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[1]*Leeds Centre for Newborn Care*

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Fleming R[1], Monnelly V[1]
[1]*Nhs Lothian*

147 Neutrophil-to-lymphocyte ratio in women with late miscarriage or preterm birth - a potential diagnostic aid in the clinician's armamentarium to diagnose placental inflammation/infection and facilitate timely delivery.

Modestini C, Trowsdale Stannard M[1], King E[1], Ridout A[1], Shennan A[1], Chandiramani M[1]
[1]*St Thomas' Hospital*

148 Improved nutritional outcomes with neurally adjusted ventilatory assist (NAVA) in premature infants: A single tertiary neonatal unit's experience.

Shetty S, Benn K[1], De-Rooy L[1], Cornuaud P[1], Kulkarni A[1], Shetty S[1,2]
[1]*St Georges Hospital,* [2]*St Georges University of London*

149 Adherence to Element 5 Saving Babies Lives Care Bundle (v2) at a Level 3 neonatal unit

Modestini C, Caunt O[1], Shennan A[1], Chandiramani M[1]
[1]*Guys and St Thomas NHS Foundation Trust*

151 Review of the outcome and efficacy of larger bore pigtail chest drains on a Neonatal Intensive Care Unit

Taylor J[Royal Bolton Hospital Manchester United Kingdom]

152 Highlighting strategies for the reduction of term admissions at a Level 3 Neonatal Unit.

Keen D[1]
[1]*East Kent Hospitals University NHS Foundation Trust*

153 Evaluation of the accuracy of oscillometric blood pressure measurement in comparison to invasive arterial blood pressure readings among preterm infants born at less than 29 weeks gestation

Moharram A, Akuma A[2]
[1]*Corniche Hospital,* [2]*Corniche Hospital*

154 Exploring Potential for Neonatal Organ Donation in a Regional NICU.

A Service Evaluation

Jackson C[1], Timmis V, Shetty V, Kirkbride V
[1]*Sheffield Teaching Hospitals*

156 The HI-5S: An inter-professional Quality Improvement initiative using LEAN methodology to improve staff and parental experience on Post-natal ward and NIPE clinic

Eyo T[1], Singh N[1], Nath P[1], Davies H[1], Sebastian N[1], Carpenter M[1], Gouldingay S[1], Johnson-Howe E[1], Wasif M[1]
[1]*University Hospital Coventry And Warwickshire*

157 A SURVEY TO ASSESS CURRENT CLINICAL PRACTICE AROUND DELAYED UMBILICAL CORD CLAMPING IN THE NEONATAL UNITS ACROSS THE UK

Peshimam N[1], Ayling H[1], Deierl A[1], Banerjee J[1]
[1]*Imperial College Healthcare NHS Trust*

158 A descriptive analysis of Coronial prevention of future death reports relating to neonatal patients in England & Wales (2015-2020)

Veeraraghavan N

8

The use of asynchronous secure video service to assist in the assessment of Fidgety movements during the COVID era.

Barnes F[1]
[1]*Ayrshire And Arran Health Board*

Objectives: To ascertain the feasibility and effectiveness of assessing fidgety Movements in ex-preterm babies from a video taken and submitted by parents using the asynchronous secure video service v-create, and to evaluate its ongoing use within the Neurodevelopmental screening clinic setting.

Methods: Prior to COVID all very preterm babies were seen for their first appointment at the Neurodevelopmental screening clinic in Ayrshire at T+3mths corrected age. A short video was taken for later analysis to look for the presence of Fidgety movements.
In March 2020 all face-to-face clinic appointments were cancelled and so videos were not obtained. Ayrshire therefore joined the national v-create development pilot set up by members of the Neonatal Network and funded by Scottish Government, which allowed parents to take videos at home and submit them to the clinic team using a secure NHS approved system.
Parents were invited to register for the system prior to the T+3 clinic appointment and asked to submit a video. Appropriate instruction and evaluation forms were produced and sent out.

Results: Use of the v-create system proved to be quick and easy and, on the whole, parents were happy to engage. Videos were of high quality and easy to assess. Receiving the videos prior to the clinic appointment allowed for them to be analysed and results discussed with the family at the clinic. A report from v-create is saved and uploaded to Clinical Portal.

Conclusions: Using the v-create service in this way has resulted in improved communication and patient care by allowing analysis of videos prior to the clinic appointment, discussion with parents at the clinic and an appropriate follow-up plan made.
We have therefore changed our initial plan of using this service purely during the COVID era as the benefits of continuing with this service are clear to see.

10

Novel PMRT tool to help focus Quality Improvement projects on ethnicity inequalities in perinatal mortality

L'Heureux R[1], Omar M[1], Ben-Sasi K
[1]*Northwick Park Hospital*

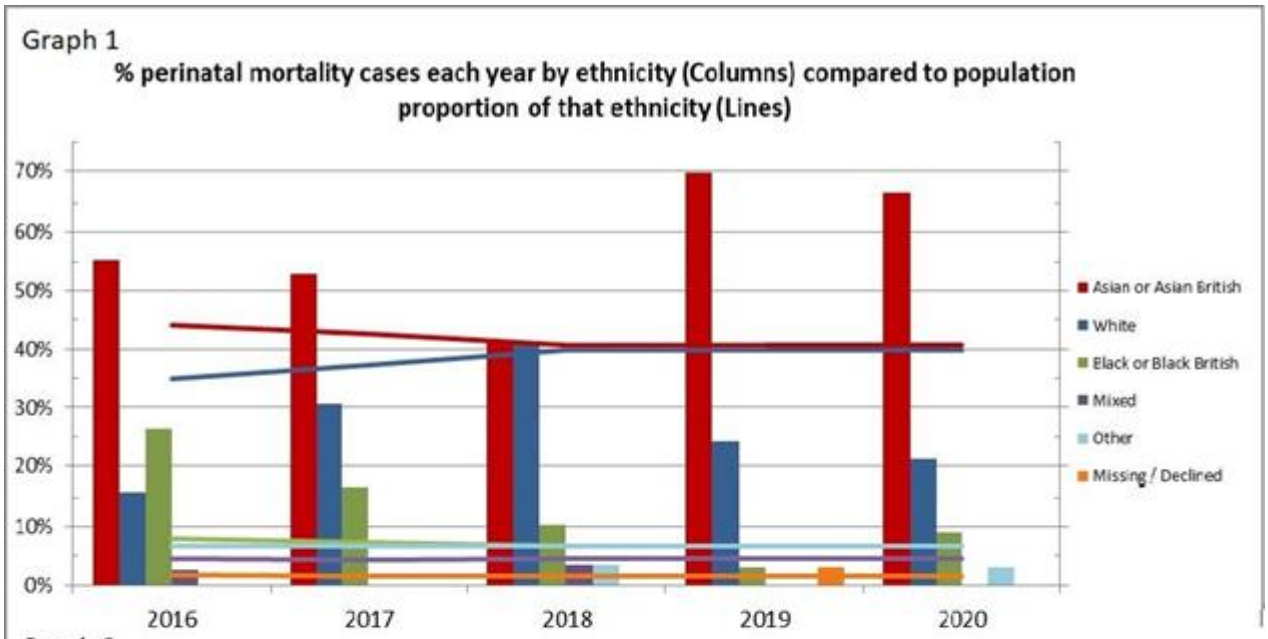
Perinatal mortality (PM) in the United Kingdom (UK) has shown considerable inequalities for women from Black, Asian and Minority ethnic (BAME) backgrounds. The plan to reduce PM by 50% by 2030 means that services must address the disproportion within their specific regions. However, tools to easily review ethnicity and inform interventions for quality improvement (QI) projects are, in practice, rare.

Our multidisciplinary (MDT) perinatal team developed an easy-to-use excel spreadsheet tool that helped collate existing local perinatal mortality and local population data from the 2016 to 2018 MBRRACE (mother and babies: reducing risk through audit and confidential enquiry) national reports. Similarly, booking ethnicity data was also converted from the local maternity data entry system into graphs to empower local clinicians drive change for QI projects.

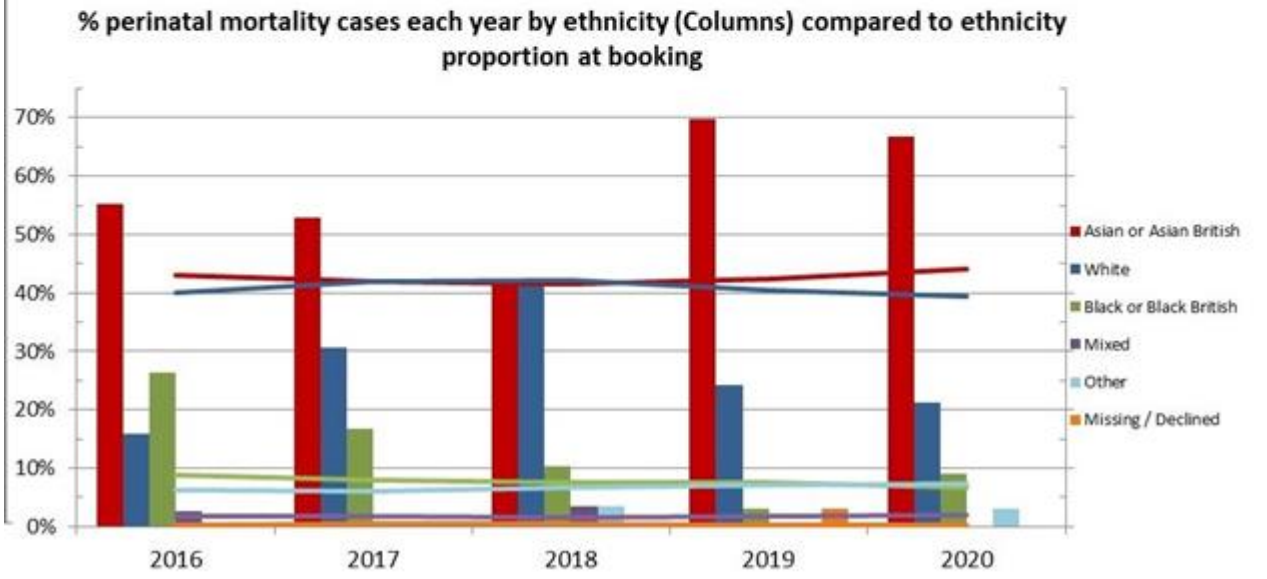
Locally, our tool confirmed that BAME groups were more likely to be represented in PM statistics than our population representation. However, the data showed that infants of Asian backgrounds were disproportionately affected, even when accounting for their proportion in our local community (Graph 1). Similar findings were found when compared to their representative proportion at booking (Graph 2). The data showed that PM in individuals from Black backgrounds were higher than the population (Graph 1) and booking (Graph 2) proportions but these have trended downwards.
The tool facilitated a visual comparative analysis of mortality and gestational age between BAME and White backgrounds (Graph 3). Foetuses and infants at 32-36 weeks gestation were a significantly at-risk subgroup to which we could apply a quality improvement change.

In conclusion, the tool has helped develop a local QI initiative aimed specifically at BAME individuals around 32-36 week gestational age. We showcase an excel tool allowing teams to analyse mortality data according to ethnicity and should assist in identifying areas where quality improvements may be targeted.

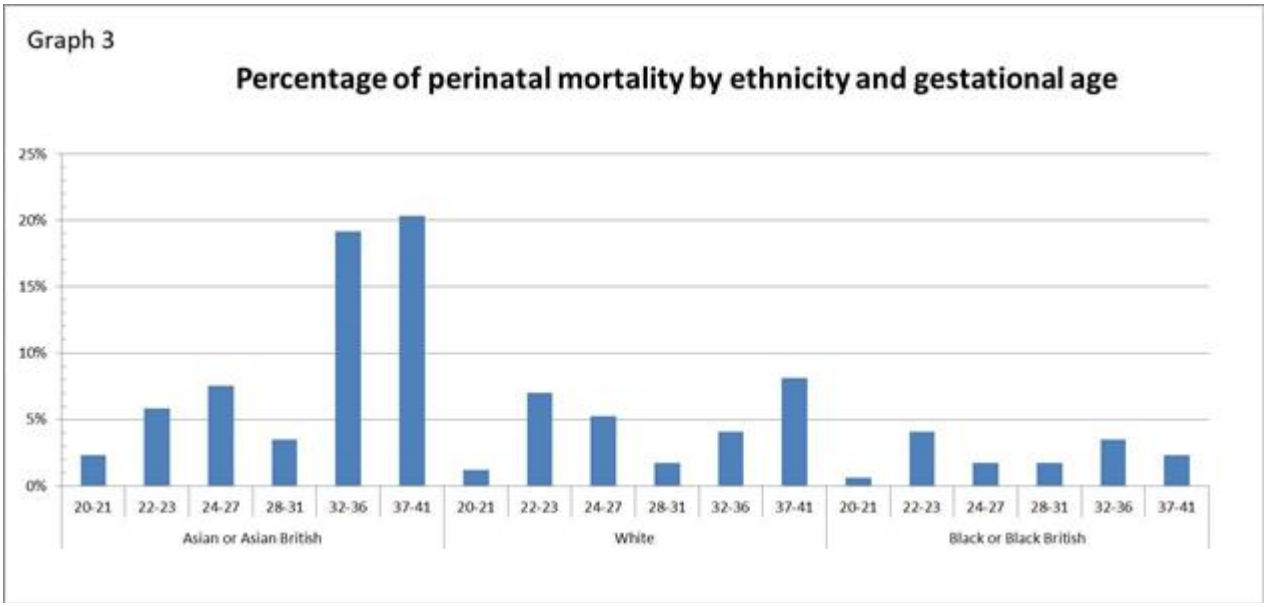
Graph 1



Graph 2



Graph 3


Percentage of perinatal mortality by ethnicity and gestational age
25%
20%
15%
10%
5%
0%
20-21
22-23
24-27
28-31
32-36
37-41
Asian or Asian British
White
Black or Black British

11

Insights into patterns of breastfeeding in preterm babies up to six months of age from the last UK National Infant Feeding Survey

Levene I
[1]*National Perinatal Epidemiology Unit*

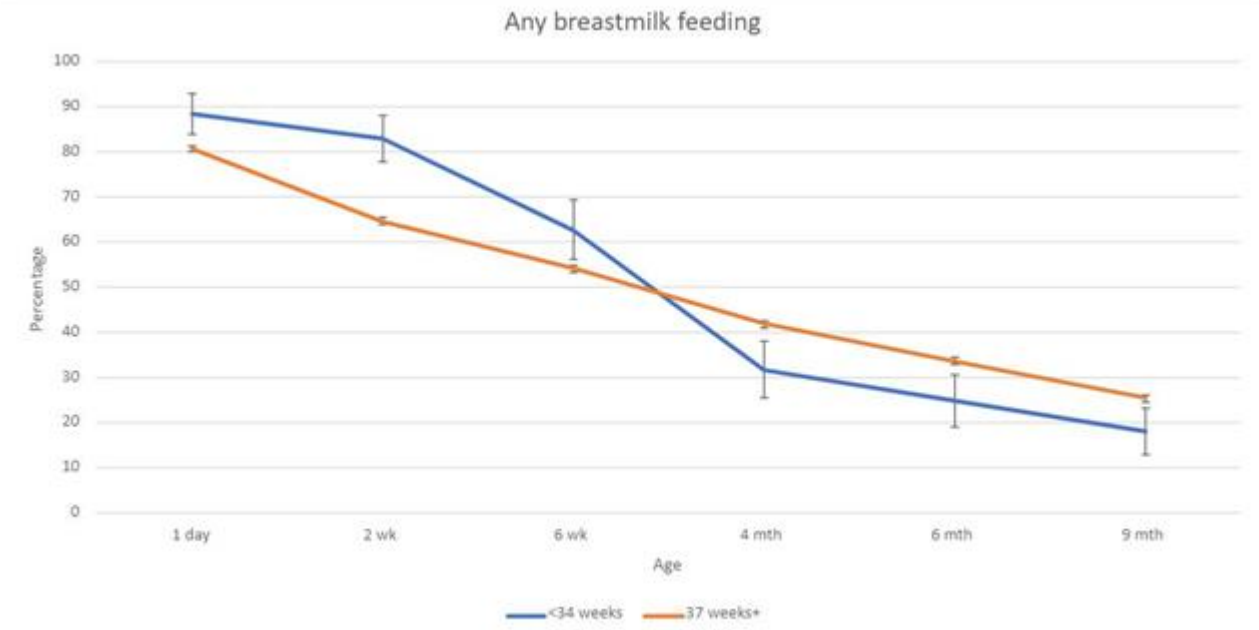
Background: There is minimal representative data on long-term breastfeeding outcomes of preterm babies, particularly those born <34 weeks' gestation. The last national Infant Feeding Survey is an unexplored source of data.

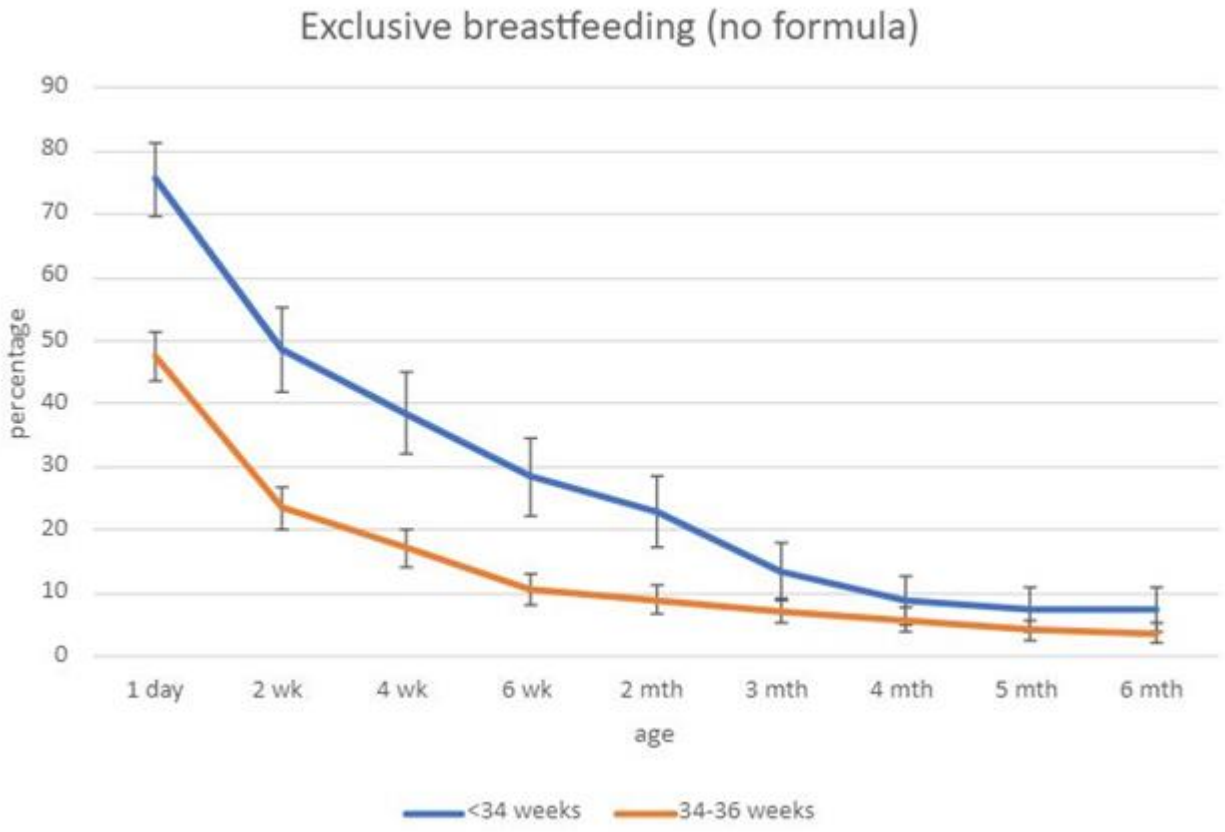
Method: A series of questionnaires were sent to a representative sample of those giving birth in Aug/Sept 2010; the final questionnaire sent at 7-9 months of age. The dataset is available for academic purposes in the UK Data Archive and this is covered by original ethical approvals. Data is presented as means and standard deviation. Error bars were constructed using binomial proportion confidence intervals. Analysis using chi squared tests.

