight of 1.253 kg and an average Gestational age[GA]of 29 weeks following a Consultant-Led Weaning [CLW] plan) was then compared with data from 2021-2022(19 babies with an average weight of 1.159 kg and an average GA of 27.3 weeks following a Nurse-Led Weaning [NLW] plan).

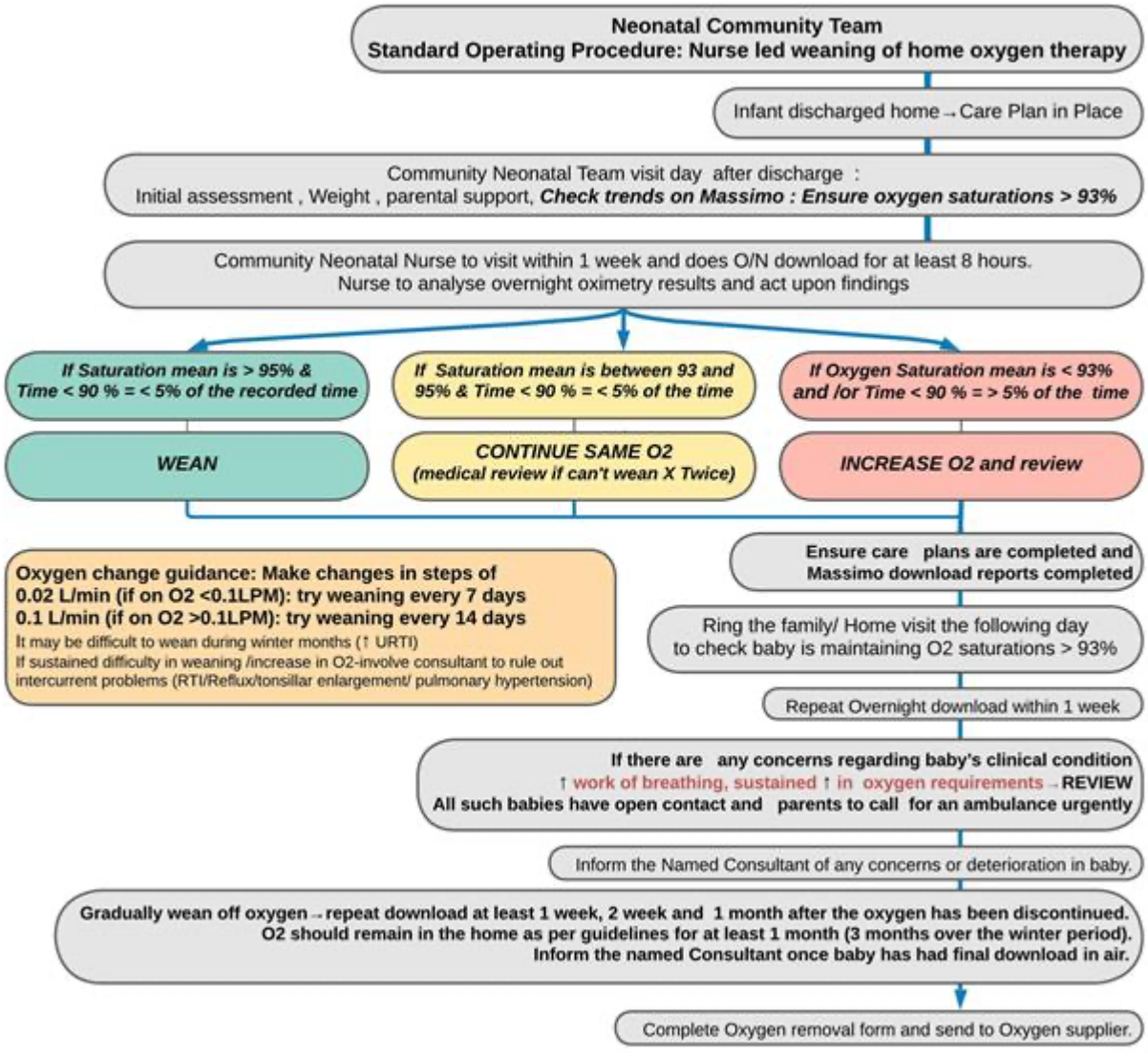
Results: The introduction of NLW led to a reduction in the average duration of Home Oxygen by 30 days (CLW-121 days, NLW-91 days, reduced by 25%). The average number of downloads /baby was increased by 3(CLW-9, NLW-12) while decreasing the average number of community team visits by 4(CLW-18.8, NLW-15 visits/baby). An almost similar number of babies were still on Oxygen at the end of 1 year.

Conclusions: A standardised plan of Nurse led weaning of home Oxygen is a feasible, safe and more efficient option. Upgrading our saturation monitors for the next phase of QI to allow bedside download and interpretation of saturation studies at patient homes may give even better results.

Graphs

Table 1: Demographic data and results of Nurse led weaning of Home Oxygen: a QI initiative at LWNC NICU		
DEMOGRAPHIC		
	PRE NURSE-LED WEANING of Home Oxygen	NURSE-LED WEANING of Home Oxygen
When was Home Oxygen started?	01/2019-12/2019	01/2021-12/2021
Number of babies	23	19
Average weight (kg)	1.253	1.159
Average GA weeks	29	27.38
Mean PNA age at discharge from NICU	144 days	116.4 days
Number of babies	23	19
RESULTS		
The average number of downloads per infant	9	12
The average number of community team visits per infant	18.8	15
The average duration of home oxygen(days)	121	91
No. of babies referred to the specialist respiratory team	3	4

Image


Neonatal Community Team
Standard Operating Procedure: Nurse led weaning of home oxygen therapy
Infant discharged home → Care Plan in Place
Community Neonatal Team visit day after discharge :
Initial assessment , Weight , parental support, Check trends on Massimo : Ensure oxygen saturations > 93%
Community Neonatal Nurse to visit within 1 week and does O/N download for at least 8 hours.
Nurse to analyse overnight oximetry results and act upon findings
If Saturation mean is > 95% & Time < 90 % = < 5% of the recorded time
If Saturation mean is between 93 and 95% & Time < 90 % = < 5% of the time
If Oxygen Saturation mean is < 93% and /or Time < 90 % = > 5% of the time
WEAN
CONTINUE SAME O2
(medical review if can't wean X Twice)
INCREASE O2 and review
Oxygen change guidance: Make changes in steps of
0.02 L/min (if on O2 <0.1LPM): try weaning every 7 days
0.1 L/min (if on O2 >0.1LPM): try weaning every 14 days
It may be difficult to wean during winter months (↑ URTI)
If sustained difficulty in weaning /increase in O2-involve consultant to rule out intercurrent problems (RTI/Reflux/tonsillar enlargement/ pulmonary hypertension)
Ensure care plans are completed and Massimo download reports completed
Ring the family/ Home visit the following day to check baby is maintaining O2 saturations > 93%
Repeat Overnight download within 1 week
If there are any concerns regarding baby's clinical condition
↑ work of breathing, sustained ↑ in oxygen requirements → REVIEW
All such babies have open contact and parents to call for an ambulance urgently
Inform the Named Consultant of any concerns or deterioration in baby.
Gradually wean off oxygen → repeat download at least 1 week, 2 week and 1 month after the oxygen has been discontinued.
O2 should remain in the home as per guidelines for at least 1 month (3 months over the winter period).
Inform the named Consultant once baby has had final download in air.
Complete Oxygen removal form and send to Oxygen supplier.

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Brachial Plexus Injury Secondary to Total Parenteral Nutrition (TPN) Extravasation from a Percutaneous Long Line – A Case Report

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Percutaneous long lines are widely used in neonatal practice and are essential for the routine delivery of parenteral nutrition to preterm and unwell neonates. We present a case of TPN extravasation causing chemical damage to the brachial plexus leading to complete flaccid paralysis of the upper limb.

A 26+6 week preterm infant was transferred on day 21 for surgical review following a deterioration with necrotising enterocolitis (NEC). A percutaneous long line was inserted via the right antecubital fossa and the tip was confirmed on chest x-ray to be in the subclavian vein. Following medical management of NEC, feeds were restarted but stopped again due to recurrent abdominal distension secondary to colonic strictures. These were resected on day 56. On day 63, the baby developed swelling of the right arm. The long line was suspected to have extravasated and was removed. Over the following days, it was noted the swelling persisted and the baby was unable to move the right upper limb.

Investigations revealed extensive soft tissue swelling in the sub-clavicular region on ultrasound. MRI showed that the muscles of the rotator cuff, deltoid, pectorals, and upper arm on the right demonstrated high signal compared to those on the left. Appearances may represent oedema but denervation of the muscle also causes this appearance. No drainable collection was seen. Nerve conduction studies showed severe axon loss involving all segments of the right brachial plexus. Plastic surgery were consulted but no surgical intervention was felt to be appropriate. The baby has been receiving physiotherapy and there has been some modest improvement in function.

There is a paucity of literature referring to TPN-associated nerve injury. Commonly reported injuries include liver extravasation and associated bleeding, skin and soft tissue injury. We report a novel case of suspected brachial plexus injury secondary to TPN extravasation.

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Presence of moral distress in Perinatal Healthcare Professionals attending periviable pre-delivery discussions

Dr Jennifer Peterson[1], Miss Kate Delaney, Professor Edward Johnstone, Dr Debbie Smith, Dr Ajit Mahaveer
[1]*Manchester University NHS Foundation Trust*

Background:
Periviable delivery necessitates a decision being made between provision of survival-focussed or comfort-focussed care at delivery. The decision should be made as a collaboration between the perinatal multidisciplinary team (MDT) and the parents. Decision-making in these circumstances carries a high risk of healthcare professionals (HCP's) experiencing conflict between their own moral values and the course of action determined by parental and wider MDT discussions. This internal conflict is termed moral distress and is linked to increased rates of stress, burnout, fatigue, depression and post-traumatic stress disorders in HCP's .

Methods:
An online electronic (Qualitrics) survey was developed to assess perinatal HCP's experiences of periviable pre-delivery discussions, including questions related to moral distress.
The survey was live between 1st March – 29th April 2022 and was distributed through multidisciplinary channels, including BAPM, RCOG, RCM and UK-wide RCPCH-listed paediatric training directors. Results were analysed by professional group. All responses were anonymous.

Results:
The survey gathered 384 responses across the UK-wide perinatal MDT.