Results: Data was available for 10,064 term babies, 429 late preterm (mean gestation 35.3±0.8 weeks) and 148 babies born <34 weeks' (mean gestation 30.9±2.1 weeks). Breastmilk initiation was highest in babies born <34 weeks' (89% versus 81% for term babies, p=0.02) but any & exclusive breastmilk rates drop below those for term babies by around two months actual age (near term corrected age; Figure 1). 25% receive any breastmilk at six months actual age, compared to 34% of term babies (p=0.02).

In contrast, babies born at 34-36 weeks' gestation have the worst breastmilk feeding outcomes throughout, with initiation of 77%, exclusive breastmilk on day one of only 48% and an absolute difference of up to 29% in exclusive breastmilk rate between gestation categories (p<0.00001; Figure 2).

Conclusion: Despite limited power, useful relationships were seen in this previously unexplored data. Babies born <34 weeks' have the highest breastmilk initiation rate, likely due to counselling on the value of breastmilk in this setting. By around term corrected age they receive less breastmilk than term babies, showing the challenges of establishing and maintaining a sustainable milk supply. Late preterm babies have the worst outcomes of all, emphasising their need for tailored feeding support.


Any breastmilk feeding
100
90
80
70
60
50
40
30
20
10
0
Percentage
1 day
2 wk
6 wk
4 mth
6 mth
9 mth
Age
<34 weeks
37 weeks+


Exclusive breastfeeding (no formula)
90
80
70
60
50
40
30
20
10
0
percentage
1 day
2 wk
4 wk
6 wk
2 mth
3 mth
4 mth
5 mth
6 mth
age
<34 weeks
34-36 weeks

12

Insights into patterns of introduction of complementary food to preterm babies from the last UK National Infant Feeding Survey

Levene I
[1]*National Perinatal Epidemiology Unit*

Background: Advice on starting complementary food ('weaning') is complex for parents of babies born <34 weeks' gestation, referencing actual and corrected age as well as developmental readiness. It is generally accepted that these infants should not be weaned at less than 13 weeks' of corrected age but there is a paucity of data on actual weaning practices. The last national Infant Feeding Survey is an unexplored source of data on this topic.

Methods: The last national Infant Feeding Survey was conducted in 2010/2011. A series of questionnaires were sent to a representative sample of those who had given birth in Aug/Sept 2010; the final questionnaire was sent at 7-9 months of actual age. The dataset is freely available for academic purposes in the UK Data Archive and this is covered by the original ethical approvals. Data is presented as means and standard deviation. The data was analysed using t-tests for continuous data (after assessment of normal distribution) or chi squared tests for categorical data (after assessment of sample size).

Results: Data was available for 10,064 term babies, 429 late preterm (mean gestation 35.3±0.8 weeks) and 148 babies born <34 weeks' (mean gestation 30.9±2.1 weeks). 39% of babies born <34 weeks' had complementary food introduced below 13 weeks' corrected age. Complementary food introduction was delayed by an average of only two weeks for these babies, compared to both term and late preterm babies – there was no difference between the two latter groups (Table 1).

Discussion: A large minority of babies born <34 weeks' started weaning before 13 weeks' corrected age in this 2010 data. Complementary feeding practices have changed significantly in the general population since 2010 so more up to date data is required – work is in process to analyse similar data from National Maternity Surveys up to 2020.

	<34 weeks' gestation (n=148)	34-36 weeks' gestation (n=429)	≥37 weeks' gestation (n=10,064)	t-test
Actual age at 1st solids (wks; mean ± SD)	22.4 ± 6.8	20.7 ± 6.1	20.5 ± 5.3	0.001*
Corrected age at 1st solids (wks; mean ± SD)	13.2 ± 7	16.1 ± 6.2		<0.00001

*comparison of babies born at <34 weeks PMA with those born ≥37 weeks PMA

13

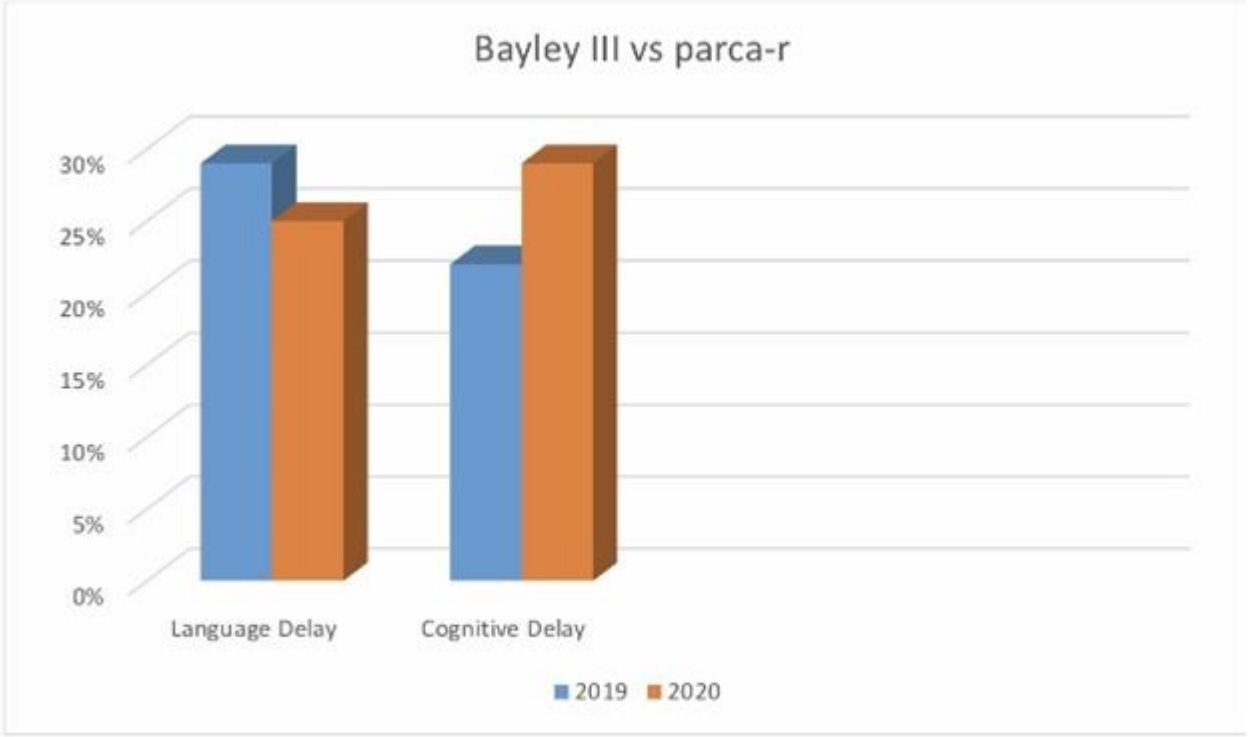
2yr Neurodevelopmental outcome data during the COVID era

Barnes F[1], Forte M[1]
[1]*Ayrshire And Arran Health Board*

Objectives: To establish a robust and reliable method of assessing Neurodevelopmental outcome at 2yr in very preterm babies, incorporating the use of virtual technology.

Methods: Prior to COVID very preterm babies in Ayrshire were seen at 2yr for a formal developmental assessment using the Bayley III Scales of Infant Development.
When face-to-face clinics were cancelled an alternative form of assessment had to be found.
The parca-r questionnaire was sent for families to complete and return prior to the clinic appointment. The scores from this are used to assess cognitive and language development, the results of which are known to correlate well with the Bayley III assessment for these domains.
No formal equivalent was found to assess motor development, so a simplified fine and gross motor assessment was carried out via a video consultation using Near Me.
Results: The results of the parca-r showed that of the 24 children assessed 6 (25%) had delay in the language domain (standard score <85) and 7 (29%) in the cognitive domain. This is comparable to our data from the previous year which showed language delay in 29% and cognitive delay in 22%.
Motor assessment using NearMe worked well in most children but not in those with motor difficulties. It was agreed these children required formal assessment using Bayley III.

Conclusions: While COVID restrictions remain in place it appears reasonable to limit face to face reviews to those for whom a more detailed assessment is required, while continuing to assess the remainder using a combination of the parca-r and NearMe. It is recognised that while a lot of useful information is gained in seeing and assessing a child in their home environment this depends on the quality of the video call and the ability of both parent and child to engage with the assessment requests.


Bayley III vs parca-r
30%
25%
20%
15%
10%
5%
0%
Language Delay
Cognitive Delay
2019
2020

14

Comparing the occupational balance and social capital of mothers with and without postnatal depressive symptomology

Cavill S[1]
[1]*Cardiff University*

Over 70,000 mothers in the UK suffer from postnatal depression, costing the NHS over £70,000 for each case. In Wales, 70% of women have no access to specialist perinatal mental health services. Symptoms include sleep deprivation; hormonal instability; self-doubt; anxiety; and poor bonding with the baby. The biological and psychological causes for postnatal depression are well established. Reduced social capital (quality and quantity of social interactions) and occupational imbalance also increase the risk of developing postnatal depression, but the mechanisms of action and how these may be ameliorated with interventions are less well understood.

Occupational therapists maximise functioning within daily activities (referred to as occupations), using coping strategies and adaptation to overcome illness associated difficulties. Currently, few occupational therapists are involved in postnatal depression care, despite the significant changes to lifestyle and impact of role adjustment during motherhood.

No studies have explored the daily occupations and accrued social capital around postnatal depression. This PhD project aims to answer the following questions:

1. What is understood by the concepts of occupational engagement, balance of occupations and social capital in relation to motherhood?
2. How does social capital, differences in daily occupational engagement and occupational balance impact on postnatal depression symptoms?

This would assist in understanding how life experience and choices impacted on the mothering role and whether routine affected perceived quality of life.

This mixed methods research utilised 212 questionnaires, alongside 9 interviews with an activity diary. Analysis involved logistic regression and thematic analysis. The results have highlighted three main themes: Expectations, Support and Time.

These results highlighted the underlying complexities of the mothering role and explores how different mothers utilise coping strategies to manage the additional responsibilities. The illustration of transitional change will provide supportive material and advocate for OT input in perinatal care.

15

Clinical manifestations of SARS-CoV-2 infection in the neonate: A systematic review

Brophy H[1], Flinders P, Shihab J
[1]*Lancashire Women And Newborn Centre*

Clinical manifestations of SARS-CoV-2 infection in the neonate: A systematic review

Burnley General Hospital
Burnley, England

Brophy, H.,Flinders, P. And Shihab, J.
Brophy: BSc (Hons), MBChB (Hons), MRCPCH (Eng)
Flinders: BSc, MSc, BMBS
Shihab: MBBS, MD

Primary Author: Hannah Brophy
Email: hannah.brophy@nhs.net

Background
The SARS-CoV-2 pandemic has devastated global health. However, it appears that the paediatric population has been relatively spared with a milder disease course and low mortality compared to the adult population. Clinical manifestations of SARS-CoV-2 in the neonate are less well described and remain a cause for concern given related viruses, Middle East respiratory syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), were known to cause adverse neonatal outcomes.

Methods
In November 2020, a systematic search of PubMed, MEDLINE and Embase was conducted to identify original studies investigating the presentation of SARS-CoV-2 in neonates. The search terms (covid-19 OR coronavirus OR SARS-CoV-2) AND (neonate OR newborn OR neonatal) were used. From 1363 initial articles, 119 relevant studies were identified. Thirty of these were included following full text review.

Results
211 SARS-CoV-2 positive neonates were identified. The most common symptoms were fever (46.8%, n=94/201), tachypnoea (31.8%, n=64/201), hypoxia (31.8%, n=64/201), lethargy (19.9%, n=40/201) and rhinorrhoea (17.4%, n=35/201). 13.9% (n=28/201) of neonates were asymptomatic. NICU admission was required in 55.8% (n=101/181) with respiratory support being delivered in 60.2% (n=112/186) of cases. 15.1% (n=28/186) needed the highest level of support in the form of intubation and ventilation. Sixteen neonates (7.6%) met the criteria for vertical transmission with positive PCR tests within 12 hours of birth. Four neonates died with SARS-CoV-2 (1.9%), although all deaths were attributable to other causes, such as congenital heart disease and culture-positive sepsis.

Conclusion
Fever, tachypnoea and hypoxia were the most common presentations of SARS-CoV-2 in neonates. No neonatal deaths were solely attributable to SARS-CoV-2.

17

Homerton NICU NIPE QIP

Rubinstein R[1], Aladangady N[1]
[1]*Homerton University Hospital*

BACKGROUND: Public Health England (PHE) mandates that ≥95% babies should have their NIPE completed by 72 hours old. PHE acknowledges that tertiary NICUs may struggle to meet this target. Homerton NICU is an outlier with only 30% of babies achieving this national KPI. Our performance was worse than comparable tertiary NICUs. A patient safety incident whereby a significant congenital anomaly was delayed in detection inspired this project as a timely NIPE would have aided prompt detection and management.
AIM: The project aimed for 60% completion rates by 72 hours and 95% started, considering the patient population including extremely premature and/or critically unwell babies.
METHOD: A multidisciplinary team including parents were consulted on various project methods. Striking logos were created for all NIPE-related paperwork. Teaching, posters and twice weekly reminders raised awareness. NIPE cots cards were designed to remind clinicians to perform the NIPE. Logos were fixed to computer screens to prompt recording of the examination in the national NIPE database. The PDSA cycle was followed.
RESULTS: Of 576 admissions in 2020, 413 were eligible for 72 hour NIPE. 330 babies ≥34+0 weeks gestation or not critically unwell, had the NIPE within 72 hours giving an overall 80% completion rate.
98.3% of eligible babies had a NIPE started within 72 hours.
Post-intervention, 10 of 12 months had >60% of NIPEs completed overall.
Of the babies excusable from the 72 hour completion target, 54 of 164, 33% were started within 72 hours, broken down to 42% for the premature babies and 9% for the critically unwell term babies.
CONCLUSION: Although the PHE targets have not been reached, our targets were reached. Lack of improvements in the critically unwell babies may reflect their clinical status. With new staff we need to investigate new ways to continue improving.

18

An Evaluation of Working from Home Practices and Experiences on a tertiary NICU during the Covid-19 Pandemic

Jones E[1,2], Crowley R[1], Tann C[1,3,4]
[1]University College London Hospital, [2]Singleton Hospital, [3]London School of Hygiene and Tropical Medicine, [4]MRC/UVRI & LSHTM Uganda Research Unit

Background
During the Covid-19 pandemic, remote 'working from home' (WFH) practices were developed on a tertiary neonatal unit to ensure compliance with shielding, self-isolation and social distancing guidelines and mitigate anticipated junior doctor staff shortages.

Objectives
- Establish a remote working service for junior doctors unable to attend in person due to Covid-19 restrictions using a remote working rota and guideline.
- Enable remote staff to contribute to clinical and non-clinical tasks securely.
- Conduct a mixed-methods evaluation of remote working practices and identify facilitators and barriers.

Methods
A rota allocated shielded and self-isolating staff to intensive care, postnatal duties, outpatient clinic or community calls. Staff used a securely accessible electronic patient records system and communicated using digital technology. A guideline formalised practice.

Quantitative and qualitative data were collected for a mixed methods evaluation. Quantitative data on time worked by staff role was collected retrospectively, while prospective online questionnaires recorded activities undertaken by remote working staff.

Qualitative evaluation involved thematic analysis of focus group discussions (FGDs) with staff WFH intermittently (Group 1) or continuously (Group 2).

Results
From 23rd March-15th August 2020, 506 hours (274 shifts) were worked remotely, a mean of 119 hrs (equivalent to 12 shifts) per week (66% by ST6-8, 25% ST1-3, 8% Advanced Neonatal Nurse Practitioners).

14 responses to 20 questionnaires were received (70% response rate) covering 126 hours of WFH activities from 28th July-15th August 2020. Main activities were audit/management and ward-based work.

The table shows thematic analysis of FGDs.

Conclusions
The remote workforce contributed substantially to the neonatal unit service and was broadly valued. Hierarchy and communication posed a risk to effective teamwork which may be mitigated by improving inclusive handover and use of digital technology. WFH had positive and negative impacts on training and wellbeing and staff WFH continuously may require additional support.

Table: Thematic analysis of Focus Group Discussions

Themes	Subthemes	Staff Opinions
Communication	Communication between remote/hospital team	Communication sometimes unclear leading to inefficiency.
	Handover	
Workforce	Staff commitment/enthusiasm	Staff were enthusiastic and committed to remote working and were supported by wider team.
	Effective time management	
	Task shifting between teams	Hierarchy recognized between staff.
	Hierarchy	
Patient safety	Safe prescribing	No negative impact on patient safety. Remote prescribing prohibited.
	Clinical safety	
Work life balance/wellbeing	Benefits/drawbacks to flexible working	Group 1 described positive effects on work/life balance and improvement in emotional wellbeing.
	Team cohesion	Group 2 described blurring of boundaries between work/life and found continuous remote working isolating.
	Emotional impacts	
Training	Practical skills training	Remote working had detrimental effects on practical skills.
	Development of leadership/management in outpatient setting	Remote working had positive effects on these areas of training.
	Opportunities for non-clinical work	
	Virtual training	
Tools	Digital technology	Enabler to remote working.

19

Improved neonatal outcomes following implementation of a Nutritional Support Team

Forster C, Hill L[1], McDowall L[1], Dhilip F[1]
[1]*Leeds Teaching Hospitals NHS Trust*

Recent consensus from BAPM & ESPGHAN recommends a multidisciplinary team approach to nutrition in preterm and growth restricted neonates. There are financial and workforce constraints to delivering this service, and there is no current data demonstrating the impact such a team can have. We present the outcomes from a tertiary surgical neonatal unit following the implementation of a Nutritional Support Team (NST). The team comprised a neonatal consultant, specialist neonatal dietician along with a pharmacist who performed weekly ward rounds supplemented by ward education for medical and nursing staff.