The main causes of moral distress across the professions arose where HCP's perceived a lack of parental comprehension of survival likelihood or long-term complications. There were no explicit reports of moral distress when comfort care had been selected. Moral distress also arose from situations of perceived professional dishonesty, such as counselling parents that survival-focussed care could be offered whilst knowing outcomes are significantly worse for periviable infants born in Level One/Two units.

Coping mechanisms were highly varied across the professional groups. However, support from colleagues was consistently ranked highly.

Conclusions:
- Involvement in pre-delivery periviable discussions causes significant moral distress burden to HCP's.
- Support from colleagues was a key method of support utilised by HCP's.
- Current network organisation policies contributed to moral distress for some HCP's.
- Significant variation in acknowledgement of moral distress between specialities.

BAPM CONFERENCE ABSTRACT
HOW BIG IS YOUR HEAD?

Measuring Head Circumference in a Surgical NICU

Dr Zoe Porteous[1], Dr Simon Hannam[1]
[1]*Great Ormond Street Hospital*

BACKGROUND
QI project in NICU at Great Ormond Street Hospital (GOSH). Infants have complex medical or surgical conditions. Babies' heads are measured irregularly and not plotted on the growth chart. This means growth is not effectively monitored and underlying pathology can be missed.

AIM
To increase the percentage of infants with their head measured AND plotted on a weekly basis from 15% to 100% by March 2022.

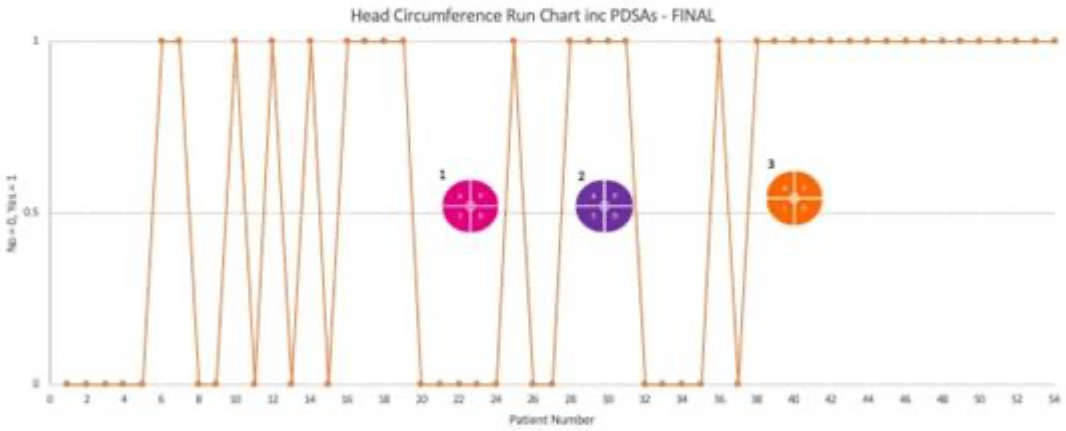
METHODS
I produced a high-level process map and fishbone diagram to understand the problem. A snapshot audit displayed the extend of the problem with 1/7 infants having measurements documented.

RESULTS
High risk infants in the NICU are not receiving their weekly head circumference measurements to monitor growing and for underlying pathology.

ANALYSIS
During this project I performed three PDSA cycles.
1. Displaying a reminder poster which was a quick and easy intervention. The impact was low.
2. I discussed with the nurse educator who assured me that nursing staff measure the head circumference weekly. She also sent out a reminder email to all staff.
3. I investigated the EPIC system; it became apparent that the nursing staff documented the data but sometimes these numbers did not translate to the growth chart. I met the EPIC configuration consultant who identified a block on the system. There must be 7-days between measurements, or they will not be plotted. This is inadequate as medical staff can miss trends, nursing staff are wasting their time taking measurements that cannot be easily found, underlying pathology can be missed. This block has now been removed to allow all measurements for infants in NICU, PICU and CICU to be effectively plotted on the growth chart. After this intervention the percentage of heads measured weekly increased to 100%. This has a positive impact on all infants in intensive care in GOSH.

Graphs

RUN CHART with PDSA CYCLES – FINAL



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Quick Response (QR) codes to connect parents to health information: A quality improvement project

Dr. Jennifer Reekie[1], Dr. Kathleen Ann Brown
[1]*University Of Dundee,* [2]*NHS Tayside*

Background
Effective parent communication is an important element of neonatal care. One widely used method of written communication is parent information leaflets (PIL). Another emerging method is quick response (QR).

QR codes allow immediate access to digital information on handheld personal devices. During the Covid19 pandemic, this contactless tool became a useful method of minimising physical contact and reducing viral transmission.

We proposed a quality improvement project offering QR codes; connecting postnatal ward parents to digital information regarding common neonatal conditions.
The aim was to investigate staff/parent acceptability of this method of communication and measure number of times codes were accessed.

Methods
Plan, Do, Study, Act (PDSA) cycles were designed. The initial cycle sought parent and staff views to gauge acceptability of QR. In the subsequent cycle, QR codes were generated linking to digital information regarding common postnatal conditions (e.g. jaundice, hypoglycaemia) and made available in the postnatal setting. The web-based QR generator platform monitored number of times codes were scanned.

Results
Twenty-five parents completed the pilot survey. Most parents (80%) were offered written information (PIL) during postnatal admission. Almost all (96%) found QR codes “extremely” or “very” easy to use. A preference for QR was expressed by the majority; only 20% preferred printed PIL.

Tier 1 and 2 medical personnel with postnatal responsibilities were surveyed, with 75% completion rate. Most staff (78%) reported a high likelihood of offering QR codes to parents.

There was an unexpectedly low number of scans during the first cycle. The next PDSA cycle involves providing information sessions and sharing parent opinions with the midwifery and neonatal teams.

Conclusions
QR codes offer an alternative communication method. This project found that parents value written information, find using QR codes straightforward and prefer this communication tool to PIL. Further PDSA cycles are planned to increase staff engagement.

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Infant Feeding Training for the Medical Workforce - From the Basics to Beyond.

Dr Kate Ridley[1], Dr Eleanor Harrison[1], Ms Rosalind Freestone[1], Ms Kath Townsend[1]
[1]*Great Western Hospital*

Background: Effective infant feeding is well known to improve infant and maternal outcomes[1]. The World Health Organisation and UNICEF's baby friendly hospital initiative '10 steps to breastfeeding' advises "that staff have sufficient knowledge, competence and skills to support breastfeeding"[1]. Despite this, it is recognised that medical schools may not adequately equip doctors for managing infant feeding concerns in practice[2].

Aims: The aim of our pilot project was to improve knowledge and confidence in medical students and doctors around infant feeding by learning in a multidisciplinary environment with midwives and neonatal nurses.

Method: Five medical students and four doctors were asked to self-assess their knowledge and confidence surrounding infant feeding using an online survey with four-point likert scale questions. Participants then completed a multidisciplinary half study day on infant feeding; including lectures, role play and case-based discussions. Participants then re-assessed themselves on an identical second survey as well as providing qualitative feedback.

Results: 77% of participants reported inadequate undergraduate training to prepare them for infant feeding concerns and self-assessed their knowledge at "novice" level. After the innovation, no participant felt they were a "novice", 44% self-assessed as an "advanced beginner" and 55% felt "competent." Confidence in giving advice to parents increased in 89% of participants and whilst 77% felt "not confident at all" in managing early weight loss in a newborn initially, following this session, all participants felt confident to manage this. Feedback was positive with participants stating "I thought it was brilliant, so interesting and engaging."

Conclusion: This innovative pilot study has further highlighted the need for more education in infant feeding training for medical students and doctors. Our multidisciplinary initiative increased knowledge and built confidence in participants when considering infant feeding issues in clinical practice. This will be built upon and influence practice at our regional teaching hospital.

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Intoxication or withdrawal: confuse at your peril

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[1]*Royal Free London NHS Foundation Trust, Barnet Hospital*

Background
Fluoxetine is commonly used in pregnancy and breastfeeding. Fluoxetine, and its active metabolite, N-Desmethylfluoxetine (norfluoxetine) have long half-lives, 4-6 days and 16 days respectively[1]. We present a case of a neonate with fluoxetine toxicity.

Case Report
A 34-year-old woman on fluoxetine 40mg once daily for depression delivered at 39 weeks gestation. At birth, baby was blue with poor respiratory effort requiring airway management but was breathing unaided from 5minutes of age. At 40 minutes of age, he became apnoeic. Once stabilised, abnormal extensor posturing and hypotonia were noted. He was admitted to the neonatal unit for non-invasive respiratory support. Serum electrolytes, calcium, glucose, lactate, cranial ultrasound and cerebral function monitor trace were all normal. Investigations for sepsis were negative and treatment subsequently discontinued. Symptoms improved and he was established on breastfeeds from day 2 of life.
On day 2, he became jittery and irritable with hypertonia, a high-pitched cry, and extensor posturing developing from day 6. He was supportively managed for presumed fluoxetine withdrawal. Review of the timeline of symptoms lead to the consideration of serotonin syndrome. Day 7 fluoxetine levels were within adult therapeutic range (see table 1) with fluoxetine in breastmilk potentially prolonging toxicity symptoms.

On day 10, following discussion with parents and professionals, breastfeeding was stopped for 6 weeks. Mother continued to express. Symptoms resolved, mirrored by blood drug levels. Breastfeeding was successfully reintroduced following change of maternal medication. At 3 month follow up, baby examined normally.

Conclusion
Symptoms of fluoxetine toxicity are similar to withdrawal. Prompt review of symptom timelines together with serum drug levels can aid diagnosis and guide infant feeding strategies. Providing breastfeeding support is important to ensure mothers can continue breastfeeding.

References
1. Nadia T Evans, N. W. (2022). Neonatal serotonin toxicity. Journal of Paediatrics and Child Health, 58(1), 189-190. doi:https://doi.org/10.1111/jpc.15443

14

The incidence of sepsis in neonates presenting with respiratory distress following delivery via caesarean section without established labour

Dr Gala Rowe-Setz[1], Dr Phoebe Khan, Dr Christopher Faraday
[1]*Rbhsc*

Introduction: Neonates who undergo screening are exposed to antimicrobial drugs, painful procedures, and maternal separation. The potential implications include delay/failure in establishment of breast feeding, intestinal microbiota dysgenesis and long-term health effects.

Aims: To identify the incidence of sepsis among a population of neonates delivered via "cold" caesarean section, who underwent septic screening for respiratory symptoms and to propose a strategy to reduce unnecessary use of antibiotics in such infants.

Method: A retrospective analysis of deliveries over a 5-year period using BadgerNet data. Babies who underwent septic screening after delivery via "caesarean section not in labour" were included. Babies with primary respiratory disease, or who were receiving antibiotics for other reasons, and out-born admissions were excluded. The rest were categorised into neonates with respiratory symptoms and neonates with non-respiratory symptoms. Primary outcomes confirming sepsis were i) positive blood culture ii) positive cerebrospinal fluid [CSF] culture, or iii) CSF cell count suggestive of meningitis, a secondary outcome measure was CRP rise above 10.

Results: Of 2061 caesarean sections (LSCS), 488 neonates were screened. 411 neonates met inclusion criteria and 226 (55%) presented solely with respiratory distress after 4 hours of age. 99 were preterm (<37 weeks' gestation) and 127 were term. There were zero positive blood or CSF cultures/counts in the neonates who met inclusion criteria.

Discussion: Neonates born via LSCS without active labour who present with respiratory distress, may be screened unnecessarily, and suffer potentially harmful implications. Respiratory distress in isolation is a poor indicator of sepsis in this population. A thorough clinical assessment should be carried out in lieu of "blanket" septic screening, the emergence of a "sepsis calculator" can supplement this assessment. However, if respiratory symptoms are accompanied by other signs this may be more indicative of impending sepsis

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Intestinal perforation in preterm infants receiving non-invasive ventilation – a case series

Dr Nicola Ruth[1], Dr Sebastian Brown[1], Dr Charlotte Roberts-Rhodes[1], Dr SherShah Pervez[1], Dr Babu Kumararatne[1]
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Background: Premature infants are more at risk of developing intestinal perforation. This may be spontaneous or attributed to necrotizing enterocolitis (NEC). Additional risk factors for NEC include gender, patent ductus arteriosus (PDA), type of feed, steroid administration and inotrope usage. In the past 9 months, there has been a perceived increase in intestinal perforation noted in our unit. This coincided with introduction of a new modality of Non-Invasive Positive Pressure trigger (NIPPVTr) ventilation.

Aim: To identify if NIPPVTr is an additional risk factor for development of intestinal perforation in preterm infants which may lead to modification of practice at a single unit.

Methods: Retrospective case-notes based study of preterm infants (defined as gestation at delivery <37 weeks) who developed intestinal perforation. Potential confounders included in analysis included gender, ethnic group, feed type, steroid use, other diagnoses e.g. PDA. The time scale was from November 2019 – May 2021 (to include the period of 9 months prior to introduction of NIPPVTr).

Results: 17 babies had a diagnosis of intestinal perforation in the specified time period. Gestational age at delivery ranged from 23+5 to 32+5 weeks gestation. 8 babies were receiving NIPPVTr and 8 patients were ventilated conventionally at the time of intestinal perforation. 1 baby received neither ventilation nor NIPPVTr. Male gender was a significant risk factor demonstrated in 75% patients ($p<0.05$). 14 patients (78%) had a birthweight less than 1kg at delivery ($p<0.005$). There were no significant differences between both groups with regards to known risk factors for NEC. 7 patients had a spontaneous intestinal perforation (3 were conventionally ventilated, 4 were receiving NIPPVTr) which is not significant.

Conclusion: Despite the perceived increase in intestinal perforation, there is no significant increased risk to patients receiving NIPPVTr versus those conventionally ventilated.

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Donor Milk Depots: Our strategy towards delivering a 'Net Zero' NHS

Mrs Emma Savage[1], Laura Atherton[1], Carol Barnes[1], Kim Hastings[2], Dr Kathy Smith[1], Dr Ravi Jayaram[1]
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Introduction:

The NHS became the world's first health service to commit to reaching carbon net zero. In July 2022, the publication of 'Delivering a Net Zero NHS' outlined a target of achieving net zero by 2045 for emissions that are influenced by the NHS.
Our NHS milk bank supplies approximately 45 neonatal units across Northern England and Wales. Upon request, milk is either transported from our milk bank or from our milk depots based at NHS neonatal units. Transport is via volunteer Blood Bike services.

1872 miles were travelled from Hull Royal Infirmary to King's Mill Hospital, Mansfield April – September 2021.

Aim:

We proposed opening a milk depot at King's Mill Hospital to reduce bike mileage and carbon dioxide equivalent emissions.

Methods:

We analysed the geographical relationship between depot location and demand for donor milk between April – September 2021. We opened a milk depot at King's Mill Hospital in December 2021.
We calculated actual mileage reduced, and equivalent carbon dioxide emissions, 6 months following the opening of this milk depot.

Results:

We observed a reduction in 3880 bike miles between December 2021 – June 2022, representing 167% decrease in mileage.
We estimate an annual reduction of 7760 miles or 1.26 metric tonnes of carbon dioxide equivalent (CO_2e). This is equivalent to carbon sequestered by 20.8 tree seedlings grown for 10 years.
We observed an increase in demand for donor milk, with demand from 2 hospitals not previously supplied.

Discussion:

Our strategy of opening a new milk depot to reduce our annual mileage aligns with delivering a net zero NHS.
Increased demand for donor milk following the opening of this depot, including demand from hospitals not previously supplied, may suggest that geographic proximity to a local milk depot may affect the perceived availability of milk, thus influencing demand.

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Memory Milk Gift – The Importance of Offering Choices in Lactation after Loss

Mrs Emma Savage[1], Kate Buckley[1], Laura Atherton[1], Phillipa Davies[2], Sara Balmforth[3], Debbie Barnett MBE[4], Alex Mancini[5], Dr Kathy Smith[1], Dr Ravi Jayaram[1], Mrs Laura Atherton, Professor Nicholas Embleton[6]
[1]Milk Bank at Chester - Countess of Chester Hospital, [2]Our Sam Baby Loss Charity, [3]Forget Me Not Children's Hospice, [4]Milk Bank Scotland, [5]Chelsea and Westminster NHS Foundation Trust, [6]Newcastle University

Background:

3500 UK families are affected by stillbirth or early neonatal death annually. 'Lactation After Infant Death (AID)' framework (2020) offered evidence-based guidance on the provision of lactation information for professionals. Developed in Australia, important themes relevant to the UK were also highlighted. BAPM published 'Lactation and Loss' framework in May 2022.

Historically, our milk bank supported approximately 12 families yearly to donate following bereavement. Following recommendations in the Lactation AID framework, we recognised we had a duty to raise awareness and offer guidance and support to professionals caring for bereaved families, specifically awareness of milk donation as a non-pharmacological choice in lactation management.

We surveyed 14 UK milk banks discovering information available was limited, difficult to access and this choice rarely offered.

Aim:

To raise awareness of milk donation as a choice for families following bereavement

Method:

Memory Milk Gift Initiative (MMGI) launched in July 2021 prior to national roll-out in October 2021. We developed information resources for professionals, families and milk banks across the UK to raise awareness of milk donation as a choice for families following bereavement.

We facilitated focus groups for parents and professionals and invited all UK milk banks to collaborate.

Results:

We have received positive feedback from families and 8 UK milk banks have adopted the MMGI to date. Locally we have received 44 referrals, 78% resulting in donation, 18% of these families have initiated lactation following bereavement.

Discussion:

'We believe that all families across the UK should be offered the choice to donate milk in memory of their baby.'

Our mission statement aligns with international and national best practice in lactation management following bereavement. The scale and pace of adoption of MMGI demonstrates the need for improved provision of information and choice and we strive to inspire change through empowering professionals and families.

Image

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Implementation of Birthday Cuddles: A Quality Improvement Project

Dr Ana Serrano-Llop[1], Dr Alison Hopper[1], Dr Donovan Duffy[1], Dr Laura de-Rooy[1], Alison Hopper, Dr Sandeep Shetty[1]
[1]*St George's Hospital*

Background:
Skin to skin is routinely performed in neonatal units worldwide, although cuddles right after birth (birthday cuddles) are less common.

Aim:
To safely implement birthday cuddles (BC).

Methods:
Quality Improvement Project developed following PDSA model.
Plan:
- Review of evidence/current practice
- Pre-implementation questionnaires for parents who did not have BC

Do:
- Development of guideline, safety criteria defined (stable observations, pre-cuddle temperature ≥36.7^{o}C, secure airway (good CPAP seal, well-secured ETT), mother willing/stable)
- Multidisciplinary teaching sessions and simulations (doctors/nurses/midwives/ventilation team)
- Provide BC: All inborn babies requiring NNU admission if safety criteria met

Study:
- Prospective observational cohort study
- Demographic and safety data collection/analysis
- Parental and staff feedback questionnaires

Act:
- Changes implemented: Continuous temperature monitoring and Glucogel® administration

Results:
Pre-implementation questionnaires (13 parents): median age at first cuddle 216 (24-576)hours.
Fifty-two BC (March-July 2022): median gestational age 33.6 (24.6-42.4) weeks, birth weight 1770 (550-4040) grams, 73% on respiratory support (CPAP 78%). Median duration 3 (0.5-15) minutes and admission age 38 (13-81) minutes. All babies remained stable throughout the cuddle, with no accidental extubations.

Temperature:
- Pre-cuddle temperature checked in 71% of cuddles: median 37.7 (36.3-38.4)^{o}C
- Admission temperature: median 36.8 (36.0-38.0)^{o}C compared to 36.8 (35.3-39.1)^{o}C pre-implementation.

Glucose:
- Admission glucose: median 2.5 (0.0-8.8)mmol/L compared to 3.2 (0.0-12.6)mmol/L pre-implementation
- Hypoglycaemias: <1.5mmol/L in 12 babies (23%), 6 babies <1.0mmol/L (12%), most of them at higher risk of hypoglycaemia (prematurity/IUGR/PET/GDM).

Discussion/conclusion:
BC were safely provided in most babies. 52 parents had a cuddle at birth, compared to 216 hours pre-implementation median age at first cuddle.
Skin probe for continuous temperature monitoring was introduced and Glucogel® administration recommended for all babies, especially if high risk of hypoglycaemia (prematurity/IUGR/PET/GDM).
Staff very engaged with the project. Parental questionnaires highlighted positive impact on parental mental health, improved bonding and early expressing.