Growth rates were collected prospectively for all babies seen by the NST in the 12 months following setting up the service, along with numbers of Catheter Related Blood Stream Infection (CRBSI) and inborn NEC rates. Time to full feeds, days receiving parenteral nutrition (PN) and length of stay were also compared pre and post establishing the NST.

Prior to implementation of the NST babies were not achieving widely recommended growth rates of 15g/kg/day. Following 12 months of regular nutritional reviews growth rates rose by 65%, increasing in preterm infants from 9 to 14g/kg/day. The number of babies falling two or more centiles fell from 46% to 25%. Length of stay, time to full feeds and days receiving PN were all reduced, as were CRBSI rates which fell from 2.85 to 0.91 per 1000 line days.

This service review demonstrates considerable improvements in nutritional outcomes after the introduction of an NST inclusive of a specialist neonatal dietician in a tertiary neonatal unit.

20

A retrospective comparison of surgical interventions for necrotising enterocolitis and spontaneous intestinal perforation

Granger C, Khatun S[2], Bradnock T[3], Simpson J[3]
[1]Newcastle Neonatal Services, Newcastle Upon Tyne Hospitals NHS Trust, [2]University of Glasgow, [3]Royal Hospital for Children Glasgow

Background
Necrotising enterocolitis (NEC) and spontaneous intestinal perforation (SIP) are acquired gastrointestinal pathologies which commonly require surgery. The type of surgery is influenced by the extent of the underlying disease process, size and clinical stability of the infant and preference of the surgical team.

Objective
To explore differences in surgical management of NEC and SIP in a cohort of infants born <32 weeks gestational age.

Methods
A retrospective review of all neonates with surgical NEC or SIP managed in a regional centre over a nine-year period (2012 to 2020). Data were extracted from the Badgernet database and medical records. Local Caldicott approval was obtained.

Results
50 infants with NEC and 31 with SIP were identified. One infant with NEC and two with SIP died prior to surgery (diagnoses confirmed at post mortem). Two infants with SIP were managed conservatively. Gestational age and birth-weight were similar in both groups but infants with SIP presented and underwent surgery earlier than those with NEC (Table 1). The insertion of an abdominal drain, either as a temporary or definitive measure, was uncommon in both groups. Almost a quarter of infants with NEC had extensive small bowel involvement incompatible with survival identified at first or relook laparotomies. Infants with SIP who underwent surgery all had a definitive procedure at their first operation. The commonest intervention in both groups was laparotomy and small bowel resection with stoma ± mucous fistula formation. Age and weight at stoma closure was similar in both groups (Table 2).

Conclusions
NEC surgery more commonly involved relook procedures to fully evaluate gut viability, reflective of the differing disease processes. Further evidence is required to inform the optimal surgical management of NEC and SIP, particularly in terms of stoma formation versus primary anastomosis, and timing of stoma closure.

21

OUTCOMES OF INFANTS BORN TO ASYLUM SEEKERS AND KEY POINTS FOR HEALTHCARE PROVIDERS

Murphy C[1,2], Loftus E[1], Malone F[3,4], McCallion N[1,2]
[1]Department of Neonatology, Rotunda Hospital, [2]Department of Paediatrics, Royal College of Surgeons in Ireland, [3]Department of Obstetrics and Gynaecology, Rotunda Hospital, [4]Department of Obstetrics and Gynaecology, Royal College of Surgeons in Ireland

Aims:
In Ireland, asylum seekers are accommodated in the Direct Provision (DP) system. The state directly provides accommodation, food and a medical card with free access to maternity care. Evidence suggests that asylum seekers have worse perinatal outcomes. Our aim was to review the neonatal outcomes of liveborn infants in a tertiary neonatal unit (8,500 deliveries/year), to mothers living in DP.

Methods:
This was a retrospective review (November 2017 - February 2020). Infants were identified by a discharge address to a known DP centre. Ethical approval was obtained. The outcomes were compared to hospital data from 2018.

Results:
81 infants were identified. 97% of their mothers had a booking visit but only 42% had a documented complete anomaly scan, owing to the late gestation at booking (median 30+4 weeks). 20% of mothers had positive serology (13-fold higher than the hospital incidence). There were no differences in the mode of delivery or induction rates. However, only 18% had a documented support person in labour.
There were significantly higher rates of NICU admission (25% v 13%, $p<0.01$) in this group. Two infants died. There were lower rates of exclusive breast feeding at discharge (23% v 45 %, $p<0.01$) and only 87% had a hemoglobinopathy screen performed. Interpreters were used in 20% of cases, but not at each visit and there was some evidence of miscommunication.

Conclusion:
Healthcare providers caring for infants of asylum seekers must ensure adequate communication at all times, have increased vigilance for undiagnosed congenital anomalies and confirm all required screening is performed (including hemoglobinopathy screening). Maternal serology must be evaluated, particularly if unavailable prior to delivery, to ensure that postnatal treatment is commenced promptly if required. Postnatal follow-up should only be carried out in hospital when clinically indicated, to avoid unnecessary financial and logistical burdens to these families.

22

"I'd like to bring this to your attention" Formal complaints relating to care of babies on postnatal and labour wards

Morris T[1], Aiyengar A[1], Aladangady N[1]
[1]*Homerton University Hospital Nhs Foundation Trust*

Background
In 2018-2019 there were over 590,000 NHS in-hospital births, with over 38% of postnatal care episodes lasting 2 or more days [1]. Many of these longer stays relate to neonatal problems such as jaundice, infection or birth abnormality.

Aim
To report an overview analysis of the distribution of formal complaints received by our maternity department, relating to care of newborns, over 10 years for the purposes of wider learning and shared insight.

Methods
325 complaints were received between 2010-20. 94 (28.9%) of these concerned the care of infants managed on delivery suite or postnatal ward: these were sub-divided and arranged into themes following consideration by the authors.

Results
Themes identified (Fig 1) were delivery & birth condition (n=22, 15%), physical injury at birth (n=16, 11%), fetal & neonatal abnormalities (n=12, 9%), feeding support (n=13, 9%), jaundice (n=4, 3%), communication (n=70, 49%) and follow up (n=6, 4%). Complaints relating to communication were the most prevalent (135 issues raised across 70 complaints). The most frequent of these regarded information provision; by the midwife (n=40 issues) or the neonatal doctor (n=30 issues). 22 complaints concerned delivery or birth condition, including, amongst others, 4 following unexpected neonatal unit admission, 4 regarding brain injury, and 3 to postnatal death of an infant. Of the 12 complaints relating to fetal/neonatal abnormalities: 8 were aimed at the newborn infant examination (NIPE), 7 at antenatal ultrasonography, and 3 at both.

Message
The most common theme within formal complaints received was communication with parents. We report also on various other themes of complaint received. Understanding the distribution of complaints across areas of maternity care may solicit discussion on wider improvement in key areas for national or political implementation.

Reference
[1] NHS Maternity Statistics, England 2019-20 - NHS Digital [Internet]. [accessed 22 June 2021]. Available from: https://digital.nhs.uk/data-and-information/publications/statistical/nhs-maternity-statistics/2019-20#resources

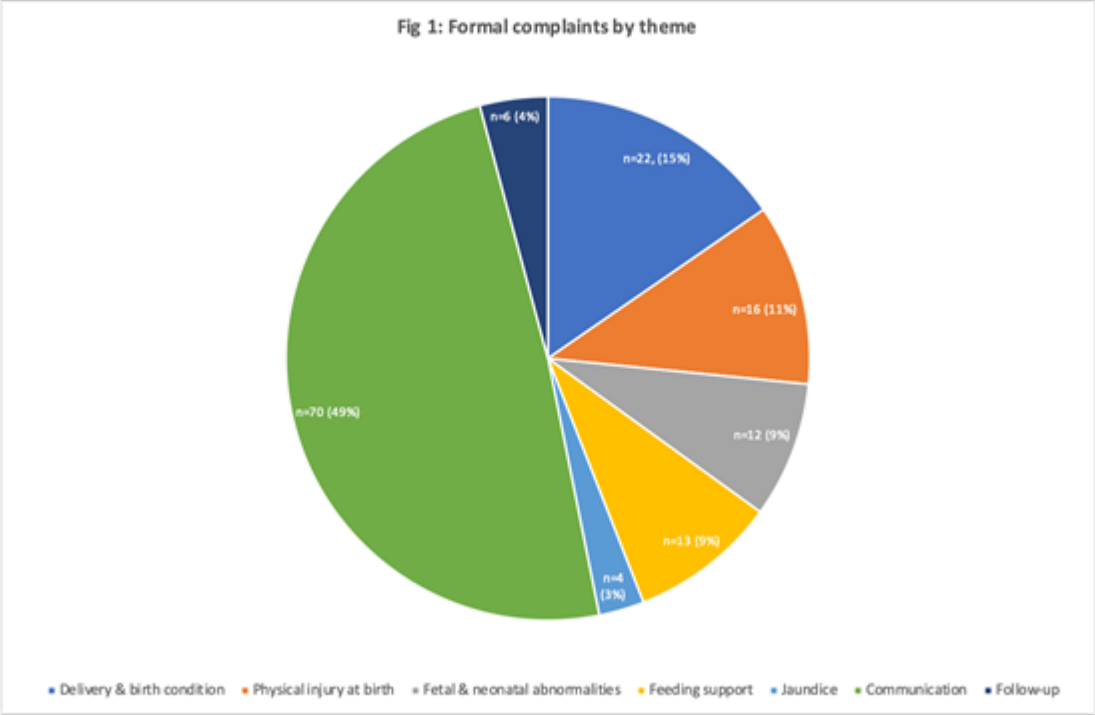


Fig 1: Formal complaints by theme
n=6 (4%)
n=22, (15%)
n=16 (11%)
n=12 (9%)
n=13 (9%)
n=4 (3%)
n=70 (49%)
Delivery & birth condition
Physical injury at birth
Fetal & neonatal abnormalities
Feeding support
Jaundice
Communication
Follow-up

23

PERIPrem a Regional Perinatal Quality Improvement Project: Bringing Teams Together

Glover Williams A[1], Bates S[2], Kay T[3], Luyt K[4]
[1]Southmead NICU, NBT, [2]Great Western Hospital Neonatal Unit, [3]Royal Devon and Exeter Hospital , [4]University of Bristol, UHBW

Background:

- An NHS Long Term Plan is to reduce neonatal death & brain injury by 50% by 2025.
- Professor Karen Luyt and Dr Sarah Bates worked with both South-West and West-of-England AHSNs to develop and deliver PERIPrem.
- The PERIPrem team was formed of: Neonatologists, Obstetricians, Midwives, Parents, AHSN Project Managers, Project Support Officers and the Communication team.
- Delivering this network-wide project during a pandemic required rapid adaptation to remote, online delivery.

Aim:

To introduce an 11-element perinatal care-bundle to improve preterm survival without brain injury consisting of: Birth-in-the-Right-Place, Antenatal Steroids, Magnesium Sulphate and Antibiotics, Optimal Cord Management, Thermoregulation, Volume-Targeted-Ventilation, Caffeine, Probiotics, Early Maternal Breast Milk and Postnatal Hydrocortisone (<28weeks).

Methods:

- The 12 neonatal and maternity units of the SouthWest Neonatal ODN each received funding for a Midwife and Neonatal Nurse to establish an MDT and undertake QI in whichever way best-suited local demand.
- Each locality had QI coaching from the SWASHN & WEAHSN.
- Multiple resources were designed to support and jumpstart the project including: Infographics, Data Collection tools, Share&Learn sessions, Webinars, Evaluation tools and a Parent and Neonatal PERIPrem Passport.

Results:

PERIPrem improved Perinatal team-working regionally, created continuity of care for families transferred between units and through parental co-production, created a Parent Passport, empowering parents in their infant's care perinatally. Regionally we have seen improvements in OCM, Early Maternal Breast Milk, Probiotic & prophylactic hydrocortisone use and consistently good performance in administration of Antenatal Steroids and Magnesium Sulphate.

Conclusions:

- Despite a pandemic a whole ODN rolled out an improvement project to improve neonatal outcomes.
- It is a challenge to implement an 11-element care-bundle and in order to do this, teams need to have time funded.
- Change takes time, team-work and sustainability to become embedded within units as standard care.

24

Perinatal Excellence to Reduce Injury in Preterm Birth

Yardley K[1], Kay T[1], Johnson T[1], Venkata N[1], Glover Williams A[2]
[1]Royal Devon and Exeter Hospital, [2]Southmead NICU

Background
Babies born before full term are at greater risk of mortality and long-term morbidity and in the South-West premature babies have a higher rate of brain injury than in other areas of the Country. Providing optimum care for babies born prematurely is key to improving outcomes.

Aim
As part of the 11-element regional perinatal quality improvement project, PERIPrem, the RD&E team chose to focus on 2 interventions: Optimal Cord Management (OCM) and Early Maternal Breast Milk (EMBM), where the most improvement could be made and that would therefore have the biggest impact on the wellbeing of premature babies born <34 weeks gestation at the RD&E.
OCM = delayed cord clamp for >60 seconds.
EMBM = infant receiving EBM within 6 hours of birth.

Methods
An MDT consisting of a Consultant Obstetrician, a Consultant Neonatologist, a Midwife and a Neonatal Nurse, met to devise a series of interventions to implement whilst continually collecting their data, leading to revision in approach.
Interventions included: raising MDT awareness through posters, email and social media, facilitating team-working and communication, antenatal expression, nominating champions, sourcing new equipment, designing patient information, creating video education videos and running simulations.

Results
Both OCM and EMBM were seen to improve over the 4 quarters of monitoring.
OCM had a standard of 85% set and started off at 42%. Over the year OCM increased to 64%, to 85%, to 71%.
EMBM had a standard of 85% set and started off at 80%, before climbing to 94% then 87%.

Conclusion
The unpredictable nature of preterm birth means that there is not always time for pre-planning and discussions with parents can be challenging if the mother is in labour. LNUs have small numbers of preterm infants, which increases the challenge of embedding practice.

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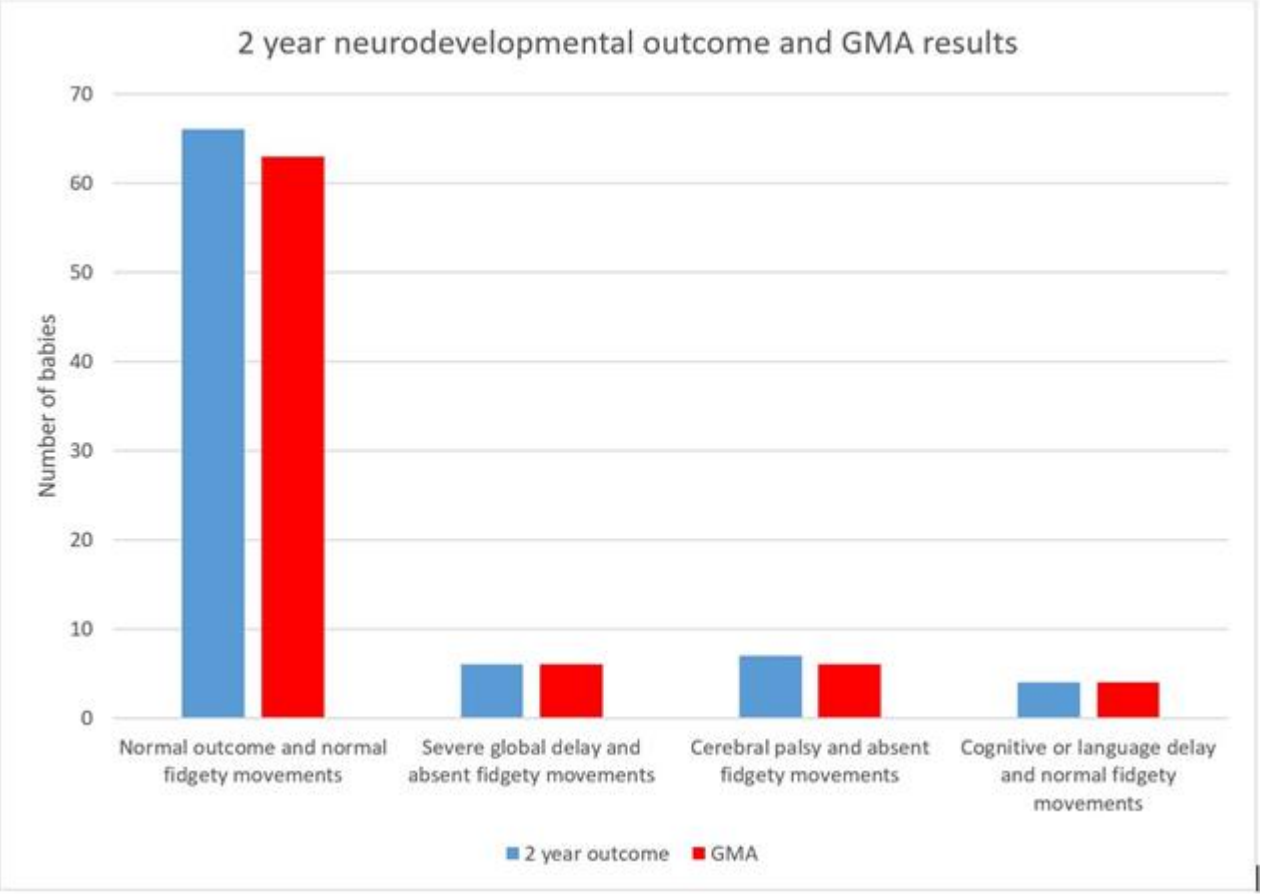
The Correlation Between General Movement Assessment and Two year Neurodevelopmental Outcome in High Risk Infants

Allman A, Paris D[1]
[1]*Aneurin Bevan University Health Board*

Introduction
Our aim was to compare Prechtl General Movement Assessment (GMA) results with standardised 2 year neurodevelopmental outcome in a population of high risk infants.
Methods
Infants born 2016 to 2018 with hypoxic ischaemic encephalopathy requiring cooling or weight ≤1500g were retrieved from neonatal databases. GMA and 2 year assessments were analysed.
Results
83 infants had GMA and 2 year assessments. All had GMA between 10 to 17 weeks of age (fidgety GMA) and most had early GMA between 2 to 8 weeks (writhing GMA). All had 2 year testing using either the Bayley's III tool or telephone interview, general health, motor function and PARCA-R questionnaires. Of the 83, 66(80%) had normal 2 year outcome and 63(96%) of the 66 had normal fidgety GMA. 34(52%) of the 66 had writhing GMA and 20(59%) of these were normal and 14(41%) had poor repertoire. 6(7%) of the 83 infants had severe global disability at 2 years and all had absent fidgety movements. All 6 had abnormal writhing GMA; 4 with poor repertoire and 2 showing a cramped synchronous pattern. 7(8%) of the 83 infants had cerebral palsy at 2 years and 6(86%) of the 7 had absent fidgety movements with 1(14%) being equivocal. 4(57%) out of the 7 had writhing GMA; 2 of the 4 displayed poor repertoire and 2 showed a cramped synchronous pattern. 4(5%) of the 83 infants had significant 2 year cognitive or language disability without motor deficit and all had normal fidgety movements.
Conclusion
Our study demonstrates a high level of correlation between absent fidgety movements and motor disability at 2 years. As recognised in literature, there is a weaker association between writhing GMA and motor problems. We advocate the use of GMA for high risk neonates. Targeted interventions have high potential to positively impact on neurodevelopmental outcomes.