Image

Table

	Pre-QI (2020-2021)	Post-QI (n=52)
Temperature at admission (°C)	36.8 (35.3-39.1)	36.8 (36.0-38.0)
Glucose at admission (mmol/L)	3.2 (0.0-12.6)	2.5 (0.0-8.8)

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Understanding the future hospital usage of donor human milk: an online survey of UK neonatal units

Dr Natalie Shenker[1], Mr Jonathan Hamill-Keays[2], Ms Gillian Weaver[2]
[1]Imperial College London, [2]Human Milk Foundation

Aims: The use of donor human milk (DHM) where there is a shortfall of maternal milk can improve both infant and maternal outcomes. In late 2021, a surge in DHM demand exceeded national milk bank capacity.

Objective: This study aimed to understand demand drivers, current DHM usage and future demand to inform milk banking service planning.

Methods: An online survey was completed by the clinical lead for enteral feeding using SmartSurvey between February and April 2022. Surveys could also be completed by telephone with the support of the study team. Enteral feeding guidelines were also collated.

Results: Surveys were completed by 55.4% units (108/195; 18 Level 1, 47 Level 2, 41 Level 3; cot numbers 9-56) representing all thirteen Operational Delivery Networks. 102 (94.4%) units used DHM regularly, two (1.8%) only for infants transferred on DHM, and four (3.7%) units did not use DHM. Responses from 90 units (84.9%) indicated DHM was sometimes (n=35) or always (n=55) supportive of maternal breastfeeding; three (2.9%) considered DHM was rarely supportive. DHM use was predicted to increase in the next 2 years in 37 units (34.9%), stay the same in 33 (31.3%) units, and 4 (3.8%) anticipated a decrease; 28 units were unsure. Parental preference, increased evidence, clinical trials, and increasing DHM availability were perceived to be driving use. Enteral feeding guidelines showed marked diversity in criteria for and use of DHM.

Conclusions: Demand from neonatal units for DHM is likely to increase. Recommendations for use are being considered by the current BAPM Framework for Practice on DHM use. Policymakers and milk banks will need an array of information to plan strategic resilient service delivery. This survey builds on ongoing cost analyses, donor recruitment strategies and infrastructure planning to support sustainable services to ensure national equity of access and broaden DHM use criteria.

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Ex Utero Intrapartum Treatment (EXIT) Procedure in a Difficult Airway

Dr Anita Singh[1], Dr Kirti Naranje, Dr Akanksha Verma
[1]*Sanjay Gandhi Postgraduate Institute Of Medical Sciences*

Introduction: The ex utero intrapartum treatment (EXIT) procedure involves partial delivery of the fetus with intact uteroplacental circulation till a secure fetal airway is established. This allows for the management of the obstructed airway in a controlled manner and the prevention of hypoxia.
Case summary: A 28-year-old primi mother was referred to our center at 36 weeks gestation after an ultrasound finding of a large fetal neck swelling. Fetal MRI showed a huge left cervical mass causing tracheal compression. Anticipating critical airway at the time of birth, a multidisciplinary team was involved, and informed written consent was taken from the parents, EXIT procedure was done at 38 weeks of pregnancy after extensive planning and team rehearsal. A single live male fetus was partially delivered to the neck and shoulder, the airway was established using video laryngoscopy and intubation within 2 minutes after which the cord was cut and the baby was then shifted to NICU after initial steps and put on mechanical ventilation. Local examination showed a mass (approx 15 x10x10 cm) in the left cervical area starting from the mastoid process and extending up to the upper thorax (Figure 1).After hemodynamic stabilization, the neck mass was resected on D7. Histopathological examination was suggestive of arteriovenous lymphatic malformation. The baby was extubated on D21 and weaned to heated humidified high flow oxygen therapy by day 40 of life. Postoperatively, the baby had swallowing difficulty with left 9th and 10th cranial nerve palsy. There was a presence of stridor with left vocal cord palsy. The baby was discharged on home oxygen.
Conclusion : Ex-utero intrapartum therapy for fetuses with severe upper airway compromise may prove life-saving and prevent hypoxia by the establishment of the airway in an elective & controlled manner.

Graphs

Figure 1: Neonate with huge cervical mass

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Neonates with abnormal antenatal umbilical doppler: A prospective analysis

Dr Anita Singh[1], Dr Kirti Naranje, Dr Akanksha Verma
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Introduction: Babies with abnormal antenatal umbilical artery Doppler at high risk of morbidity and mortality compared to those with normal Doppler at same gestational age. The spectrum of abnormal antenatal Doppler ranges from increased resistance to reversed end diastolic flow.
Aim: This study was planned with objective of describing morbidity and mortality of babies born with abnormal antenatal umbilical artery Doppler.
Methods: The data on babies with abnormal antenatal Doppler was prospectively collected for five years duration. The demographic details, maternal risk factors were recorded. The gestational age and birth weight was described as mean± SD and morbidity was described as proportions.
Results: There were 100 (4.1%) babies who were born with abnormal antenatal Doppler out of total 2460 deliveries. Fifty three percent babies were male. Mean gestational age and birth weight of the babies were 33 weeks and 1550 grams respectively. Pregnancy induced hypertension, gestational diabetes mellitus, oligohydramnios was present in 23%, 18% and 35% of cases. Ninety percent of the babies were delivered by cesarean section. Two third of the babies were small for gestational age. The need for ventilation, sepsis, shock, hypoglycemia, necrotizing enterocolitis and intraventricular hemorrhage was present in 51%, 18%, 26%, 5%, 8% and 6% of cases respectively. Thirteen percent of the babies died.
Conclusion: Neonates with abnormal antenatal Doppler at high risk of morbidity and mortality.

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Exploring the relationship between maternal mental health and breastfeeding in a deprived and multi-ethnic population

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Background: This project aimed to explore the relationship between maternal mental health (specifically depression) in pregnancy and breastfeeding intention and practices in a multi-ethnic diverse population with a high degree of deprivation. This study will further add to our understanding of the prevalence of depression in pregnancy in this particular population and its impact on breastfeeding intention and breastfeeding behaviour.

Aim: To explore the relationship between maternal mental health and intention to breastfeed, and subsequent initiation and continuation of breastfeeding.

Objectives:
1. How does depression in pregnancy influence pregnant women's intention to breastfeed in a deprived and multi-ethnic population?
2. How is depression in pregnancy associated with subsequent breastfeeding practices, specifically, initiation and continuation?

Methods: This was a retrospective cohort observational study, where collected data from the Born in Bradford's Better Start (BiBBS) birth cohort study were released for analysis. One-way ANOVA, Error bar, and, multinomial regression analysis were performed to analyse relationships between depression, feeding intention, selected descriptive population characteristics, and breastfeeding practices.

Result: No clear associations were found between maternal depression in pregnancy and breastfeeding intention or breastfeeding practice in this cohort. However, breastfeeding intention was significantly associated with breastfeeding initiation. Additionally, the Maternal deprivation index was found to be a strong predictor of both breastfeeding intention and initiation, however, the birth origin/not born in the UK and level of education were found to be strong predictors of only breastfeeding intention.

Conclusion: Findings from this study suggest depression in pregnancy does not independently predict maternal feeding intention or practices. However, the intention to breastfeed was found to predict the initiation of breastfeeding in this population. Maternal deprivation index, birth origin, and level of education were found to be independent factors associated with breastfeeding intention.

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Respiratory Care for Babies Born Preterm – Reducing Unnecessary Invasive Ventilation

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Aim: To establish the effect of local Quality Improvement Initiatives on the initial respiratory management of preterm infants at NICU admission following publication of NICE Quality Standard 'Specialist Neonatal Respiratory Care for Babies Born Preterm'.

Method: A retrospective review of the respiratory management of in-born extreme preterm infants <28+0 weeks' gestation born at a NICU before and after the implementation of the NICE Quality Standard. Ex-utero transfers and Delivery Suite deaths were excluded. Local quality improvement initiatives (QIIs) implemented in response to the Quality Standard included an education programme and additional ANNP-led skills training to improve confidence with videolaryngoscopy and LISA amongst medical and nursing teams.

Results: During a 1-year baseline-period 1 July 2019-1 July 2020, immediately prior to the NICE standard publication, 38 in-born infants <28+0/40 were admitted to NICU (mean gestational age (ẋGA) 25.4/40, mean birth weight (ẋBW) 810.7g, female-to-male 1:1.1); 29(76.3%) received invasive ventilation and 9(23.7%) were stabilised with NIV, of which 5(55.6%) received LISA. Re-audit following QII implementation occurred 31 March 2021-27 March 2022 in which 42 in-born infants <28+0/40 were admitted to NICU (ẋGA 25.0/40, ẋBW 749.6, female-to-male 1:1.3); 20(47.6%) received invasive ventilation and 22(52.4%) were stabilised with NIV, of which 20(90.9%) received LISA (Table1).

Conclusion: Results demonstrate an improved rate of infants <28+0/40 stabilised on NIV, and in the proportion receiving LISA. Education on the benefits of NIV and LISA with practical skills sessions to improve procedure confidence amongst medical and nursing teams has led to a change in the management of extreme preterm infants in line with National guidance.

Our population is too small to be able to say if this will translate to a reduction in Bronchopulmonary Dysplasia (BPD) or death. However, reducing the rate of invasive ventilation is an important, positive step towards reducing BPD and the associated morbidity and mortality.

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Impact of increased pharmacist resource on a level 3 neonatal unit

Mrs Nicola Staton[1], Mr Lee Abbott[1], Mrs Jyoti Kapur[1]
[1]*University Hospitals Of North Midlands NHS Trust*

Background
Neonatal pharmacists are fundamental components of the neonatal workforce and should have job plans with protected capacity for providing advice and support in neonatal pharmacy1. Using Neonatal and Paediatric Pharmacists Group staffing recommendations2 a shortfall of 0.675 whole time equivalent (wte) band 8a pharmacist resource was identified. A business case was developed and approved for 1wte band 8a pharmacist commencing June 2021. The main driver was the number of medication incidents reported, particularly involving gentamicin.

Aim
To describe the qualitative and quantitative impact of increased pharmacist resource.

Method
Feedback was sought from a multi-disciplinary team to ascertain the impact of increased pharmacist resource. Review of all gentamicin errors reported electronically via Datix from June 2019 to June 2022 was undertaken.

Results
The following improvements were identified:
- Sustained improvement in medication incidents.
- Bedside teaching for nursing and medical staff.
- Pharmacist attendance at handover and on ward rounds.
- Co-operative decision making with Consultants in real time.
- Pharmacist prescribing.
- Development of guidelines, prescribing proformas and prescription charts.
- Communication between pharmacists in network providing peer support.
- Support with unlicensed medicines and drug shortages.
- Support in neonatal governance, perinatal mortality review and palliative care.
- Safety improvements in storage, transport and use of resuscitation medications.
- Support with discharge and community medication challenges.