2 year neurodevelopmental outcome and GMA results
70
60
50
40
30
20
10
0
Number of babies
Normal outcome and normal fidgety movements
Severe global delay and absent fidgety movements
Cerebral palsy and absent fidgety movements
Cognitive or language delay and normal fidgety movements
2 year outcome
GMA

27

Mixed Methods Systematic Review: Parents' and Healthcare Providers' Perceptions, Experiences, Knowledge of, and Attitudes to Kangaroo Care of Preterm Babies in Hospital Settings

Almutairi A, Gavine A[1], McFadden A[1]
[1]University Of Dundee, School of Health Sciences, [2]King Saud bin Abdulaziz University for Health Sciences

Background:
Kangaroo care (KC) is universally known as an effective intervention to improve the development of preterm infants (1). However, despite the evidence, the global implementation of KC remains low (2,3).

Aims:
The review aimed to answer the following questions: :1) What are parents' and healthcare providers' perceptions, experiences, knowledge of, and attitudes to KC of preterm babies in hospital settings? 2) To what extent are parents satisfied with kangaroo care?

Methods:
A systematic search was conducted to identify relevant quantitative and qualitative studies. Studies were synthesized using parallel-results convergent integrated design (4). The MMAT 2018 was used for quality assessment (5). The review protocol is registered on PROSPERO: CRD42020180912.

Results:
Thirty-five studies were included. This review identified that HCPs were generally knowledgeable about KC. In contrast parents had limited information about KC. Furthermore, it seems both HCPs' and parents' had positive perceptions and attitudes toward KC globally. However, there was a lack of evidence on parental satisfaction that are associated with KC.

Conclusions:
While HCPs' know about KC, parents' knowledge was limited. Disseminating knowledge about KC amongst parents could be initiated in prenatal clinic services. Besides, organisational support is required for continuing education to develop practice guidelines and protocols, to ensure the standardisation of information for HCPs for some preterm infants. Additionally, this review supports the need for future research on father's role and involvement in KC. Further studies are needed to explore parents' satisfaction. Finally, there is a need for more research in relation to the practice and implementation of KC in some infants.

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MIND: Mental-Health Initiative for Neonatal Department – Improving wellbeing in the workplace

Suliman A[1], **Chowdhury N[1]**, Kleine I[1], Piza A[1], Sharma N[1]
[1]*University Hospital Lewisham*

Aims:
Research demonstrates 14.7% of people experience mental health problems in the workplace, with approximately 12.7% of all UK sickness absence attributed to mental health. Poor staff wellbeing and burnout are associated with clinical errors. We aimed to reduce staff burnout and those experiencing stress more than twice per week by 10%.

Method:
A pre-intervention survey gathered existing perceptions of stress. Eighty-eight percent of participants (n=47) reported feeling stressed at least monthly, with 35% experiencing stress 2-4 times per week. Seventy-five percent admitted their work-role was contributory. Fifty-three percent were less active during the pandemic and 57% of respondents had never partaken in mindfulness.

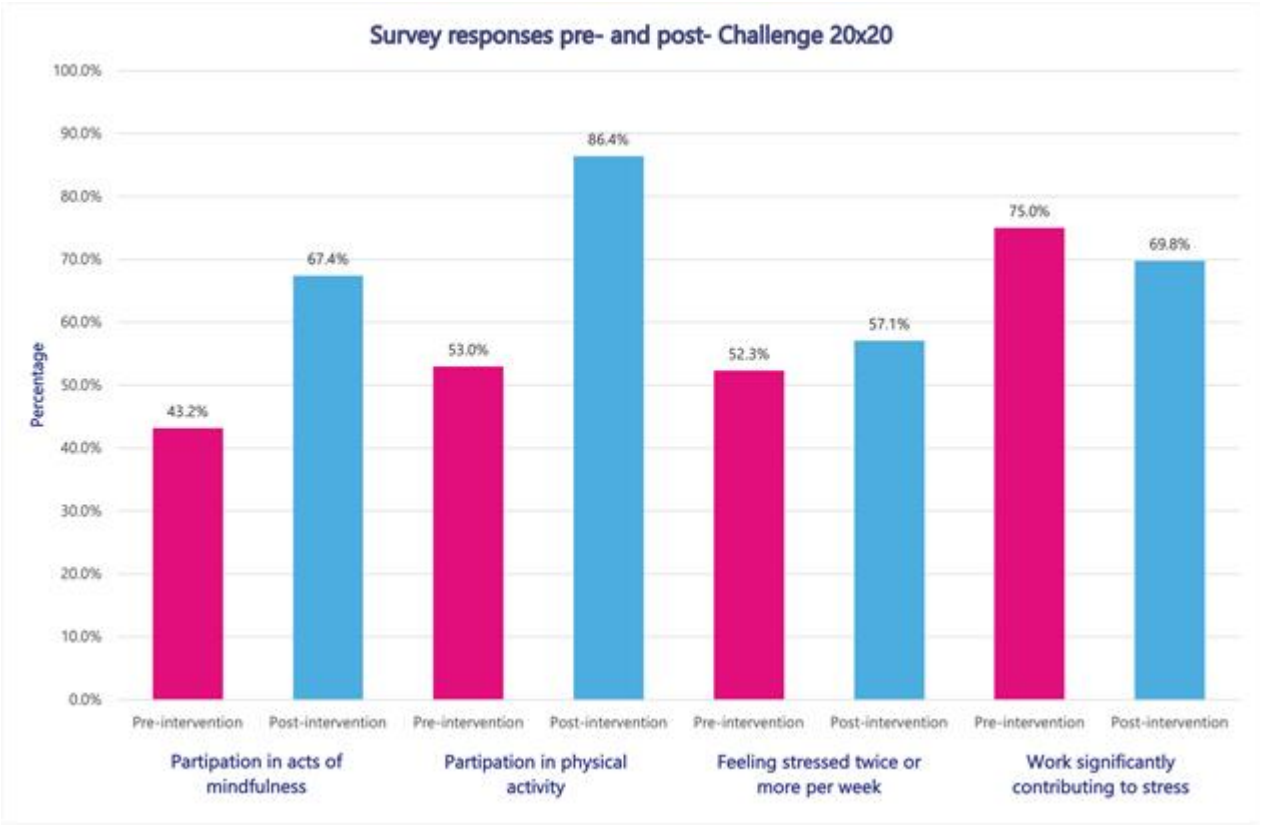
We devised "Challenge 20x20"; a three-week initiative where participants completed 20-minutes of mindfulness or physical activities daily. Activities included yoga, meditation, walks and home workouts. Engagement was encouraged through a self-updated GoogleDoc and a WhatsApp group posting motivational messages. We designed and circulated a weekly newsletter with participant photos and quotes.

Results:
Eighty percent of participants completed the post-intervention survey. Participation in mindfulness activities increased to 67% and over 85% reported exercising more than twice a week.

Participants feeling stressed more than twice per week remained relatively unchanged (52.3% pre-intervention: 57.1% post-intervention). Further questioning found individuals were more aware of stress triggers following the challenge. There was a reduction in those perceiving their work-life as contributing to their stress (75% pre-intervention: 70% post-intervention).

Discussion:
"Challenge 20x20" engaged staff in a multi-professional network of mindfulness and wellbeing. Participants expressed feeling "motivated", "supported" and "inspired" by colleagues. The sense of 'team' increased significantly.

Challenges arose affecting engagement, including personal, health and external stresses. There is ongoing participation in the WhatsApp group and novel ideas promoting wellbeing and mindfulness at work. We aim to extend the scheme Trust-wide, particularly considering the impact of COVID-19 on healthcare workers' mental wellbeing.


Survey responses pre- and post- Challenge 20x20
Percentage
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
43.2%
67.4%
53.0%
86.4%
52.3%
57.1%
75.0%
69.8%
Pre-intervention
Post-intervention
Pre-intervention
Post-intervention
Pre-intervention
Post-intervention
Pre-intervention
Post-intervention
Partipation in acts of mindfulness
Partipation in physical activity
Feeling stressed twice or more per week
Work significantly contributing to stress

33

Addressing Thermoregulation as part of a Regional Quality Improvement Project to improve Neonatal Outcomes: PERIPrem

Hewitt P[1], Colliver J[1], Glover Williams A[2]
[1]Gloucestershire Royal Hospital, [2]Southmead NICU

Background:
Mortality is increased by 28% for every 1°C decrease in the recorded temperature a premature baby has on admission to the Neonatal Unit.
As part of the SouthWest ODN collaboration on the implementation of the PERIPrem care-bundle (Perinatal Excellence to Reduce Injury in Premature Birth), the Perinatal team at Gloucestershire Royal Hospitals NHS Trust have focussed on improving rates of admission Normothermia.

Aim:
The standard of >90% of preterm babies <34 weeks gestation to have a normothermic temperature of between 36.5 - 37.5°C measured within 1hr of their admission was set.

Methods:
Using improved inter-team communication, education and PDSA quality improvement methodology the PERIPrem MDT in Gloucester identified through patient timelines, factors considered to affect achieving optimal thermoregulation within the preterm population, notably environmental factors: the use of cold towels at birth; being born into a cold theatre environment; etc.
A towel heater was purchased with funds from the Scoo-B-Doo local Neonatal Charity, TransWarmers® were purchased, and with the support of the Trust's Estates Department, control of the theatre temperatures was returned directly to clinicians enabling any member of the theatre team to increase the theatre temperature in response to an imminent preterm birth.

Results:
Over the project timeline of 8 months, thermoregulation was achieved in up to 100% of preterm infants on monthly review.

Conclusion:
Compliance with this element of the PERIPrem care bundle has been achieved thanks to contributions from all members of the clinical MDT as well as critically, the Trust's Estates Department. Upon monthly review of data, compliance with normothermia is being examined, clinical patient factors identified, (notably sepsis), and continuous improvement is taking place.

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Ice Ice Baby: The Quest to Improve Admission Normothermia in Very Preterm Infants in a Level 2 NICU

Aghababaie A, Douch C[1], Belosludtseva Y
[1]*Barts Health NHS Trust*

Background

Hypothermia is associated with poorer outcomes in preterm infants [<32 weeks gestation], including sepsis and mortality. The national standard dictates that 90% of infants in this group should be normothermic within 1 hour of admission.

Aims

1. To audit our admission temperatures for preterm infants in the preceding year
2. To review staff understanding and current practices related to temperature control
3. To improve our local practice relating to temperature control in very preterm deliveries

Methods

We distributed anonymous questionnaires to all healthcare professionals (HCPs) in our department to gauge understanding and practice around temperature control in this group.

We collected data from BadgerNet related to local very preterm admissions in the preceding year, presenting the findings in departmental teaching sessions, with a focus on education around optimal temperature management for these infants. This stimulated meaningful discussion and brainstorming around improving our current practice. We initiated a local action plan including: daily checks of the transport-incubator and emergency equipment, and newly added temperature probes and transwarmers.

Results:

Pre-intervention:

1. HCP questionnaires: 50 staff
- 50% correctly defined normothermia
- 50% aware that temperature monitoring should begin at delivery
- 22% identified that infants should be monitored <1 hour of delivery

2. April 2020-April 2021: 45 very preterm infants
- 47% normothermic
- 2% hyperthermic
- 49% hypothermic

Post-intervention:

1. May 2020-June 2021: 12 very preterm infants
- 75% normothermic
- 17% hyperthermic (all in May)
- 8% hypothermic

Conclusion:

Our local action plan and education around temperature control has improved our practice in achieving normothermia in very preterm babies. The dedication in implementing our improvements initially caused increased hyperthermia. In the months ahead our aim is to ensure pre-transfer temperatures are monitored and documented.

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In-utero transfer requests in Yorkshire and the Humber between January 2018 and December 2020: a retrospective analysis.

Tontus S, Anumba D[1], Harrison C[2]
[1]The University of Sheffield, [2]Embrace Yorkshire and Humber Infant and Children Transport Service

Background: In-utero transfers (IUTs) are an important part of improving neonatal outcomes. However, demand for IUTs is high, which places pressure on the neonatal transport service. IUTs are also a large burden to the women, sometimes travelling many miles from their booking hospital to be in an appropriate unit for their care. Despite this burden, many transfers are carried out unnecessarily - two previous retrospective studies in 2011 and 2015 found that only 52% and 35.1% of women delivered within 48 hours of transfer, and that only 11% and 28% of women had received predictive testing for preterm delivery prior to transfer.

Method: This study was a retrospective cohort study, reviewing all IUT requests handled by Embrace (the Yorkshire and Humber neonatal transport service) between January 2018 and December 2020. For each request, gestation, use of antenatal corticosteroids, use of predictive testing, and transfer outcome were reviewed.

Results: 1,389 requests within the study period were reviewed. 24.55% of women underwent predictive testing before an IUT was requested, with 83.87% of these positive and 16.13% negative. There was a large variation in usage between hospitals, with the highest use found in Barnsley, an LNU (43.4%) and the lowest use in Hull and Bradford, both NICUs (8.1%). 89.77% of women received antenatal corticosteroids prior to IUT request.

Conclusion: Results show that the use of predictive testing in the region is still extremely low, undoubtably contributing to the issue of inappropriate IUTs. The use of predictive testing must increase to minimise the number of women being unnecessarily transferred from their homes, as well as the demand on transport services. Our retrospective data did not include delivery outcomes, and further prospective work has been conducted to include full delivery outcome data.

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Delivery outcomes following in-utero transfer in Yorkshire and the Humber

Tontus S, Anumba D[1], Harrison C[2]
[1]The University of Sheffield, [2]Embrace Yorkshire and Humber Infant and Children Transport Service

Background: In-utero transfers (IUT) are vital for neonatal survival, enabling infants to be born in the right place. However, preterm delivery is difficult to predict, and many transfers are carried out unnecessarily - two previous studies in the region found that only 35.1% and 52% of women delivered within 48 hours of transfer. This has led to increased demand on neonatal transport services. IUTs are also emotionally demanding, with some women travelling many miles away from their booking hospital to the nearest appropriate neonatal unit. Evidence has shown that testing for cervicovaginal biomarkers, such as fetal fibronectin, is an extremely useful method of identifying women at high risk of delivery, however, use of these within the region has previously been found to be low.

Aim: Our study aimed to identify whether the current methods of triaging women presenting with threatened preterm labour (TPTL) require optimising.

Method: A prospective cohort study was conducted over 6-months, analysing IUT requests directly from the Embrace (Yorkshire and Humber neonatal transport service) database. To obtain delivery outcome data, Embrace staff were instructed to contact receiving delivery suites 48 hours following transfer.

Results: 161 IUT requests were analysed. Table 1, attached, shows the number of women transferred from/to each level of neonatal unit, suggesting that 50.37% of requests were due to uplift in care and 49.63% of requests were due to issues with capacity. Predictive testing was used in 28.8% of women. Only 29.1% of women delivered within 48 hours of transfer.

Conclusion: Results show that delivery outcomes following an IUT are lower than previously thought, and many women are transferred inappropriately. Predictive biomarker testing prior to transfer is still uncommon. The current methods of triaging women in TPTL are in clear need of optimising to minimise burden to women and demand on the transport service.

Table 1: Number of women transferred from/received by level 1, 2 and 3 neonatal units.

Requesting unit	Receiving unit			
	Level 1 SCBU	**Level 2 LNU**	**Level 3 NICU**	**Total**
Level 1 SCBU	0	17	10	**27**
Level 2 LNU	2	22	61	**85**
Level 3 NICU	2	15	8	**25**
Total	**4**	**54**	**79**	

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Thermoregulation in Newborns

Sharma N[1], Ambulkar S[1], Roberts J[1], D' Cruze C[1], Checketts S[1], Taylor C[1], Bates N[1]
[1]*Lewisham Hospital, London*

Aim:
Neonatal morbidity and mortality increase with decreasing admission temperature. Admission temperature <35˚C is independently associated with the risk of death. WHO defines normothermia as 36.5-37.5 °C, hypothermia <36.5 °C and hyperthermia >38 °C.
Neonates are predisposed to hypothermia due to high surface area to body ratio, lack of subcutaneous fat (term infants), lack of adipose tissue, lack of brown fat (preterm) and limited thermogenesis.
We aimed to achieve the national standard of >=90%.

Methodology:
This project was carried out in three stages using WHO, NNAP and BAPM tool kit. All gestations were included. Those repatriated, outborn or HIE babies needing passive cooling, were excluded as we had no control over the admission temperatures.
An initial audit was done from Jan 2020 until May 2020 (retrospective data collected from BADGER net) to understand the standard practice. Data analysed, revealed no significant impact of the confounding factors (environmental, resuscitation or sepsis). The Normothermia rate was 73%.
The thermoregulation checklist was designed and made mandatory.
Reaudit was done in June 2020 and September 2020 to February 2021.
3 points temperatures: T1 = On resuscitaire in labour ward/theatre.T2 = Transport temperature.T3 = Admission Temperature.
Methods used to maintain normothermia included checking room and incubator temperatures, use of hats, plastic bag etc.

Outcome:
Data showed an improved normothermia rate for direct admissions (73% to 95.4% and 100% for postnatal ward admissions).

Learning Points:
Challenges can be overcome with effective team engagement, teaching, training, performance feedback of staff etc.
National standards can be achieved, and high-quality service can be delivered to the patients with sheer commitment and dedication.

What Next?:
A nurse-led project, where standards achieved, is maintained. A similar vision is to be carried out at Queen Elizabeth Hospital.