Conclusion
The reduction in gentamicin errors although achieved prior was sustained as a likely result of increased pharmacy presence. The improvements identified all contribute to improved patient safety. This may be further improved by the development of standard prescription charts, guidelines and drug formulary across the local network or nationally.

References
1. Department of health. Toolkit for high quality Neonatal services. October 2009.
2. Neonatal and Paediatric Pharmacists Group. Neonatal Pharmacy staffing on Neonatal Units – Recommendations For Trusts Commissioning. October 2018.

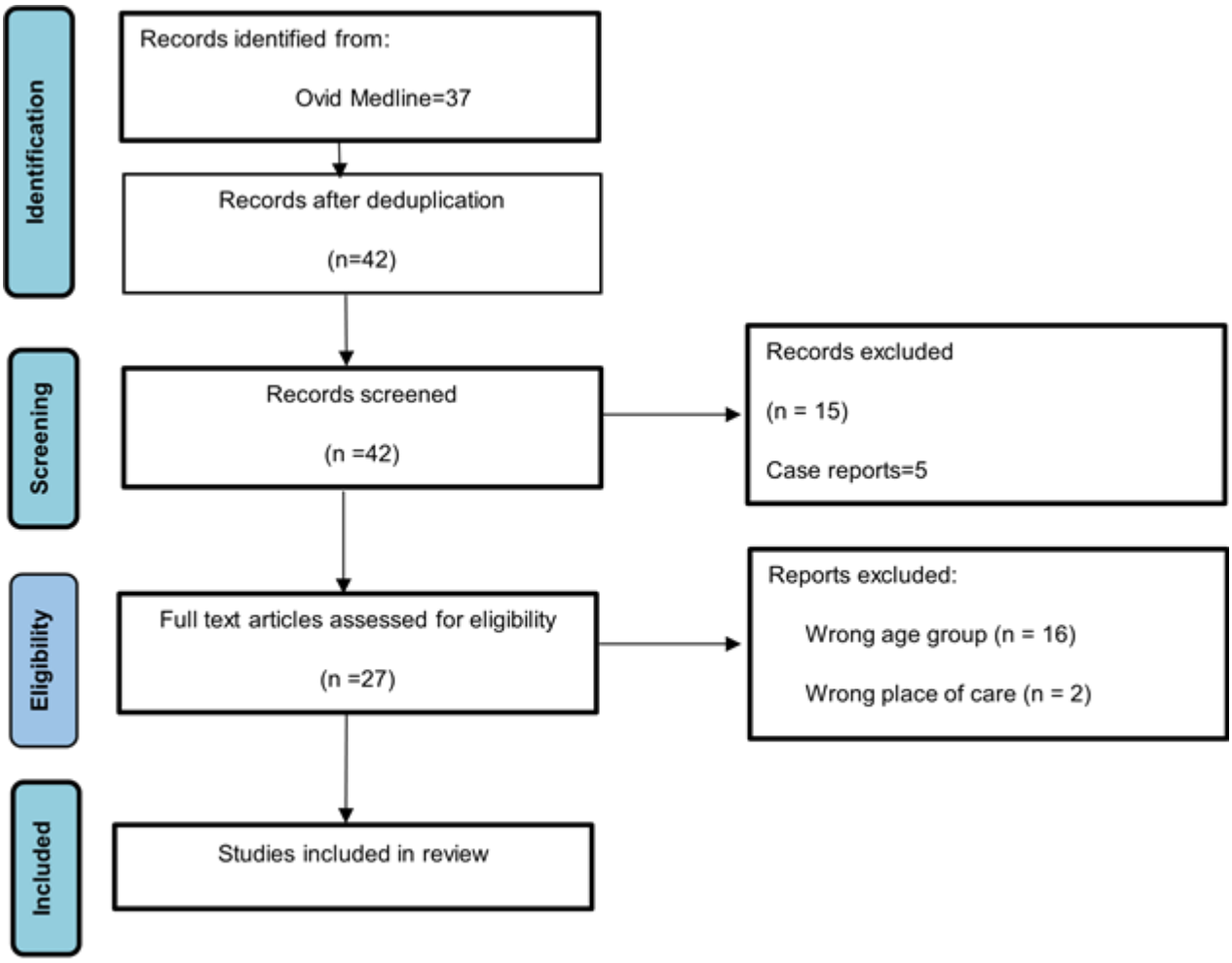
5

Management pathway for infants requiring chronic complex care in neonatal units- a scoping review

Dr Amitava Sur[1], Dr Anshuman Paria[1], Dr Savi Sivashankar, Dr Jasim Shihab, Norney Claire
[1]*Lancashire Women And Newborn Center*

Background: Improvements in diagnostic and therapeutic modalities of antenatal care has meant that the neonatal intensive care units (NICU) care for infants with complex congenital conditions who need ongoing care post discharge. This, along with, improved survival of the extreme preterm infants, provides the neonatal team with a cohort of infants who require long standing multi-disciplinary input. Children with such conditions are often loosely termed as children with Complex Care Needs (CCNs). This concept of CCN has been defined and explored to a large extent in the young children and adolescent age group with available data. However, provision of dedicated teams looking after infants with complex medical needs are not commonly reported in NICU workforce structure.
Objectives: To perform a scoping review of literature on presence of structured and dedicated complex care management teams in neonatal intensive care unit and their outcomes on care delivery.
Methods: The scoping review was done following closely the PRISMA-ScR (PRISMA extension for Scoping Reviews) which was developed following published guidelines from the EQUATOR
Review question
1. What strategies have been implemented and what experiences have been shared regarding care of infants in the neonatal intensive care unit with perceived complex needs?
2. Has use of a dedicated complex care team/ multi-disciplinary approach demonstrated improved outcomes or improved quality of care in this cohort of infants?
Results: 7 articles were shortlisted and reviewed. All were from USA and Canada. All, except one retrospective study, were QI or clinical improvement models. 3 reports were exclusively around care of chronic lung disease. Only one reported on outcome improvements. We tried to identify common co-morbidities and themes reported in this cohort.
Conclusions: This review identified very few clinical models reported with no robust data on clinical outcomes. There is scope of local research is required to address this.

Image



PRISMA flow diagram for the scoping review

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Development of a BPD Toolkit in a tertiary neonatal unit - from evidence to practice

Dr Amitava Sur[1], Dr Anshuman Paria[1]
[1]*Lancashire Women And Newborn Center*

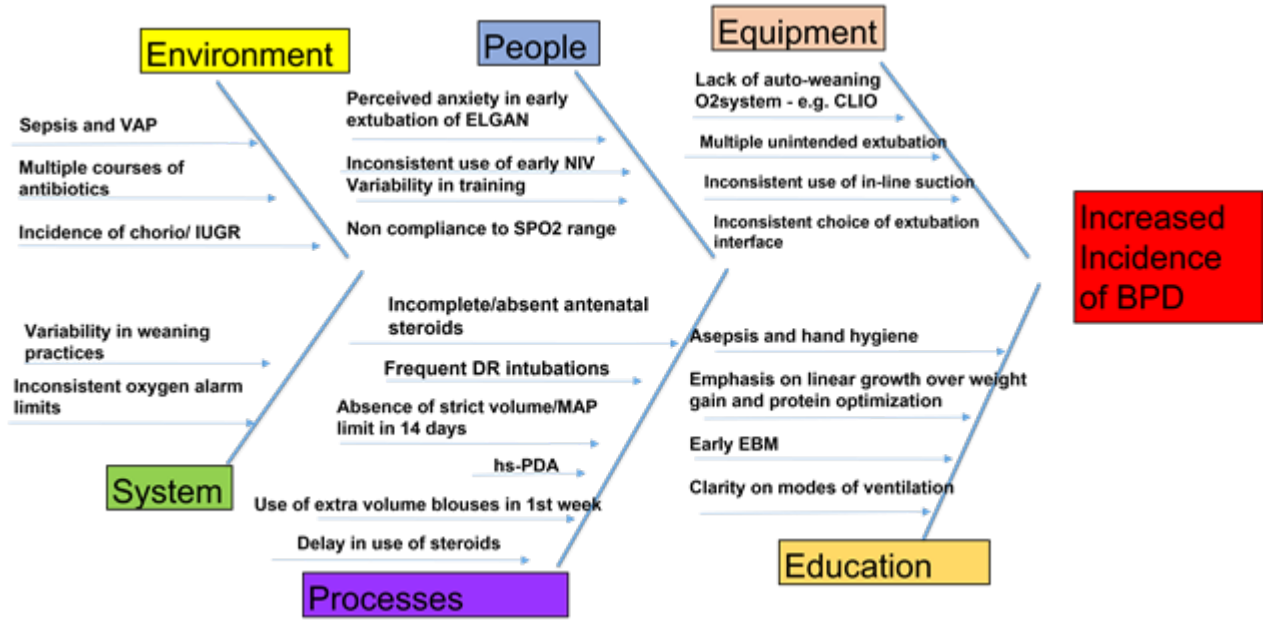
Background problem : In a recent meta-analysis, the global incidence of BPD was reported to be anywhere between 10-89%, with 47% in the UK, which was one of the highest reported in Europe, making one of the principle areas of focus Our unit, which is a non-surgical neonatal intensive care unit (NICU) was an outlier with composite outcome of BPD and death being of 63% (NNAP 2017) and BPD of rates > 50% (NNAP 2018-19Q2).
Aims: To reduce incidence of BPD <35% in 24 months in NICU
Methodology: 1. Review of evidence of QI initiatives published and identifying themes.
2. Use QI tools like fishbone and process map to identify themes of change
3. Prepare PDSA cycle map.
Interventions: 3 Target phases were identified :
1. Antenatal and Delivery room (DR) management- MDT efforts in liaison with obstetrics team. Principal interventions -a)Antenatal steroids in borderline viability,
b)optimal cord management(OCM)
c)PEEP for all infants at birth and strict criteria for DR interventions
2. Early NICU:
a)LISA and use of NIPPV for extubation
b) Strict Volume targeted ventilation
3. Late management:
a) Hyperoxia prevention through routine histogram analysis during rounds
a) Inhaled steroid trial for >4 week PMA on NIV
b) Room air challenge at 35 weeks if FiO2 <30%

Timeline:
OCM and DR PEEP was already embedded since 2019-2020.
Room air challenge was implemented in 06/2021
LISA was implemented in 01/2022
Results:
Continuous monitoring was done aided by NNAP report and network dashboard
1.The unit reported a significant reduction in BPD rates with the latest incidence on 2021-22Q4 (Jan-March 22) being 36.5%
2. Secondary outcomes:
a)We also demonstrated reduction in extubation failures (72% in 2017- 50% 2019- 37% 2022)
b) Successful integration of LISA into routine practice
c) This initiative helped sustain already embedded measures like OCM and DR PEEP.