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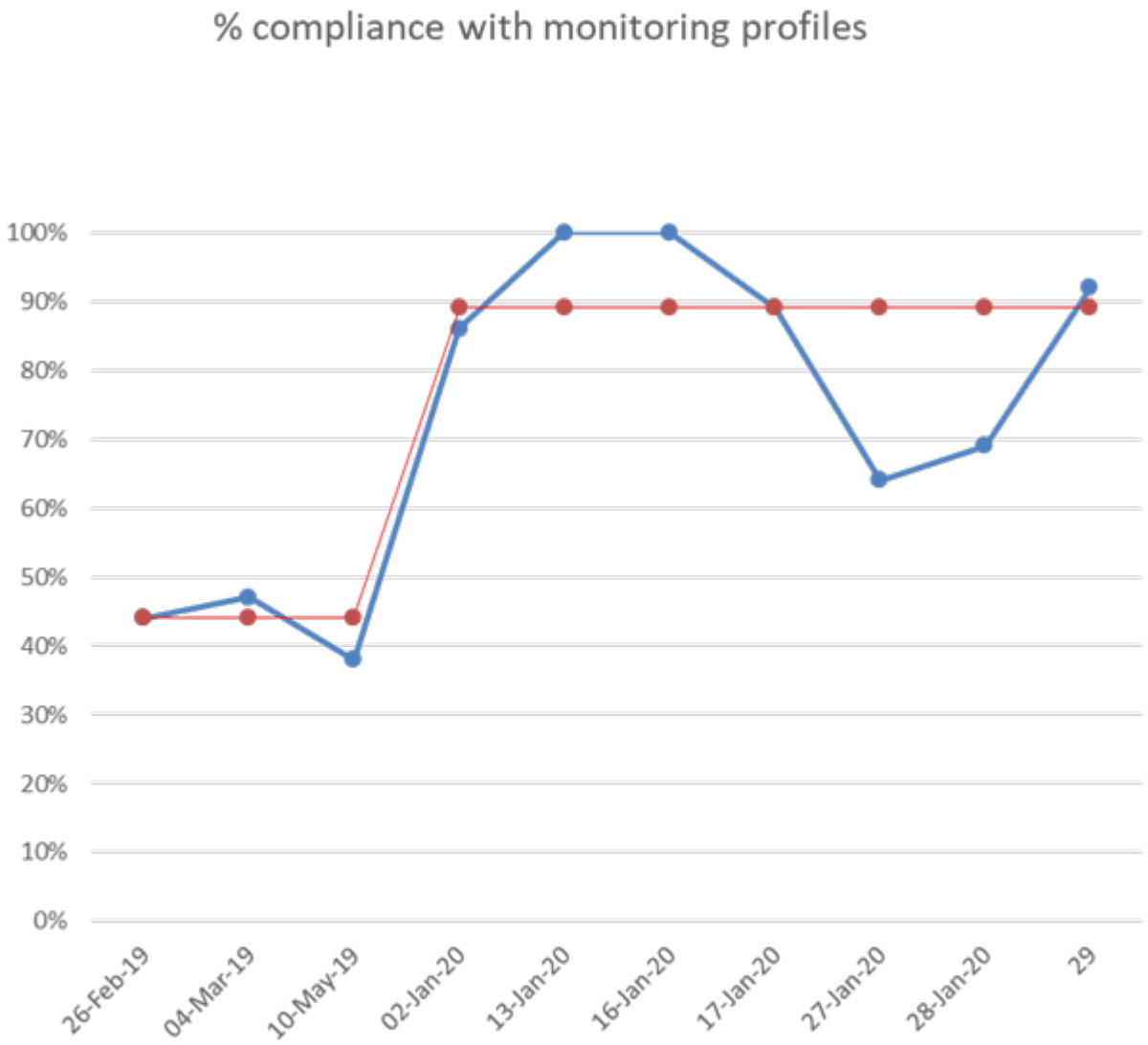
Histogram analysis for bedside respiratory monitoring in preterm neonates- qualitative synthesis and pilot

Sur A[1], Paria A[1], AlMusawi Z, Wood J
[1]*Lancashire Women And Newborn Center*

Background: Despite robust evidence in favour of maintaining optimal oxygen saturation targets (SPO2) in the preterm infants, the titration of oxygen is largely dependent on manual observations and transcription. Similarly, notwithstanding the gaining popularity of non-invasive modalities like high-flow nasal therapy, the practices of weaning and escalating support are largely individualized and based on point of care observations and manual transcription records. These are often erroneous and lack objectivity. Algorithmic decision making from machine learning is an emerging trend. Histogram analysis from patient monitors is an easy and objective way of quantifying vital parameters and their trends. Histograms are a graphical way of visually representing vital measurements like SPO2 and respiratory rate over an extended time period through bar clusters.
Aim: To review the evidence behind use of this technology in preterm infants and implement it as a quality improvement pilot.
Methods: Undertake a PDSA cycle of 1. Qualitative synthesis of available literature on histogram analysis. 2. Baseline audit of compliance with SPO2 limits in unit and rational behind weaning on non-invasive support. 3. Formulate Histogram based protocol (SOP) along with education of staff. 4. Re-audit after pilot phase
Conclusions: We identified no randomized controlled trials on this practice but several quality improvement studies. We found analysis of bedside histogram and decision making algorithm based on it a feasible practice with objectivity and implemented it. We demonstrate significant improvement in compliance with target SPO2 (from 44% in pre-implementation phase to >80% after education and SOP) in the initial implementation phase which was not sustained necessitating a repeat cycle of education and training.


% compliance with monitoring profiles
100%
90%
80%
70%
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26-Feb-19
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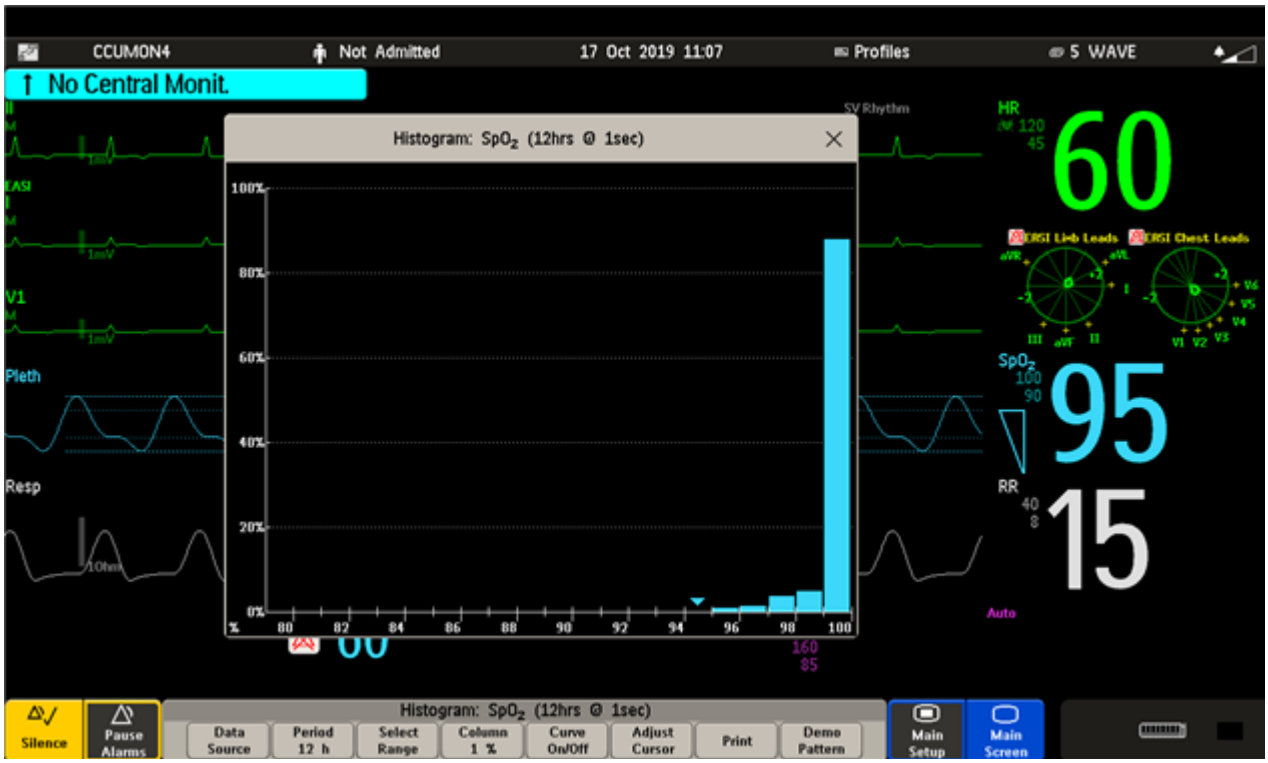
CCUMON4
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Histogram: SpO2 (12hrs @ 1sec)
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ERSI Limb Leads
ERSI Chest Leads
SpO2
100
90
95
RR
40
8
15
Auto
Pleth
Resp
SV Rhythm
Silence
Pause Alarms
Data Source
Period 12 h
Select Range
Column 1 %
Curve On/Off
Adjust Cursor
Print
Demo Pattern
Main Setup
Main Screen

40

Evaluating the Continuity of Care For Long-Term and Complex Neonatal Patients

Harvey S[1], Musson R[1]
[1]*Jessop Wing, Sheffield Teaching Hospitals*

We have observed that long-term and complex neonates are at risk of disrupted continuity of care, difficult admission progression and can be the focus of staff and parental frustration. We conducted a service evaluation by collecting the data for all patients (n=26) admitted for longer than 85 days in a 12-month period (range 87-173 days). We summarised demographics before assessing neonatal, Allied Health Professional (AHP) and speciality input with review and communication entries to objectify the continuity of care.

The delivery gestations ranged from 23+3/40 to 30+3/40 and discharge gestations from 37+0/40 to 48+4/40. 46% of patients were discharged to another unit for ongoing care with an average of 4 significant diagnoses. Patients moved care level 3 times internally (range 0-6) on average with 38% requiring at least one external transfer during admission for specialised care. Neonatal consultant involvement changed on average 56 times with a mean of 6 non-neonatal specialities providing an average 31 (range 6-74) inputs at a rate of 0.63 reviews per day. The AHPs, including dietician, Physiotherapy and Speech and Language provided most continuity with consistent personnel and averaged 27 reviews in an admission excluding weekly MDTs on HDU/SCBU. The total non-neonatal inputs averaged 68 per admission (range 27-105) and 29 different 'communicators', excluding junior doctors and nursing staff.

We found significant neonatal, AHP and speciality input for this cohort with regular personnel change making continuity difficult to maintain. We found that the number of communications independently correlated with number of specialities and significant diagnoses. We also found that number of significant diagnoses correlated more strongly to length of admission than birth gestation, indicating complexity is as important as gestation. Our aim is to use this evaluation to produce a 'Long-Term Admission Care Pathway' to improve progression and continuity for this cohort.

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Parental experiences and staff views of visiting restrictions on a neonatal intensive care unit during COVID-19.

Garfield H[Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge University Hospitals NHS Foundation Trust, Cambridge, Cambridgeshire, UK], Westgate B[Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge University Hospitals NHS Foundation Trust, Cambridge, Cambridgeshire, UK], Chaudhary R[Cambridge University Hospitals NHS Foundation Trust, Cambridge, Cambridgeshire, UK], King M[Cambridge University Hospitals NHS Foundation Trust, Cambridge, Cambridgeshire, UK], O'Curry S[Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge University Hospitals NHS Foundation Trust, Cambridge, Cambridgeshire, UK], Archibald S[Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge University Hospitals NHS Foundation Trust, Cambridge, Cambridgeshire, UK]

Background
The COVID-19 global pandemic posed significant implications for NICU parents and staff in terms of the visiting restrictions that were put in place during the first wave in March 2020. Therefore the NICU clinical psychology team in collaboration with the NICU nursing and medical team at the Rosie Hospital, Cambridge, endeavoured to explore the impact on parents, as well as the NICU staff's experiences of supporting parents throughout the visiting restrictions.

- Methods
A bespoke survey was completed following the first COVID-19 lockdown to gather more information on the impact of change to visiting access on one level 3 NICU. One survey was completed by staff on NICU (N = 56). One survey was completed by parents of babies currently on NICU, or had a baby admitted to NICU whilst COVID-19 restrictions were in place (N =50). One or both parents were offered to take part in the survey. Alongside relevant literature, the questions were developed in the context of initial observations of the impact of visiting access changes on families and staff.

- Results
The findings of this study have illustrated the sheer extent of the restrictions on parental wellbeing and mood, with the restrictions having had an adverse effect on this. In addition, we show the extent of the adverse effect restricted visiting to NICU had on: babies' wellbeing, parent-infant bonding, partners wellbeing, parental confidence, the ability to breastfeed confidently and parents' access to the medical teams (see Table 1 in PDF).

- Conclusion
The findings of this study have a number of significant clinical implications for parents and staff on NICU. Namely, the data supported the decision not to close NICU again when cases of COVID-19 rose dramatically again over the winter of 2020-2021 and into the second and third waves.

42

WOLF IN A SHEEP SKIN - SURFACTANT DEFICIENCY MASQUERADING AS MECONIUM ASPIRATION IN A TERM NEONATE

Bailey E[1], Baldwin C[1], Chandershaker P[1]
[1]*East And North Hertfordshire Foundation Trust*

Surfactant deficiency is an increasingly recognised cause of neonatal respiratory disorders and makes up to 20% of childhood Interstitial lung diseases (ILD). In this case, an infant, who was thought to have respiratory distress due to meconium aspiration, was later found to have surfactant deficiency. Highlighting the importance of awareness and initiating investigations when symptoms continue to persist.

A term infant was admitted to NICU due to increasing oxygen requirement and work of breathing. There was meconium-stained liquor at birth but no other risk factors for sepsis during the pregnancy. CPAP was commenced and initial chest x-ray showed signs of meconium aspiration.

She was successfully weaned to nasal-cannula by 24hours of age. However, oxygen requirement increased over the next 12days. A trial of vapotherm was given but made little difference. She was screened for sepsis and treated with 5days of antibiotics. Blood culture and viral screens, were negative. A day12 chest x-ray showed 'bilateral granular opacification'.

Vapotherm was weaned to nasal-cannula by day41. However due to ongoing oxygen requirment, a chest computed-tomography was arranged; showing evolving 'bronchopulmonary dysplasia'.

Genetic assessment for surfactant deficiency was negative. Therefore, with lack of clinical progress and diagnostic dilemma, a lung biopsy was organised. This showed florid type2 pneumocyte hyperplasia with interstitial thickening and normal vascularity, strongly suggestive of surfactant protein deficiency.

ILDs affect lung tissues and airspaces, resulting in poor gas exchange at capillary-to-alveolar level. They have long been described in adults, but only recently recognised in children.

ILDs are rare compared to other newborn lung pathologies, however they have significant morbidity and mortality, with long term oxygen dependency being common.

This case exemplifies how infants presenting with 'typical' newborn lung pathologies can be misdiagnosed due to overlapping clinical symptoms. Additionally, the importance of thinking outside the box to support early diagnosis and management.


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AVOIDING SEPARATION: IMPROVING RESPIRATORY EVALUATION IN TERM NEONATES

Egharevba O, Eldalal M, Collins B[1], Gbinigie H[1]
[1]*Medway Maritime Hospital*

Background:
There is overwhelming evidence that separation of mother and baby soon after birth disrupts the normal bonding process, adversely impacts maternal mental health and establishment of breastfeeding. These are all important factors that are known to affect (impact) an infant's neurodevelopmental outcome. As respiratory symptoms are a leading cause for term admissions to NICU, we reviewed the effectiveness of a newly devised respiratory pathway in reducing the number of avoidable term admissions on our unit.
Design:
In our MATNEO project we implemented the respiratory pathway to assess its effectiveness in reducing avoidable admissions in babies (≥37 weeks) with respiratory symptoms, who have no risks for infection. This was a retrospective, cross-sectional study pre and post implementation of the respiratory pathway.
Results: 60 babies were admitted to the unit for respiratory symptoms. 32 babies were pre-intervention and 22 post-intervention. We excluded 6 babes who had co-existing morbidities. The majority were early term babies (37-38 weeks). Also, there was a sharp decline in number of admissions after implementation of the respiratory pathway. For babies who required admission, duration of respiratory support significantly impacted on length of hospital admission ($p<0.05$)

Conclusion:
Implementation of the respiratory pathway effectively reduced the number of unnecessary NICU admissions in term infants with respiratory symptoms, which enhanced parent-baby bonding and positively impacted on establishment of breast feeding.

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Neonatal Herpes Simplex Virus Infection: An Unusual Presentation

Webster K[1], Yasmeen A[1]
[1]*NHS Fife*

Introduction: Although rare, neonatal Herpes is potentially devastating and can lead to neuro-disability or death. Infants presenting with localised disease (skin/eye/mouth (SEM)) typically present at around 10-12 days of age, with 80% of these infants displaying a vesicular rash.1 We demonstrate an unusual presentation of SEM Herpes Simplex Virus type 2 (HSV-2) infection at birth.

Background: At his first examination, a term male infant was noted to have purpura/ecchymoses to the soles of his feet (Figures 1), but with no vesicles, blisters or inducible skin fragility. Maternal history disclosed oral cold sores but no genital lesions at any time. Blood and CSF samples, and viral PCR were negative. Skin surface bacteriology/virology confirmed HSV-2 infection, repeat samples were required as the first were taken from the dry scab surface. The baby was treated with Aciclovir, he remained clinically well throughout his admission and at neonatal follow up he is thriving with no recurrent lesions.

Message: Neonatal HSV infection does not always present as vesicles, clinicians should consider de-roofing dry scabbed areas to obtain an adequate sample for analysis. HSV-2 infections pose significant mortality and morbidity but those with symptoms restricted to skin/eyes/mouth have the best prognosis. HSV-2 can be asymptomatic in many women.

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Individualised decision-making: interpretation of risk for extremely preterm infants, a survey of UK neonatal professionals

Wood K[1], Di Stefano L[2], Mactier H[3], Bates S[4], Wilkinson D[1]
[1]John Radcliffe Hospital, [2]Monash University, [3]Princess Royal Maternity, [4]Great Western Hospital

Background: The British Association of Perinatal Medicine (BAPM) published a revised framework for perinatal management of extremely preterm infants (EPIs) in 2019. We aimed to assess UK neonatal professionals' interpretation of elements of this framework, as well as the consistency of their estimates of outcome for EPIs.

Methods: An online survey was distributed to UK neonatal professionals involved in antenatal decision making around the management of EPIs. Participants were presented five cases (table 1). Respondents were asked to assign a risk category and management option using the BAPM framework and to estimate the chance of survival with active resuscitation, and chance of severe disability with survival.

Results: Table 2 shows the respondent's baseline characteristics. For each case respondents were relatively consistent in their interpretation of risk categories. However, management decisions did not always correspond with risk assessment, with less inclination to recommend palliative care, and in almost all scenarios, respondents would follow parental wishes about management (figure 1). Respondents gave very wide estimates of survival or severe disability (5-90%) (figure 2). The estimates of survival were similar between professional groups and types of centres worked in. Consultants provided lower estimates of severe disability and there was no difference in the estimates of severe disability between types of centres.

Conclusion: UK neonatal professionals deferred to parental wishes in the cases presented, indicating an emphasis on shared decision-making and a widening of the 'grey zone' for decision making. However, they did not necessarily use the risk stratification approach for management decisions. Variations in estimates of outcomes raises questions about consistency in counselling and the accuracy of informed decision-making. suggesting support is needed for UK clinicians to incorporate risk factors into individualised counselling. There may be value in validating existing online risk calculators for UK infants, or developing a UK specific risk model.

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Measuring the loudness in a neonatal unit and awareness of the staff about its impact on preterm growth and development

Coimbra P[1], Price D[1], Khipal J[1]
[1]*Buckinghamshire Trust*

Babies shielded by an intrauterine environment, when exposed to higher decibels can have an impact on growth and development, leading to hearing loss and altered behaviors. The awareness of neonatal unit staff is utmost important to bring about the change in preterm neonatal care.

This study investigates the noise present in the Neonatal Unit in Stoke Mandeville Hospital and evaluates the knowledge and perception of staff regarding noise exposure.

The noise was measured using a software called Decibel Meter for a period of twelve hours of the three nurseries in the unit. Questionnaires with multiple choice questions were distributed to evaluate staff awareness and knowledge. All results were analysed using Excel software.