Graphs


Chart Title
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
INCIDENCE OF BPD
55.00%
34.60%
25.00%
26.70%
36%
36.50%
2021-2022 QUARTILES

Image


Environment
People
Equipment
Sepsis and VAP
Multiple courses of antibiotics
Incidence of chorio/ IUGR
Perceived anxiety in early extubation of ELGAN
Inconsistent use of early NIV
Variability in training
Non compliance to SPO2 range
Lack of auto-weaning O2system - e.g. CLIO
Multiple unintended extubation
Inconsistent use of in-line suction
Inconsistent choice of extubation interface
Increased Incidence of BPD
Variability in weaning practices
Inconsistent oxygen alarm limits
Incomplete/absent antenatal steroids
Frequent DR intubations
Absence of strict volume/MAP limit in 14 days
hs-PDA
Use of extra volume blouses in 1st week
Delay in use of steroids
Asepsis and hand hygiene
Emphasis on linear growth over weight gain and protein optimization
Early EBM
Clarity on modes of ventilation
System
Processes
Education

22

Implementation of neuroprotection bundle in a tertiary neonatal unit - development, challenges and outcome

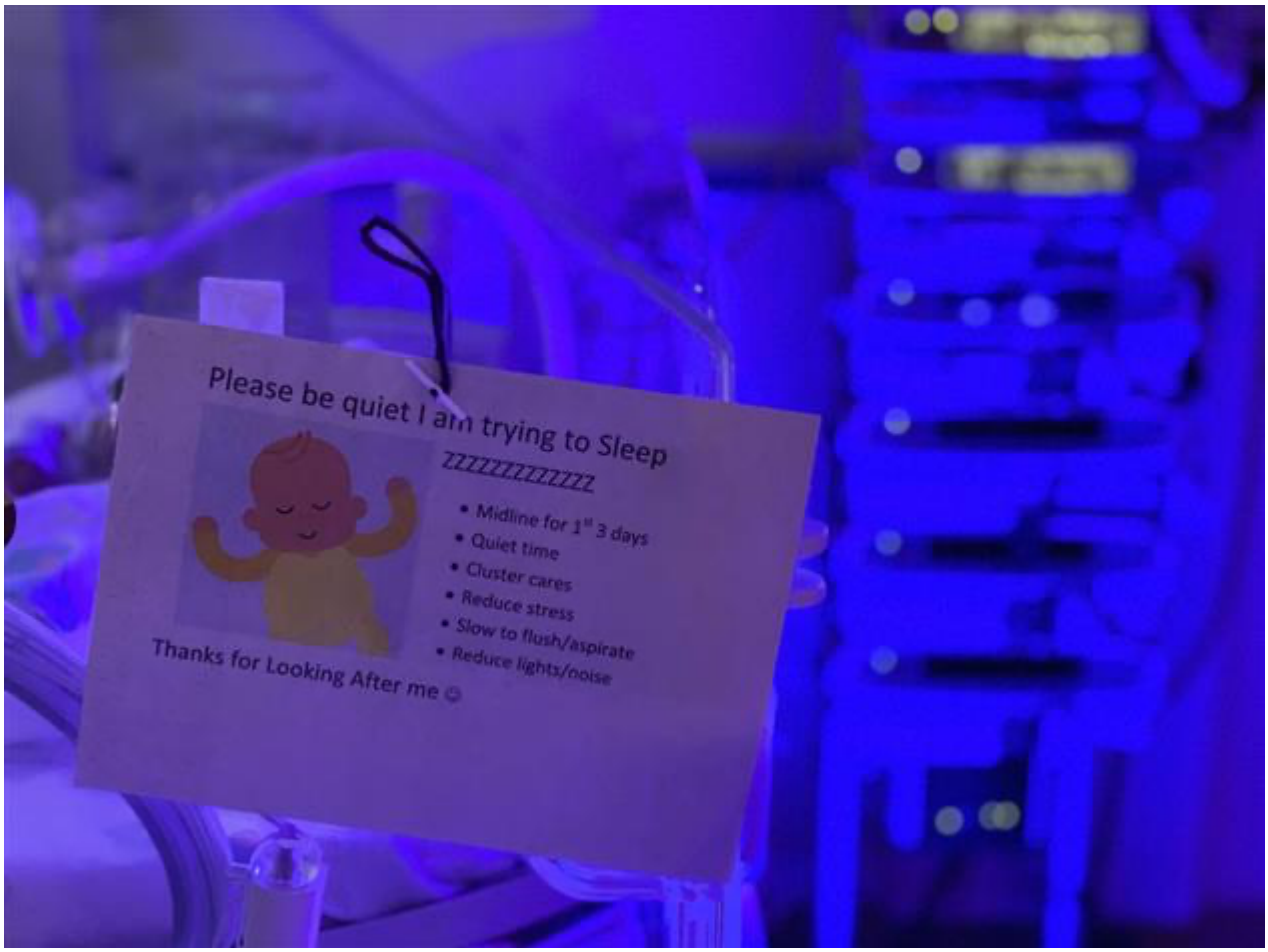
Dr Amitava Sur[1], Dr Bethany Greenwood, Bethany Greenwood, Dr Anshuman Paria
[1]*Lancashire Women And Newborn Center*

Rational: The background rate for severe IVH (s-IVH) in Lancashire Women and newborn center was audited to be 16.3% in 2019 (above national average 5.8%). In 2020 an IVH bundle was introduced in our unit for preterm infants born <32/40. This was based on a scoping review of high impact interventions and included specific smaller bundles aimed at medical and nursing staff.
Components: The medical bundle focused on
1. Minimizing disruption from ultrasound and Echocardiogram by clustering of cares
2. Minimal and cautious fluid bolus, preferably < 2/day in the first 72 hours;
3. Limiting use of sodium bicarbonate and slow administration if used
4. Proactive titration of inotropes to avoid fluctuations in blood pressure
The nursing care bundle focussed on:
1. Positioning (supine midline head positioning with 15-30° i tilt) with avoidance of lifting of legs during nappy changes
2. Light and noise reduction
3. Procedural analgesia with swaddling
4. Slow withdrawal from and flushing of UAC and delaying routine weight check for 72 hours.

Dissemination: An IVH awareness card is displayed on all incubators immediately after admission to NICU and a template card is displayed on bedside

Method: We performed 2 retrospective post-intervention audits for 2020 and 2021 (n=127, 85).
Results: Rate of s-IVH showed reduction 7.4% (2020) and 10% (2021) which were still above national average. Overall all grade IVH did not show significant reduction and was 22%.
Compliance: There was poor-to-moderate compliance with interventions, with no infants receiving all components of the bundle and only 21% of infants having partially compliant care.
Outcome and forward plan: We are currently performing a systematic review of IVH bundles to evaluate high-impact interventions and monitoring to improve compliance. Bedside teaching and focused sessions on IVH during nursing education days and departmental teaching are used to increase awareness and compliance

Image


Please be quiet I am trying to Sleep
zzzzzzzzzzzz
• Midline for 1st 3 days
• Quiet time
• Cluster cares
• Reduce stress
• Slow to flush/aspirate
• Reduce lights/ooise
Thanks for Looking After me

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RETINOPATHY OF PREMATURITY- PRE AND POST EARLY CARE HYDROCORTISONE INTRODUCTION

Dr Kumar Swamy[1], Dr Nora Imolya[2], Dr Ju Lyn Lim[3], Ms Rosemary Lambley[4]
[1]Neonatal Service, Nottingham University Hospitals NHS Trust, [2]Neonatal Service, Nottingham University Hospitals NHS Trust, [3]Ophthalmology, Nottingham University Hospitals NHS Trust, [4]Ophthalmology, Nottingham University Hospitals NHS Trust

Background: Retinopathy of prematurity (ROP) is multifactorial and is associated with lower gestational age, low birth weight and oxygen therapy; other postnatal risk factors including the use of postnatal steroids are known to increase the risk of ROP especially those needing treatment (Laser and/or anti-VEGF).
Early care hydrocortisone was introduced as part of the early care guideline for babies <28 weeks gestation in our tertiary neonatal unit. Hydrocortisone is initiated within the first 24 hours, and the dosage used is 1mg/kg/day divided into two doses for 7 days, followed by 0.5mg/kg/day once daily for 3 days.

Aim: To determine the effect of introduction of early care hydrocortisone (<1 week) on ROP in babies <28 weeks gestation.

Methods: Using electronic patient records, data was retrospectively analysed between the period of Jan 2018- June 2019 (pre early care hydrocortisone introduction) and between July 2019- Dec 2020 (post early care hydrocortisone introduction). Detailed data on the neonatal intensive care support was also analysed.

Results: 69 babies in pre and 77 babies in post group were analysed. Breakdown of results are as shown in the table.

ROP (all stages) was detected in 21 (30%) babies in the pre group compared to 28 (36%) babies in the post group; 6 (8.6%) babies needed laser treatment in the pre group compared to 9 (13%) in the post group.

Conclusions:
Number of babies with ROP and needing laser treatment were higher post introduction of early care hydrocortisone but the numbers are small from a single centre data and there maybe other factors that may have contributed to this. A larger study looking into this would be beneficial.

50

Neonatal refractory seizures – An unusual approach to management

Dr Jasmine Taylor[1], Doctor Deivasumathy Muthugovindan[1]
[1]*Paediatric Intensive Care Unit, Manchester*

Introduction:
We present a 5-month-old boy with refractory seizures secondary to alterations in the GRIN2D gene. This is the first case in the UK among a handful of cases worldwide. This gene mutation is linked to significant epilepsy and developmental delay. Memantine was used as a trial novel agent to treat refractory seizures in genetic epilepsy. It is a glutamate receptor antagonist commonly used for dementia and not licensed in neonatal seizures.

Case Summary:
Conceived via IVF and delivered via emergency Caesarean section due to a pathological cardiotocography but required no resuscitation. Generalised hypertonia necessitated admission to the neonatal unit. Cord gases were normal and there were no concerns for hypoxic ischemic encephalopathy. For the first 72 hours, clinical seizures associated with abnormal CFAM changes were treated with phenobarbital. The CFAM changes and generalised hypertonia persisted but the clinical seizures abated. Microbiological samples were negative allowing cessation of anti-infective agents. Following clinical improvement, he was discharged on day ten of life.
He re-presented with failure to thrive, severe reflux and irritability. Further seizures required anaesthesia and ventilation followed by two bradycardic arrests. MRI showed delay in myelination within the posterior limb of the internal capsule and possible white matter hyperintense signals. EEG remained abnormal. Rapid exome sequencing for R59 and a hyperekplexia panel revealed a de novo alteration in the GRIN2D gene. Resistant to multiple antiepileptic drugs (Levetiracetam, Lacosamide, Gabapentin, Clonazepam) and ketogenic diet, memantine for seizure control was considered.
Ketamine infusion was an interim measure until consensus between neurology, intensive care, pharmacy and the medical director was reached to commence memantine. Dosing started at 0.2mg/kg/day orally.

Conclusion:
Other than occasional breakthrough seizures requiring acute treatment, memantine appears to have controlled this genetic form of epilepsy. The clinical effects will need to be evaluated in 4-6 weeks.

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Learning from Get It Right First Time: Timely discharges from the Special Care Baby Unit

Dr Laura Temple[1], Dr Alice Peach[1], Dr Christine Chiong[1], Dr Louise Wilson[1], Dr Kausar Iqbal[1], Dr Helen Dyson[1], Christine Neen Chiong, Dr Kirsteen Mackay[1]
[1]Jessop Wing, Royal Hallamshire Hospital

Background:
The most recent Get It Right First Time (GIRFT) data identified that our neonatal unit in Sheffield had significantly later discharges for 2 cohorts of lower intensity babies compared to the national average. (28)

Aim:
To identify possible causes of delayed to safely shorten neonatal admissions.

Methods:
We identified all the infants meeting the 2 cohort criteria discharged between 1st January 2021 and 30th June 2021 using our Badger database:
1. 30-33/40 gestation babies requiring fewer than 5 days of intensive or high dependency care
2. 27-32 week gestation babies not requiring intensive or high dependency care after 33/40 corrected gestational age (CGA).

We reviewed the medical and nursing notes to identify possible causes of delay in discharge.

Results:
The median discharge age for the 27-32/40 group had already improved by 1 week CGA compared with the GIRFT data, but still 3 days later than nationally. The median discharge age for the 30-33/40 group remained similar. No babies were discharged before 36 weeks CGA.
Large variations exist regarding which days of the week infants are discharged (8/32 om Wednesday versus 1/32 on Friday), likely related to lack of community resource over the weekend and weigh days.

Infants sent home nasagastric(NG) feeding had a median CGA at discharge of 36+4/40, 3 days earlier than the 37+0/40 of those fully orally fed..

Age at discontinuation of caffeine or monitoring and being from out of area did not affect discharge CGA. (130)

Conclusions:
Our median discharge CGA continues to be later than the GIRFT data set. Increased community nursing provision would facilitate patients going home on Fridays and Saturdays and increase the capacity for home NG feeding. Earlier promotion of home NG feeding to parents should bring discharges earlier. Further evaluation of culture around discharges on the unit is required.

Image

Criteria	All units (GIRFT)	Jessops (GIRFT)	Jessops (early 2021)
30-33/40	35+3	36+3	36+4
27-32/40	36+1	37+5	36+5

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Transfusion Troubles! A review of current transfusion practice against national standards in a tertiary NICU.

Dr Natalie Thompson[1], Dr David Millar
[1]*Belfast Health And Social Care Trust*

Background/ Introduction
There is a wide variation in practice for use of FFP and cryoprecipitate in neonates. Testing coagulation without clear clinical indication involves a cost to both the patient and hospital.

Aim
In this study, the use of FFP/ cryoprecipitate in a tertiary NICU was reviewed against the audit standards published by the National Comparative Audit of Blood Transfusions (NCABT).
The study period was 1/1/22 to 1/6/22.

Protocol/ Methods
The NCABT audit standards (2021) provided an overview of national practice with key areas for improvement. This study reviewed current practice against the standardised audit tool.

Data was obtained from the haematology laboratory and blood bank, on the coagulation screens sent and FFP/ cryoprecipitate issued and transfused.

Information on patient demographics, documentation, prescription, coagulation testing and consent was obtained from review of clinical notes, Badgernet and Electronic care Record.

Results
In the study period, 163 coagulation screens were sent. 39 blood products (32 FFP/ 7 cryoprecipitate) were issued and transfused. 64% were given to neonates <32 weeks' gestation, and 76% of transfusions occurred in the first 48 hours of life.

Reason for transfusion was documented in 84%. Volume transfused was correct in 87.5% but underdosed in 12.5% requiring repeat transfusion within 24 hours.

Interestingly, on review of the coagulation screens used to determine need for transfusion against local guidelines, no abnormality of coagulation was detected in 48% of samples.

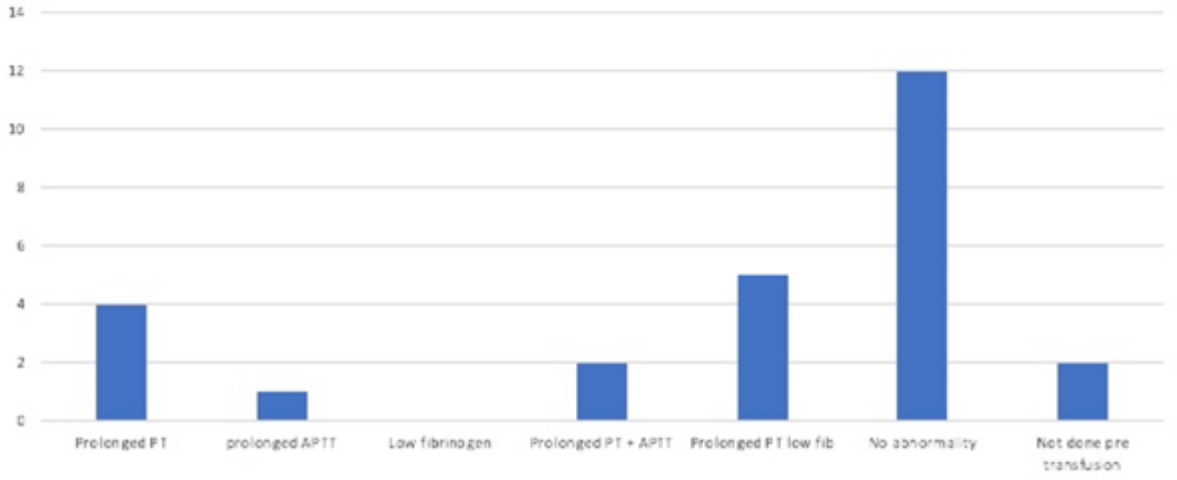
72% had a coagulation screen checked up to 24 hours post transfusion.

Consent was not obtained for transfusion in 64% of patients.

Conclusions
The variation in practice for testing coagulation and use of blood products is a key area for improvement for all neonatal units, reflected in national audit data and this follow up study. Local education, guideline review and consultation with laboratory staff is underway to improve our practice.

Graphs

A16: Coagulation tests relating to initial transfusion



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Prevalence of congenital anomalies and their outcome in referral center of Northern UP

Dr Akanksha Verma[1], Dr Kirti M Naranje[1], Dr Anita Singh, Dr Preeti Solanki[1]
[1]*Sgpgims, Lucknow, India*

Introduction: Congenital malformations remain one of the least focused areas of disease surveillance in India compared with communicable and some chronic diseases.

Objective: To know the prevalence and type of congenital anomalies, and their outcome at discharge in a tertiary-level NICU in North India.

Methodology:This is a retrospective observational study of all inborn and outborn babies admitted over a period of 7 years (2014 to 2021)

Results: Total 3,694 babies were screened. Incidence of congenital anomalies was 9.9% (368/ 3694). The MC congenital malformation was due to CVS (109/368; 29.6%), followed by GI tract (76/368; 20.6%). Other anomalies were of CNS (13/368; 3.5%), Metabolic (18/368; 4.9%); Skin malformation (22/368; 5.9%); AVM(11/368; 3%); respiratory (33/368; 8.9%); hemat (7/368; 1.9%); Musculoskeletal (35/368; 9.5%); Dysmorphology (40/368; 10.8%).

The incidence of death was 15.4% (57 /368).Most of the deaths were due to defects of the CVS (22 /57 ; 38.5%) and GIT (21/57; 36.8%), with CDH and TEF being the MC cause. The other malformations included malformations of GU tract (6/57; 10.5%)

Conclusion: We have looked at data from a tertiary-level hospital in UP, India to see the incidence of congenital anomalies at birth. We found a rate comparable with other studies.
The ultimate objective of this is to plan strategies for preventive and supportive care, such as educating the public and creating awareness about birth defects and formation of support groups.
Also, we must work at maintaining a Birth Defects Registry easily accessible to all.

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Impact of education and positioning aids on the prevalence of head shape deformities in preterm infants on a level 3 neonatal unit

Mrs Charlotte Xanthidis[1]
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Background

In May 2021, a positioning audit was carried out on a level 3 neonatal unit where no head positioning aids were in use. This showed 78% of babies assessed were poorly positioned. The neurodevelopmental and psychosocial impact of adverse head shaping is well documented in research and is a condition that is largely preventable.

Method

Gel and fluidised pillows were ordered to support optimal positioning, and information on their correct use disseminated. Focused teaching on positioning was integrated into a monthly developmental care education session alongside cot side support. Head shape on discharge was recorded as part of the standard neurodevelopmental screening process for all infants <32weeks gestation or under 1.5kg. Data was collected retrospectively. Classification of head shape was based on observation by an experienced physiotherapist who assessed all babies to improve reliability. Head shape data was compared prior to implementation of equipment and education and after to assess the impact.

Results

Retrospective data was collected from March 2021 to March 2022. A total of 68 babies met inclusion criteria, although 9 were excluded (incomplete data set) Pre-implementation group had 36 babies, post implementation group had 23 babies. A head shape classification of normal or mild scaphocephaly were deemed an acceptable outcome. Pre implementation only 50% babies had an acceptable head shape on discharge, compared to 95% following introduction of education and positioning aids.