Analysis shows that the mean noise detected in all areas was between 49-56dB, with intensive care and high dependency being the loudest at 54dB during the day and 56dB overnight. Nursing handovers and ward rounds were the loudest periods, with a range of 65 to 70dB. The questionnaires reflect that although staff have some knowledge on noise levels, education regarding the effect of noise on babies can be helpful. On the subject of the permissible loudness, 53.3% of staff answered 55dB, most of them mentioning that they were unsure. Regarding the level of noise at which babies start experiencing pain, 60% answered more than 90dB and 13.3% answered more than 200dB.

We conclude noise is a measure of quality of care in a neonatal unit and guidelines to regulate should be followed to ensure optimal care to growing preterms. Moving forward, our intended actions would be to educate staff and parents, obtain a certified device to monitor noise in the unit, alter environmental factors and use visual aids to help reduce noise in our unit.

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The Impact of COVID-19 on C-reactive protein in Neonates

Bailey E[1], Thompson M[1], Vimalesvaran S[1], Ali S[1]
[1]*Luton and Dunstable*

Background
Limited data exists on the impact of the COVID-19 pandemic on neonates. Vertical transmission of SARS-CoV-2 has been postulated, but evidence remains scarce. However, some studies have shown infants (<1year) are more susceptible and become more critically unwell if infected with SARS-CoV-2.

Aim
The aim of this study was to investigate the inflammatory impact, if any, of SARS-CoV-2 for babies born to mothers with suspected COVID-19.

Method
Single-centre retrospective review of term infants (>37weeks) receiving intravenous antibiotics between March-May 2020 (pandemic, Epoch2) with indication for treatment being "maternal pyrexia". These mothers were also suspected to have COVID-19 during the pandemic, due to pyrexia. We compared a similar cohort of infants screened for "maternal pyrexia" between July-September 2019 (pre-pandemic, Epoch1).

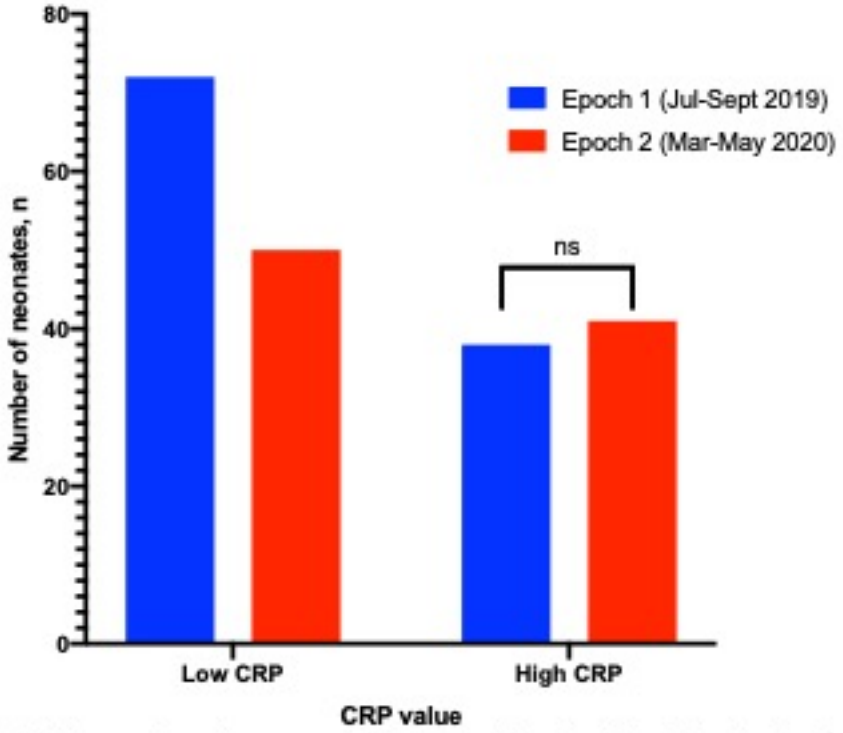
The marker of inflammation used was C-reactive protein (CRP) with values of >10mg/L identified as 'high' as per NICE guidelines. We excluded infants who were clinically unwell or had positive blood cultures as potential confounders.

Results
Epoch 1; 139 infants received antibiotics. 29 were excluded, 38 infants had a high CRP. Epoch 2; 119 infants received antibiotics. 28 were excluded, 41 infants had a high CRP. There was no significant difference in the number of infants with high CRP between the two Epochs (Fisher's exact test, p=0.15).

In Epoch 2, 3 mothers tested positive for COVID-19. CRP in these babies was high (mean 65.2, range 10-100), but not statistically higher compared to the rest of their cohort (Unpaired t-test, p=0.19).

Conclusion
This data shows the number of babies with a high CRP who were screened for maternal sepsis did not vary significantly between the two periods. This suggests that a significant inflammatory response is not seen in newborns whose mothers are suspected of having COVID-19.

CRP Values for neonates in Epoch 1 & Epoch 2



(Excluded neonates who were clinically unwell and positive blood culture)

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Infantile-onset Pompe disease presenting as neonatal cardiomyopathy, a case report.

Forestier-Zhang L[1], Jain S[1]
[1]*Royal Bolton Hospital*

Background
Pompe disease, also known as glycogen storage disease type II, is an autosomal recessive metabolic disorder characterised by deficiency of the lysosomal enzyme acid-alpha-glucosidase (GAA). Enzyme deficiency causes accumulation of lysosomal glycogen in the heart, smooth and skeletal muscles and nerve cells. Pompe disease is classified by the age of onset; infantile-onset (IOPD) - the most severe form, presents before the first year of life. Without treatment IOPD is rapidly progressive and survival beyond a year is rare. Treatment with human recombinant GAA enzyme replacement therapy (ERT) is well established, and can extend life expectancy by years.

Case Presentation
We report a term female infant who presented to the neonatal unit with respiratory distress at birth. Her chest radiograph showed cardiomegaly and an echocardiogram confirmed hypertrophic cardiomyopathy. Parents were non consanguineous, antenatal anomaly scan was normal and mother did not have Diabetes. The infant required oxygen therapy for two weeks, however otherwise was asymptomatic. She did not have hypotonia or macroglossia. Infantile-onset Pompe Disease was diagnosed at two weeks of age when low GAA level was detected as part of work up of hypertrophic cardiomyopathy. She was started on GAA enzyme replacement therapy at four weeks of age.

Conclusion
Although IOPD is rare and not universally screened for in the UK, the diagnostic test and ERT are readily available. Neonatologists should test for IOLD early in infants with hypertrophic cardiomyopathy, as early initiation of ERT improves outcomes.

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Less Invasive Surfactant Administration – Outcomes from a Local Neonatal Unit

Xiang N[1,2], Fukari-Irvine E[1]
[1]London North West University Healthcare NHS Trust, [2]The Hillingdon Hospitals NHS Foundation Trust

Background
Respiratory distress syndrome in premature infants has commonly been treated by surfactant administered through an endotracheal tube following intubation. There has been a trend towards using less invasive surfactant administration (LISA) avoiding the need for intubation (recommended by 2019 European Consensus Guidelines and 2019 Specialist neonatal respiratory care for babies born preterm NICE guideline). LISA is performed by passing a catheter through the vocal cords, administrating surfactant and removing the catheter, with the aim of stabilising the baby on non-invasive ventilation post-procedure.

Aim
To assess the efficacy and safety of LISA at Northwick Park Hospital, a local neonatal unit in London.

Methods
Data was collected on all infants who underwent LISA as per local guidelines between February 2020 and March 2021. A Control group of infants intubated primarily for administration of surfactant between March 2017 and March 2019 prior to introduction of LISA was retrospectively identified.

Results
We compared 27 infants in the LISA group with 29 in the control group. The median gestational age and birth weight in the LISA group were significantly greater than the Control group, other baseline characteristics were comparable.

Following LISA 26% infants had bradycardia, 63% desaturation, 7% required mask ventilation and 4% invasive ventilation.

Duration of invasive ventilation was significantly reduced in LISA vs Control group (Fig 1). Following correction for birth weight and gestational age, the duration of invasive ventilation remained significantly reduced in the LISA group by factor of 1.89 (p=0.01).

Conclusion
LISA was associated with significantly reduced length of invasive ventilation. There were no serious adverse events associated with LISA, and rates of transient adverse reactions were consistent with previous studies. We demonstrated that LISA can be safely used in very and moderately preterm infants on our local neonatal unit.

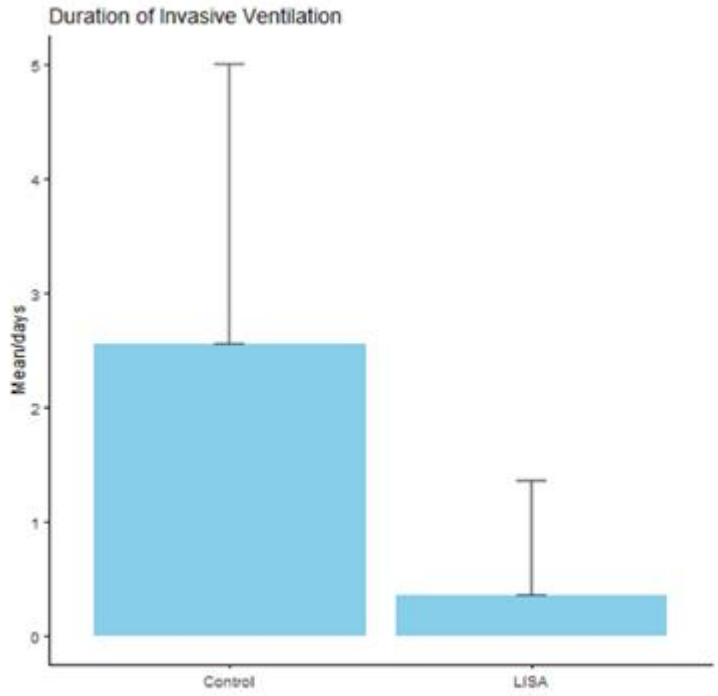

Fig 1. Duration of invasive ventilation was significantly reduced in LISA vs Control group by Welch's T-test [mean 0.4 days (SD 1 day) vs. mean 2.6 days (SD 2.4 days), p<0.001].

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Car-Seat Challenge in infants discharged from NNU

Sriskandarajah K, Obayomi J[1], Nicholl R[1,2]
[1]Neonatal Unit, Northwick Park Hospital, London North West University Trust, [2]Imperial College London, Department of Medicine

Aim: Safe transportation in a car-seat of preterm and low birth weight infants following discharge from hospital has been a cause for concern for some years [1]. With the car being the most common method of conveyance home and improvement in survival rates with earlier discharge of premature and low birth weight infants, we have seen a substantial increase in the number of smaller babies being transported in car-seats. Physiological monitoring studies have indicated that some preterm infants experience episodes of oxygen desaturations, apnoea, or bradycardia when seated in standard, poorly fitting car-seats.

Method: A simple infant car-seat challenge (ICSC) can be conducted prior to discharge to evaluate safety and avoid adverse outcomes from improper use. The ICSC assesses the infant's observations for 90 minutes, particularly looking for apnoea (cessation in breathing), bradycardias or desaturations, while placed in their car-seat in the controlled hospital environment. For the purposes of this QIP the ICSC was classified as "failed" if there were any profound bradycardias (<100 bpm), apnoeas or persistent desaturations <93% during the assessment.

Demographics: We conducted a prospective quality improvement project on the use of the car-seat safety challenge in 41 preterm (<35 weeks) and/or low birthweight (<2.5kg) infants who were medically fit for discharge from our level 2 neonatal unit at Northwick Park Hospital in North West London.

Results: Of these 41 babies, we report on three cases (7.3%) of failed car-seat challenge. In particular we identified one case of significant bradycardia and apnoea, which was a near miss and could have led to a fatal outcome.

Case 1

36+6 GA
2310 g

1st ICSC
Reason for failure:
Sats of 90% at 90 mins

O_2 **90%**

2nd ICSC - Simple head adjustment in car seat to pass

Case 2

35+2 GA
2035 g

1st ICSC
Reason for failure:
Sats of 88% at 90 mins

O_2 **88%**

2nd ICSC - Parents wanted to purchase a new car seat regardless to pass

Case 3

36+1 GA
2170 g

1st ICSC
Reason for failure:
Sats of 76% at 30 mins

O_2 **76%**

Bradycardia of 86 bpm

2nd ICSC - The child was simply adjusted in the seat to pass

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Intra-thoracic lesions mimicking congenital diaphragmatic hernia- a case series

Colthorpe A, Emmerson A[1,2], Kamupira S[1,2], Lansdale N[1,3], Tanney K[1,2]
[1]The Manchester Centre for Neonatal Surgery, Manchester University NHS Foundation Trust, [2]Newborn Intensive Care Unit, Saint Marys Hospital, [3]Paediatric and Neonatal Surgery, Royal Manchester Children's Hospital

Introduction
Congenital diaphragmatic hernia (CDH) is a complex pathology requiring careful medical and surgical management. We present three cases of suspected CDH in a tertiary surgical NICU. Further evaluation and imaging excluded CDH and made alternative diagnoses, highlighting the potential diagnostic uncertainty of plain radiography.

Infant A was born at 36 weeks' gestation with antenatally-diagnosed CDH and complex congenital cardiac defect. She was intubated and ventilated immediately after birth. Initial chest x-ray was atypical for Bochdalek-type CDH and central Morgagni defect was suspected. A barium contrast study was performed which instead confirmed congenital hiatus hernia and malpositioned duodenum.

Infant B was born at 35 weeks' gestation and developed respiratory distress requiring CPAP. Initial chest x-ray suggested CDH and he was transferred to the surgical NICU. CT thorax with contrast demonstrated pulmonary interstitial emphysema (PIE) secondary to surfactant deficient lung disease, with a large locule of air posterior to the heart.

Infant C was born at 32+0 weeks and required CPAP support. Bilious gastric aspirates were noted on day 4 and x-ray was suspicious of CDH, with a lucency across the diaphragm. She was further investigated with CT thorax and instead found to have posterior pneumomediastinum.

Conclusions:
These cases illustrate that antenatal findings and initial postnatal plain radiography can be misleading when considering the diagnosis of CDH. A common feature here was the central location of the lucent area (gas) around the diaphragm: this led to further imaging in each case and allowed the correct diagnosis to be made.

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Neonatal nursing during the COVID-19 global pandemic: A thematic analysis of personal reflections

Gallagher K[1], Shaw C[1,2], Petty J[3], Mancini A[4,5], Boyle B[2]
[1]University College London, [2]Queens University Belfast, [3]University of Hertfordshire, [4]Chelsea & Westminster NHS Foundation Trust, [5]The True Colours Trust

Background: The COVID-19 pandemic has resulted in significant changes and restrictions to neonatal care. A growing body of research has examined the experiences of nurses caring for COVID-19 patients in adult intensive care (Fernandez et al., 2020; Jia et al., 2020; Liu et al., 2020); however, the impact on nurses working in the neonatal environment where both babies and parents are cared for re-mains unknown.
Aim: The aim of this study was to explore the global experiences of neonatal nurses during the first phase of the COVID-19 pandemic and identify strategies used to address challenges they continue to face.
Methods: We conducted a thematic analysis on written reflections by neonatal nurses worldwide, exploring their experiences of COVID-19. A total of 24 neonatal nurses working in a variety of clinical, educational and research roles took part in the study from 11 countries, including: England, Ireland, Northern Ireland, Sweden, Spain, Portugal, Malta, Australia, New Zealand, Brazil and the USA.
Results: Thematic analysis revealed 4 main themes relating to the nurses' role: 1) protector 2) challenges to human quality of care 3) vulnerability and 4) resilience. The measures taken as protector were described as compromising the human qualities of care fundamental to their role. This tension, together with other new challenges, heightened feelings of vulnerability. Concurrently, nurses identified role resilience, including resourcefulness and peer support, which allowed them to navigate the global pandemic.
Conclusion: By identifying global challenges and strategies to overcome these, neonatal nurses may be better equipped as the pandemic continues. The reflections underscore the importance of family integrated care and the tension created when it is compromised.

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Below the threshold of “viability”- 10-year experience in the UAE

Ofoegbu B, Abdelshafy A[1], Simmons P[1]
[1]*Corniche Hospital*

Corniche Hospital, in Abu Dhabi, is the largest and most advanced perinatal center in the United Arab Emirate (UAE), providing care in line with international standards within its 64-cot NICU, serving a mainly Muslim population.

The updated British Association of perinatal Medicine (BAPM) framework for management for extreme preterm birth [1] is both timely and thought provoking. There is no doubt that outcomes have improved for babies born at early gestations in recent years[2]. However, initiating intensive care below the current definition of viability needs addition thought in some environments.

We share our experience from a large center in the Middle East on this aspect. We hope this information may feed into the development of similar frameworks guided by cultural, religious and legal aspects applicable to the Middle East.

Over a nearly 10-year period, just over 67,000 live births occurred at our center of which 118 babies were born between 22+0- and 22+6-week gestation; 20 babies were admitted to the NICU . There were four survivors with neuro-disability.

UAE Federal laws[3] on “Do not Resuscitate (DNR)” and “Allow natural death (AND)” which allow non-escalation of care are slowly becoming more embedded in clinical practice in Abu Dhabi, allowing for the important development of organ transplant programs.

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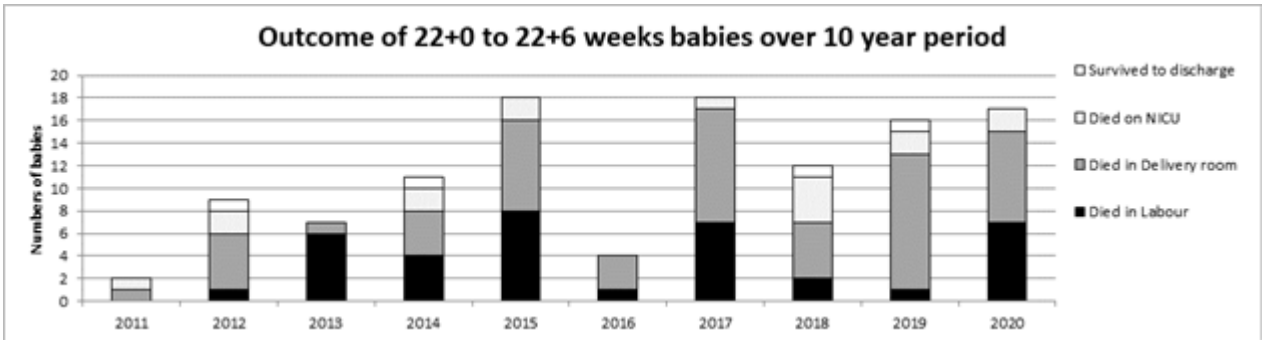
Outcome of 22+0 to 22+6 weeks babies over 10 year period
Numbers of babies
0
2
4
6
8
10
12
14
16
18
20
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Survived to discharge
Died on NICU
Died in Delivery room
Died in Labour

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Are foetal heart scans performed when indicated? A District General Hospital Perspective

Lim Z[1,2], Adeoye G[1], Allen R[1], Wilson N[1]
[1]Barts Health Nhs Trust, [2]University College London

Background:
Cardiac malformations are responsible for a high proportion of infant morbidity and mortality. Overall incidence of congenital heart disease (CHD) is about 6-12 per 1000 live births. Timely foetal echocardiography (FE) allows proper counselling of families, appropriate in utero interventions, as well as adequate delivery planning if any abnormalities are detected.

Aim:
To elucidate if the local maternity unit met the recommendations set by the British Cardiovascular Society, the Association of European Paediatric Cardiology and American Heart Association.

Methods:
Data was collected retrospectively from September 2020 to March 2021 on all babies born with positive cardiac risk factors on National Newborn and Infant Physical Examination (NIPE) screening programme. Further clinical information were obtained through maternal and neonatal electronic records.

Results:
A total of 67 neonates had positive cardiac risk factors on NIPE. 49% (33/67) were White and 51% (34/67) were from a Black, Asian or Minority Ethnic (BAME) background. 25% (17/67), 34% (23/67), and 18% (12/67) had maternal, familial and foetal risk factors correspondingly.

45% (23/51) of neonates with indications for FE had it performed. 83% (19/23) of FEs were performed at 18-22 weeks of gestation. 92% (11/12) of neonates with foetal risk factors had follow up FEs ($p<0.001$). However, less FEs were performed for neonates with maternal or familial history of CHD; 47% (8/17; $p=0.344$) and 22% (5/23; $p=0.041$) respectively.

Conclusion
Majority of FEs were performed within the recommended gestation period. Neonates with antenatally abnormal anomaly scans were reliably referred for FEs, but neonates with familial cardiac risk factors were underrepresented. Awareness should be raised on screening pregnant women appropriately to ascertain those who need additional scans. There was no significant discrepancy in uptake of FEs between different ethnic groups, reflecting the engagement by the trust with families who may face challenges with cultural and language barriers.

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Empowering our team using psychological safety

Edwards G[1], Langasco N[2], Findlay C[3], Welsh J[3], Coy S[3]
[1]Royal Hospital For Children, Glasgow, [2]Croydon Health Services NHS Trust, [3]University Hospital Crosshouse

Background

Psychological safety is a shared belief in the safety of team members to voice concerns. Communication within neonatal and paediatric teams is perceived to be more open than other specialities.(1) However, reflection on personal challenges in raising concerns and an interest in staff wellbeing motivated us to consider psychological safety within our team.

Aim

To promote the ethos of psychological safety in a district general hospital and empower staff to feel able to raise concerns.

Methods

All paediatric and neonatal staff were emailed an anonymous survey examining individual experiences of psychological safety and areas for improvement. Changes were then implemented and a follow-up survey six months later evaluated the effect on practice.

Results

- Fifty-six responses from all tiers of medical and nursing staff, of whom;
- 63% reported difficulties in raising concerns
- 59% felt concerns raised had not been listened to
- Frequent themes in the rationale for not speaking up were: fear of looking confrontational or questioning a senior, not knowing the right words to use, lack of familiarity with team members and fear of exposing a gap in knowledge

We used staff responses to create an “Are you happy to speak up?” poster with suggested phrases to use and we created a ‘post ward round debrief’ toolkit.
27 staff responded to the re-survey. Of those who had previously reported difficulty raising concerns, 56% found it easier, whilst 82% found the post ward round toolkit useful. Free text comments were positive (Image 1).

Conclusions

This project has facilitated multidisciplinary discussion on the ability to raise concerns. A framework for team communication has been embraced and has improved staff confidence in speaking up.

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Use of Asynchronous video to support Neonatal Follow-Up Services in Scotland

Cruickshank H[1], Offer S[2]
[1]NHS Lothian, [2]NHS Highland

Neonatal follow up services provide ongoing specialist assessment and support to families of babies born prematurely or with other medical complications that place them at increased risk of adverse developmental outcomes. Prechtl's General Movement Assessment (GMA) forms a core component of the clinical pathway and typically involves capturing a two minute video recording of an infant's unstimulated movement in supine as part of the first clinic appointment. The video is reviewed by a clinician with specialist training to look for a subtle feature described as "fidgety movements". This time-sensitive assessment performed at 10-16 weeks post-term age provides reassurance about normal development and assists in the early detection of emerging neurological disorders such as Cerebral Palsy (CP).

Aim:

To co-develop, trial and evaluate an asynchronous video system (AVS) for use in Neonatal Follow-Up services locally and across Scotland.

Across the duration of the project, 28 clinicians and 106 families were registered with the AVS service and a total of 121 videos uploaded across six health boards.

Use of AVS effectively facilitated maintenance of the GMA as a standard component of the clinical pathway without the need for a face-to-face review.

Use of AVS presented additional benefits to the service not foreseen at the outset:

- Completion of the GMA in advance of the clinic appointment provided a focus for further assessment and discussion during clinic.

- Assisted in triaging the need for a face-to-face review.

- Provides a safety net in the event of technical failure during a virtual appointment by facilitating retrieval of video data after the clinic appointment to support the assessment.

- Enhanced the clinician's ability to respond to concerns raised by parents between scheduled appointments.

- Facilitated a secure method of seeking a second opinion from another centre

- Provides a valuable resource for use in teaching

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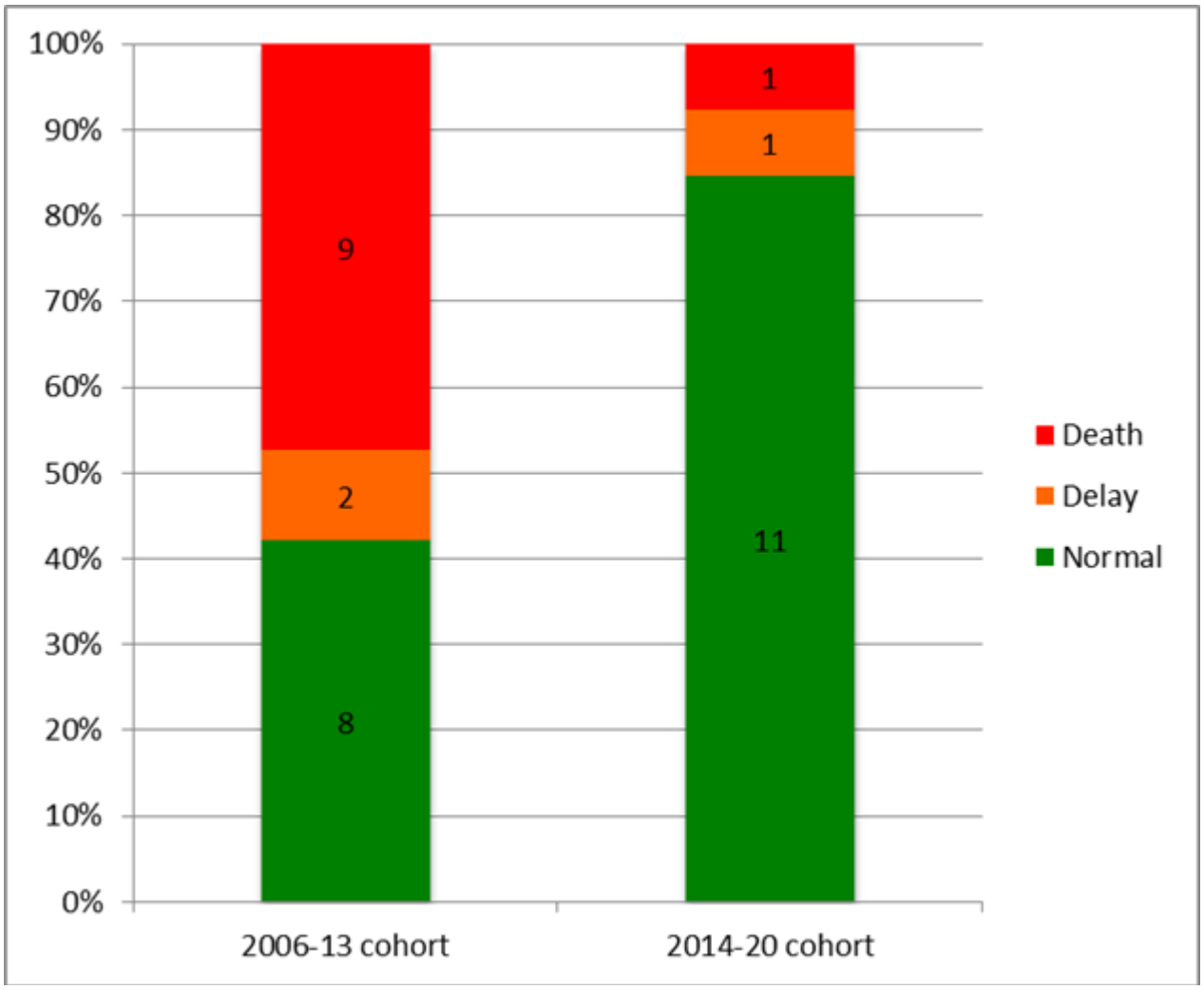
Neonatal Herpes: 14-year cohort study showing improved outcomes post-guideline introduction from a single centre in the UK

McAllister S, Rangamuthaiah D[1], Davies P[1], Smith C[1], Batra D[1]
[1]*Nottingham University Hospitals Nhs Trust*

Background:
Herpes simplex infection in neonates is uncommon, but can have devastating outcomes for otherwise healthy babies. A specific guideline for managing infants at risk of, or with suspected HSV was launched in 2014, and we have compared the incidence and outcomes for these two cohorts: pre- and post-guideline introduction.
Methods:
We retrospectively reviewed the case notes of all herpes-infected neonates presenting within the first 28 days of life to Nottingham University Hospitals from 2006-2020; identified from laboratory and admission databases. Chi-squared test was used to establish significance ($p < 0.05$).
Results:
Thirty two cases of neonatal herpes infection were identified between 2006 and 2020. Five of these cases were transferred from other hospitals for tertiary care; we analysed the remaining 27 from the local population. Dividing the cohorts (2006-2013 – "pre-guideline", and 2014-20 – "post-guideline"), incidence was similar: 18.7 vs 20.1 per 100,000 live births respectively; p 0.844. However, the incidence of death was significantly lower in the later cohort (47.3% vs 7.7%; p 0.017), and a greater proportion of the post-guideline cohort had a "normal" outcome (fig.1).
Conclusions:
The incidence of neonatal herpes in our single-centre tertiary service remains high, 19.3 per 100,000 live births, but mortality has fallen significantly. We believe the specific neonatal HSV guideline has raised awareness of herpes, and consequent early treatment has led to a fall in mortality and improvement in outcomes. HSV infection should be considered when babies present with suspected sepsis in the neonatal period, and we strongly recommend a robust and specific guideline to aid clinicians.


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
9
2
8
1
1
11
2006-13 cohort
2014-20 cohort
Death
Delay
Normal

63

Knowledge continues to grow with remote teaching.

Foulerton E, Foulerton E, Clarke S[1], Parnell K[1], Singh A[1]
[1]*West Midlands Neonatal ODN / Birmingham Women's and Children's NHS Foundation Trust*

Knowledge continues to grow with remote teaching.

Background: The Allied Health Professional (AHP) team in the West Midlands Operational Delivery Network (WMNODN) have always delivered staff education, aiming to reduce variability in practice. There was an urgent need to change delivery methods following COVID19 restrictions.
Aims:

- Maintain high-quality teaching
- Develop specific learning objectives
- Improve accessibility and equity
- Measure attendance and knowledge scores to inform change

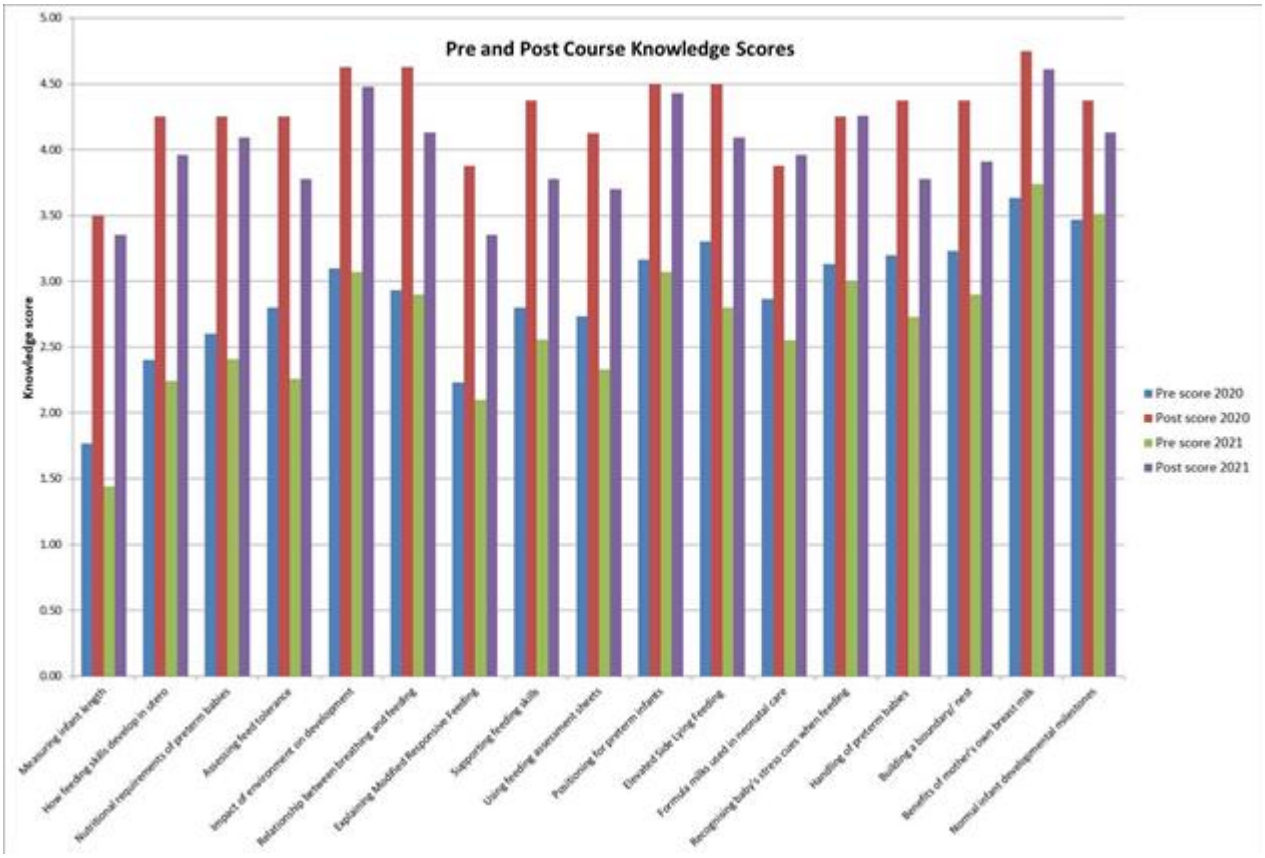
Methods:

- Core learning objectives were devised suitable for remote delivery
- Therapies in Action Foundation Course (TiAF) was developed, which comprised 9 one-hour live sessions delivered weekly (including 2 tutorials)
- Recordings were made available online
- PDSA cycles were used to assess changed practice
- Knowledge scores for both cycle 1 and cycle 2 were collated

TiAF live attendance was recorded. Software analytics were used to record the number of views of session recordings. A questionnaire was devised for pre and post course self-assessment of knowledge. A qualitative feedback survey addressed content, delivery and learning.

Data/Results:
Engagement: Increased from 7 contacts per month (average) in 2019 compared to 97 and 99 contacts per month (average) in 2020/early 2021 respectively.
Knowledge: Average percentage increase in knowledge scores was 27.7% and 26.1% in 2020/21 respectively. 75% (2020) and 74 % (2021) of responders said they would change their practice based on their learning.
The free text comments around knowledge were overwhelmingly positive but the registration process was reported as challenging.

Discussion:
We have demonstrated that delivering standardised learning objectives remotely is feasible, meets participants learning needs and has increased the uptake considerably. The registration process was refined. The challenges moving forward may be sustaining interest and avoiding remote learning fatigue. Future iterations are likely to include a combination of remote and face to face opportunities.

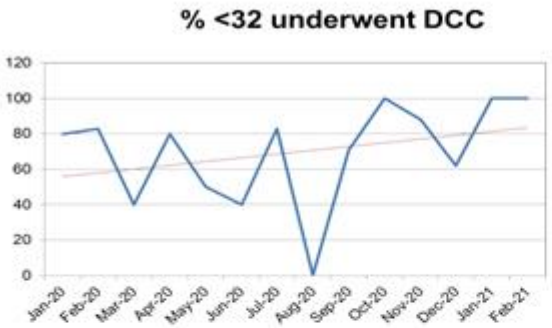

Pre and Post Course Knowledge Scores
Knowledge score
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Measuring infant length
How feeding skills develop in utero
Nutritional requirements of preterm babies
Assessing feed tolerance
Impact of environment on development
Relationship between breathing and feeding
Explaining Modified Responsive Feeding
Supporting feeding skills
Using feeding assessment sheets
Positioning for preterm infants
Elevated Side Lying Feeding
Formula milks used in neonatal care
Recognising baby's stress cues when feeding
Handling of preterm babies
Building a boundary/ nest
Benefits of mother's own breast milk
Normal infant developmental milestones
Pre score 2020
Post score 2020
Pre score 2021
Post score 2021

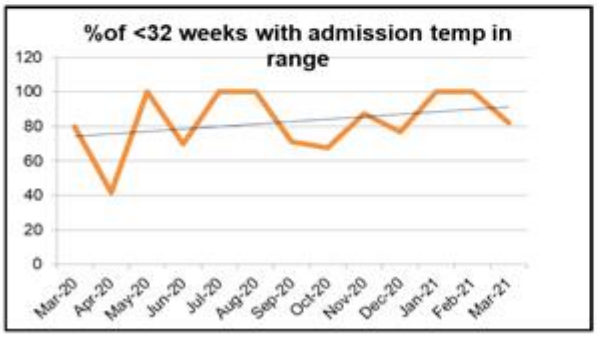
64

Developing a preterm stabilization bundle- facilitating the "soft landing"

Sur A[1], Paria A[1], Shihab J[1], Cox A[1], Bend S[1], Sivashankar S[1], Douglas C[1]
[1]*Lancashire Women And Newborn Center*

Background- The neonatal unit at Lancashire Women and Newborn Centre aimed to develop a comprehensive delivery room(DR) bundle to optimize preterm stabilization in 2019. The 3 key elements for this bundle were: 1. optimal cord management (OCM) with delaying the clamping (DCC) for 1 minute using the Lifestart resuscitaire, 2. Provision of PEEP delivered to all infants for transition immediately after birth, 3. optimize thermoregulation.
Methods: This was registered as a quality improvement project which links into the key drivers of MatNeo initiative. We used standard toolkits like a driver diagram to outline the key drivers, a fishbone for gap analysis and process mapping for every step. 2 PDSA cycles were undertaken. Champions were selected from key stakeholders for each key driver and dissemination of education was done through repeated cycle of lectures and multi-disciplinary simulation sessions.
Results: At the interim analysis after 1 year :
1. OCM- % infants < 28 weeks who had DCC for 1 min = 72.4%, % infants <32 weeks who had DCC= 40%.
2. PEEP= 100% born between 23-32 weeks received PEEP at delivery. %infants born <28 weeks intubated in DR reduced from 100% (previous unit policy- 55%)
3. % infants <32 weeks with admission temperature within range = 66%
Certain changes were implemented based on analysis and identification of possible gaps including pre-made cord management packs and more focused simulation.
Re-audit 2020-
1. OCM- median successful DCC for <32 weeks= 80%
2. PEEP delivery =100% but DR intubations had increased for < 28 weeks to >70%
3. Median % of infants <32 weeks with temperature within range >75%
Conclusions: Optimal preterm stabilization is a multi-pronged approach and care bundles facilitate this process better than individual measures and the process of physiological transition is a continuum.