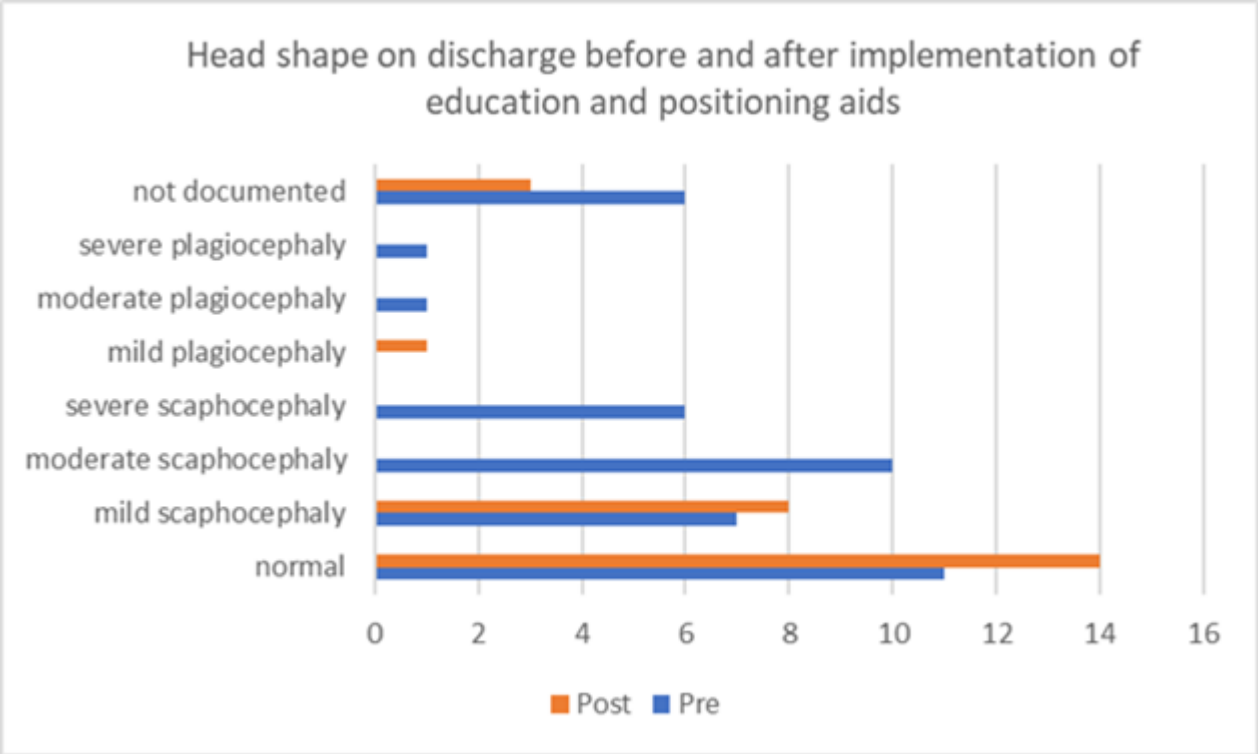
Limitations

Compliance with the use of aids was not assessed and may need review in the future.
The head shape rating used was subjective however the same therapist assessed all babies which ensured reliability in classification.

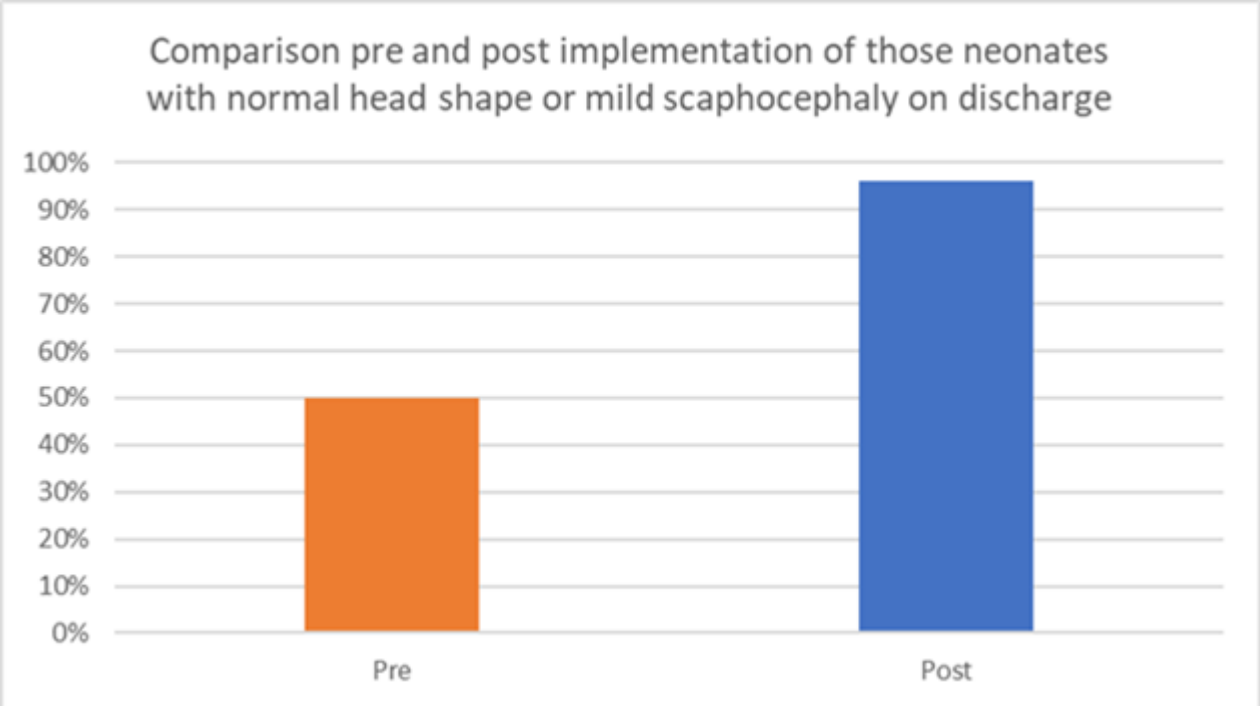
Conclusion

The use of head positioning aids alongside education and therapy support can have a big impact on reducing the prevalence of adverse head shapes in preterm infants.

Graphs


Head shape on discharge before and after implementation of education and positioning aids
not documented
severe plagiocephaly
moderate plagiocephaly
mild plagiocephaly
severe scaphocephaly
moderate scaphocephaly
mild scaphocephaly
normal
0
2
4
6
8
10
12
14
16
Post
Pre

Image


Comparison pre and post implementation of those neonates with normal head shape or mild scaphocephaly on discharge
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Pre
Post

23

Case Report: Preterm infant with congenital malformation of right upper limb

Dr Asma Yasmeen[1], Dr Jasmine Sawyer[1]
[1]*Victoria Hospital Kirkcaldy, Nhs Fife*

Introduction: We report a case of preterm infant who was born at 28+6 weeks gestation and was noted to have abnormally formed right upper limb. His investigations showed other congenital malformations leading to the diagnosis of VACTERL association.

Presentation:
Baby delivered at home after quick progress of preterm labour. Placenta showed partial infarction. There was history of regular cannabis and cocaine use during pregnancy.
The initial stabilisation was done by the ambulance team. His initial management in neonatal unit focussed on respiratory distress syndrome, temperature, hydration, and nutrition.
The right arm was short, with forearm angulated and a split hand with three digits. His umbilical cord had had only two vessels.

On his echocardiography, there was mildly deviated cardiac apex but otherwise normal structure.
There were multiple segmentation anomalies noted in thoracic spine (Fig 1). X-ray of right upper limb (Fig 2) showed hypoplastic humerus and ulna with radial aplasia.
There was horse-shoe shaped kidney on his renal ultrasound.

Discussion:
VACTERL is a rare clinical condition and the acronym stands for Vertebral anomalies, Anal atresia, Cardiac defects, Tracheoesophageal fistula/Esophageal atresia, Renal and Limb defects.
The exact cause is unknown, multiple environmental and genetic factors have been implicated. For making a diagnosis, three components of VACTERL association are needed. In our baby, there were vertebral and limb defects noted along with renal anomaly.

In most of the cases, it does not affect mental functioning. With the improvements in medical and surgical care, the outcomes have improved. Multidisciplinary team is involved in the long-term management.
The genetic testing (microarray) was negative in this infant. The differential diagnosis included Fanconi anemia, thrombocytopenia-absent radius, Okihiro, Cornelia de Lange syndrome and Ulnar Mammary syndrome, etc.

Message:
It is important to recognise rare disorders for management of associated problems, genetic counselling and multidisciplinary management.

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An unusual case of neonatal hypoglycaemia.

Dr Asma Yasmeen[1], Dr Jasmine Sawyer[1], Dr Anthony Tasker[1]
[1]*Victoria Hospital Kirkcaldy, Nhs Fife*

Transient hypoglycaemia is common in neonatal period. Recurrent or refractory cases should be investigated further. Inadequate management can lead to poor neurological outcomes.

Presentation:
Baby B was delivered in good condition at term by elective C-section due to bicornuate uterus and breech presentation. There was no history of gestational diabetes or risk factors for infection. Weight was on 9th centile and head circumference between 9th and 25th centile. She was noted to be hypothermic, lethargic, poor feeding and hypoglycaemic at 2 hours of life. Despite adequate management, there were recurrent episodes of hypoglycaemia necessitating admission to neonatal unit and intravenous dextrose infusion. She had no dysmorphic feature and glucose requirement was 4-7 mg/kg/min. She improved within next 2-3 days and gradually weaned to enteral feeds.

Hypoglycaemia screen showed appropriately low insulin but also low cortisol & ACTH levels. Short synacthen test showed reduced peak of cortisol at 60 minutes. Endocrine investigations of the pituitary hormones showed low thyroxine and gonadotrophins but a normal level of growth hormone (see Table 1). MRI brain showed ectopic posterior pituitary and volume of anterior pituitary was unclear.

A diagnosis of “Congenital hypopituitarism (CH)” was made and replacement therapy commenced with hydrocortisone and thyroxine. Endocrine follow up and “sick day” training organised for parents. She is currently 7 months old and showing normal growth and development.

Discussion:
Abnormal pituitary development may lead to dysfunction of some or all of the hormones produced by the gland. The clinical findings of neonatal hypopituitarism depend on the causes and on presence and extent of hormonal deficiency but can be a cause of neonatal hypoglycaemia.

Message:
CH is a rare condition, characterized by a deficiency of one or more pituitary hormones and can be life-threatening. A high index of suspicion is required while investigating causes of hypoglycaemia.