% <32 underwent DCC
120
100
80
60
40
20
0
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Jan-21
Feb-21


%of <32 weeks with admission temp in range
120
100
80
60
40
20
0
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Jan-21
Feb-21
Mar-21

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Transport incubator teaching on a tertiary neonatal unit – a quality improvement project

Bednarczuk N[1], Williams E[2], Arratu-Thodika F[1], Nanjundappa M[1], Bhat R[1], Greenough A[2]
[1]Neonatal Intensive Care Unit, King's College Hospital NHS Foundation Trust, [2]Department of Women and Children's Health, Faculty of Life Sciences and Medicine, King's College London

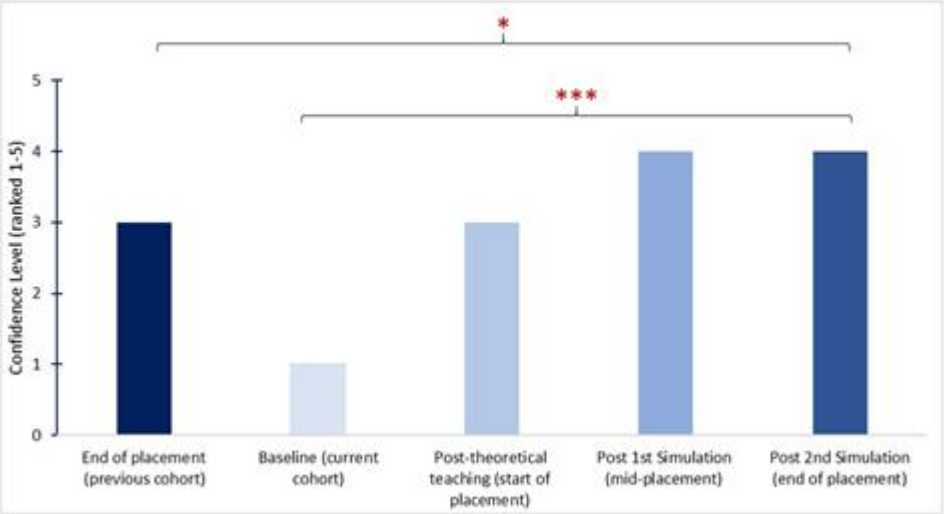
Introduction:
Neonatal transport incubators are key components of routine clinical care, facilitating neonatal transport including intra-hospital transfers to the radiology department or operating theatre. Despite daily use in neonatal clinical practice, trainees rarely receive formal training on how to operate neonatal transport incubators.

Methods:
A quality improvement project to incorporate neonatal transport incubator training into the teaching curriculum delivered to trainees was conducted at a London teaching hospital from February to July 2021. Neonatal trainees of any grade were invited to participate. Outgoing trainees, who did not receive formal transport incubator training as part of the rotation, were asked to anonymously rate their level of confidence in using this equipment. Following this, baseline confidence at the start of the new rotation for incoming trainees was assessed. Three plan-do-study-act (PDSA) cycles of multi-modality teaching were then delivered, including theoretical and simulation training, covering the set-up and operation of neonatal transport incubators. After each cycle, trainees were asked to rank their level of confidence (1=no confidence, 5=extremely confident).

Results:
Three quarters of incoming trainees (73.3%) had no prior transport incubator training. Theoretical teaching significantly improved confidence levels (median (range): 3[2-4]) compared to baseline confidence levels [1 (1-3); p=0.01)]. Confidence levels further improved from baseline by incorporating transport incubators into sequential simulation sessions [4 (3-5); p<0.001] (Figure 1). Both theoretical and simulation sessions were clinically useful to trainees (theoretical: 5[4-5]; simulation: 5[4-5]; p=0.151). Formal teaching resulted in higher end-of-placement confidence levels in this cohort of trainees [4 (3-5)] compared to the preceding cohort [3 (1-4); p=0.027].

Conclusions:
Sequential multi-modality teaching with repeated PDSA cycles improved trainees' confidence level in their ability to utilise neonatal transport incubators. Transport incubator training should form a regular component of the teaching curriculum delivered within a tertiary neonatal unit.

Figure 1: Comparison of confidence levels from previous cohort to progress made by current cohort (*=p<0.05; ***p<0.001)



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The impact of COVID-19 on smoking cessation in pregnancy

Bednarczuk N[1], Williams E[3], Absalom G[2], Olaitan-Salami J[2], Greenough A[3]
[1]King's College Hospital NHS Foundation Trust, [2]Lambeth Stop Smoking Service, Guy's and St Thomas' NHS Foundation Trust, [3]Department of Women and Children's Health, Faculty of Life Sciences and Medicine, King's College London

Background:
Greater numbers of non-pregnant smokers attempted to stop smoking during the COVID-19 pandemic. The full impact of the COVID-19 pandemic, however, on women who to continue to smoke in pregnancy and on their demand for antenatal smoking cessation services is unknown.

Aims:
To evaluate the use of community antenatal smoking cessation services and nicotine replacement therapies (NRT) in a cohort of pregnant women before and during COVID.

Methods:
Anonymised data from pregnant women attending the Lambeth and Southwark community specialist smoking cessation service from the 1st of April 2019 to March 31st, 2021, were reviewed. Trends in pre-COVID smoking cessation rates and strategies from 2019-2020 were compared with those observed during the COVID-19 pandemic.

Results:
A total of 252 pregnant women who smoked were referred to their local antenatal smoking cessation service, of which 90 (35.7%) (median age: 31 years [19-52 years]) chose to attend smoking cessation clinics. The COVID-19 pandemic was not associated with an increase in the number of women attending smoking cessation clinics (2019–2020 n=44 [30.9%] of 142 referred pregnant women, 2020–2021 n=46 [40.8%] of 110; p=0.061). Eighty-two women (91.1%) across both years utilised NRT to help them stop smoking and the frequency of NRT use did not change during the pandemic (2019-2020 n=39, 2020-2021 n=43; p=0.420). No significant differences in smoking cessation rates were observed at either four-week (2019-2020 75%[n=33]; 2020-2021 70%[n=32]; p=0.285) or twelve-week follow-up (2019-2020 43.2%[n=19]; 2020-2021 39.1%[n=18]; p=0.829). There was also no significant change in the number of women trying to stop smoking before 20 weeks of gestation during the pandemic (2019-2020 median stop date into pregnancy 18.14 weeks [2.57-39.14 weeks]; 2020-2021 17.71 weeks [6.14-33.85 weeks], p=0.235).

Conclusion:
Demand for antenatal smoking cessation services and frequency of NRT use remained unchanged during the COVID-19 pandemic in this cohort of pregnant women.

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Is Levetiracetam superior to Phenobarbitone or Phenytoin at treating Neonatal Seizures? A Systematic Review

Lim S[1]
[1]*NHS Tayside*

Introduction
Phenobarbitone and phenytoin are still used as first line treatment in neonatal seizures despite only being about 60% effective. There is increasing concern about the long-term side effects of both these drugs. Levetiracetam as it is thought to have a more favourable pharmokinetic and safety profile. This systematic review aims to evaluate the efficacy and safety of Levetiracetam compared to Phenobarbitone and Phenytoin in the management of neonatal seizures.

Method
A search of the MEDLINE database and Cochrane Central Register for Clinical Trials was conducted. Studies with any form of randomisation were included if they measured the efficacy or safety of levetiracetam compared to Phenobarbitone or Phenytoin. Studies had to be performed in the human neonate less than 28 days old if born at term, or at a corrected gestational age of 48 weeks or less if born prematurely. The primary outcome studied was seizure cessation. Secondary outcomes include rate of adverse events and long-term neurodevelopmental outcomes.

Results
5 randomised controlled trials (RCTs) were included. 4 RCTs looked at the primary outcome. There were significant heterogeneity between the trials. Meta analysis using the the Mantel-Haenszel statistical method showed that phenobarbitone was more effective at achieving seizure cessation compared to levetiracetam. However, there were more adverse effects in the phenobarbitone treatment group. 2 RCTs measured neurodevelopmental outcomes but the data was inconclusive.

Conclusion
Levetiracetam may not be as effective as phenobarbitone in treating neonatal seizures when used as first line treatment. However, it appears to have fewer side effects and a better safety profile in the short term.

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Working With Young Parents to Understand their Experiences of Neonatal Care

Richmond L[1], Anderson J[Bliss, national charity for the newborn]
[1]*Bliss*

Bliss is the leading UK charity for the 100,000 babies born needing neonatal care every year. We champion their right to receive the best care by supporting families, campaigning for change and supporting professionals, and enabling life-changing research.

Babies born to young parents are statistically at much higher risk of prematurity and neonatal death. Young parents who are in the difficult and distressing position of having a baby in neonatal care are also often facing a variety of other challenges: their own health, education and economic outcomes remain disproportionately poor, which affect the life chances for them and their babies. Bliss' young parents' research project was designed to increase understanding of the unique experiences of young parents when their baby is born premature or sick.

The project was co-designed with young parents who responded to a call-out on social media. It consisted of three components: an involvement group of four young parents who contributed to the project on a monthly basis, twelve semi-structured telephone interviews, and a survey, which received 246 responses. Our focus was primarily on babies born to parents younger than 25 years within the last 5 years and in the UK, in order to ensure that the information gathered was as relevant and as up-to-date as possible. Qualitative data was analysed thematically alongside the quantitative survey results.

Key themes to be presented in this paper are:

* An Intergenerational Approach
* Young Parents in Education
* Young Parents' Work and Finances
* Judgement and Discrimination
* Preparing Young Parents for a Neonatal Admission
* Young Parents' Involvement in Babies' Care
* Working with Maternity Services
* Young Parents' Information and Support
* Post-Traumatic Growth

These will inform the development of a tailored support offer and Bliss' parent information and campaigning work.


Research
to support
young
parents

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Improving bereavement support to families on a tertiary neonatal unit

Hurley A, White K[1], Barker L[1], Johnson K[1]
[1]*Leeds Neonatal unit, Leeds Teaching Hospitals Trust*

Background: Leeds teaching hospitals trust (LTHT) neonatal unit is a large tertiary neonatal unit with onsite cardiology, neurosurgery and paediatric surgery. We found low rates of parents returning for bereavement debriefs, with some families reporting difficulty in accessing this support. Previous work by Bliss and Sands highlights the lack of specialist bereavement specialist staffing. Since May 2021, there is a full time bereavement nurse specialist working at LTHT.

Aim:Does having a dedicated bereavement nurse improve bereaved parental support and return to followup.

Method:Using badger.net database and Patient electronic records (PPM) review all deaths on the neonatal unit at Leeds Teaching Hospitals Trust in 3 separate periods of January 2021-July 2021, July 2020- December 2020 and July 2019- December 2019. The first group is when the bereavement nurse started working. The latter 2 groups are a 6month period with one pre COVID-19 pandemic and one during the pandemic. This was to see if the reason for low parental return is attributable to the pandemic. Primary outcome was how many parents return for a neonatal team debrief. Secondary outcome was any common themes for those parents who choose not to attend.

Results:Across the 3 comparison groups 30-38% of families were from the local area. In comparison between pre intervention groups we found 7-13% had phone call support and 20-26% attended a neonatal debrief. In post intervention group, 100% of families had a least 2 phone calls from bereavement nurse. 44% of families attended a debrief. The phone calls provided families the opportunity to request hospice support if initially declined. Empowers families to share concerns about care afterwards.

Families were more likely to attend if English speaking (94%) and if there were ongoing investigations (30%).

Conclusion:We have found having a dedicated bereavement nurse, we have improved our parental support and debrief return rate.

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Standardising PDA management in Tertiary NICU: Validation of clinical & echocardiographic scores in PDA treatment

Rajaraman N[1], Madawala Gamage A[1], Gowda H[1]
[1]*University Hospitals Birmingham*

Background:

Patent ductus arteriosus (PDA) is the most common cardiac condition in premature neonates. Decision to treat remains a highly debated topic, resulting in variations in practice. Delays in initiation of treatment result in failure of duct closure, increasing PDA related morbidity and mortality.

Aim:

To validate the clinical and echocardiographic scores for medical treatment of PDA.

Methods:

Retrospective data collection from April 2017 to December 2020 (45 months) of premature neonates born between gestation 22+0 to 27+6 weeks, weighing =/<1000g, with proven PDA on ECHO in first two weeks of life.

Each preterm infant was given a score using the scoring system shown on Table 1. Echocardiography, pulmonary hypercirculation and systemic hypoperfusion were taken into consideration. Two groups (treated vs. not treated) were identified, and compared using 9 criteria (Table 1), to determine the extent to which decision to treat was influenced. Scores between the two groups were then compared.

Results:

Gestational age ranged from 22+4 to 27+6 weeks (Mean & Median: 25+3 weeks). Birth weight ranged from 420g to 1000g (Mean:737g, Median:745g), with an equal number of male and female infants (Male:40, Female:40).

On average, echocardiograms were done on day 6 of life. 30/80 (37.5%) infants were not treated for PDA while 50/80 (62.5%) had decision made to treat, and on average, were treated on day 8 of life. In two infants, treatment was withheld due to thrombocytopenia.

The mean score in the treatment group was 5.4 (Range: 3-8) while in the non-treated group was 4.2 (Range: 2-6). A one-tailed t-test gave a p-value of 0.0001.

Conclusions:

We have demonstrated that babies who had treatment for PDA had a statistically significant higher score than the non-treated group. Using an objective standardised scoring system within first week of life, can guide clinicians in PDA management in extremely premature neonates.

Criteria	Score given if criteria present
Invasive ventilation	1
FiO2 requirement >30%	1
Hypotension requiring treatment	1
Pulmonary haemorrhage	1
Creatinine >100	1
Feed intolerance	1
Evidence of diastolic steal	1
PDA size • Moderate (1.5 to 2mm) • Large (> 2 mm)	 1 2
Left atrium: Aortic root (LA:AO) ratio	1

Table 1: Table demonstrating the clinical and echocardiographic scoring system

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ASSESSMENT OF CURRENT CERCLAGE INSERTION EXPERTISE USING A CERCLAGE SIMULATOR AND A SURVEY OF DOCTORS IN THE DEPARTMENT

Coary C[1], Suff N[2], Hall M[3], Tydeman G[4], Shennan A[5]
[1]Department of Women's Health, School of Life Course Sciences and Medicine, King's College London, [2]Department of Women's Health, School of Life Course Sciences and Medicine, King's College London, [3]Department of Women's Health, School of Life Course Sciences and Medicine, King's College London, [4]NHS Fife, [5]Department of Women's Health, School of Life Course Sciences and Medicine, King's College London

Introduction:
Preterm birth affects 15million births worldwide. Currently cervical cerclage placement is a common preventative therapy for cervical insufficiency, commonly associated with preterm birth. Cerclage can be technically challenging, and the outcome is likely to be operator dependent. Training and experience are elusive and crucial. Therefore, access to a simulator would be ideal. A cerclage simulator has recently been developed but has not been previously evaluated.

Methods:
We compared Experts, Intermediates, and Novices (based on seniority and experience) in the use of the simulator. The simulator allows the cervix to be removed and technical characteristics measured (several parameters were measured to ascertain time taken and aspects of stitch placement). We also developed and performed a pre and post simulation survey which used a Likert scale to assess self-reported confidence in performing the procedure, ease of use and educational value.

Results:
21 Obstetrics and Gynaecology Doctors participated. Cervical cerclage placement was similar between all groups, with a trend towards better performance in the Expert group in all areas. Experts obtained the greatest mean height of stitch with 3.7cm (sd = 1.241, p = 0.9084) and smallest inside stitch diameter of 7.353 (sd = 4.252) vs 8.623cm and 11.17cm. Following simulation confidence was significantly better within the novice group, (p = 0.0078). All groups found the simulator easy to use and felt it had educational value.

Conclusion:
Using simulation, trainees' confidences in cerclage placement increased significantly. Participants within the Novice group obtained the greatest benefit. Evaluation by the participants highlights its appropriateness as a teaching tool. Future work should establish the clinical relevance of the technical parameters that can be measured in the simulator with a view to improving future training.
Overall Self Evaluation of Cervical Cerclage Placement.png (could not be inserted)

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Malan syndrome – a rare cause of macrocephaly

G N, Prentice S, Chandershekar P, Seed L[School of Clinical Medicine, University of Cambridge, Cambridge Biomedical Campus, Hills Road, Cambridge]
[1]*Lister Hospital, East And North Hertfordshire NHS Trust*

Background

Macrocephaly is a common clinical presentation. In this case, we highlight a rare genetic condition, Malan syndrome, diagnosed in a 13-month-old with macrocephaly.

Case presentation

A 9-week-old infant presented to the outpatient clinic with macrocephaly (head circumference 98th – 99.6th centile, weight 75th – 91st centile). Antenatally, he was noted to have dilated ventricles at 33 weeks. He was born in good condition at term, and had a normal cranial ultrasound scan on day 2 of life. Of note, there is a family history of maternal epilepsy. As he appeared clinically well, he was followed up with serial head circumference measurements in the community. Owning to gradually increasing head circumference, he underwent an MRI brain at 4-months-old, which demonstrated enlarged extra axial cerebrospinal fluid spaces and slightly bulky ventricles.

At 8-months old, he exhibited delayed motor development, and at 13-months of age, he was noted to have global developmental delay. His mother also reported staring episodes, and an electroencephalogram performed accordingly did not demonstrate epileptiform activity. A microarray was performed which revealed a copy number loss in the short arm of chromosome 19, with break points within 19p13.2. This copy number variant, taken together with the patient's clinical features of macrocephaly, developmental delay and possible epilepsy, confirmed a diagnosis of Malan Syndrome (Sotos syndrome 2, OMIM #614753).

Discussion

Growing understanding and progress in the field of genetics has enabled rapid diagnosis in neonatology as illustrated in this case. Malan syndrome is a rare overgrowth syndrome, first reported in 2010, caused by a mutation in the NFIX gene on chromosome 19.

Learning points

Overall, this case highlights the importance of close follow up of a child with macrocephaly, and to consider early genetic testing, particularly if there are red flag features such as developmental delay.

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Inequalities in NHS Maternity and Perinatal Care in Great Britain

Webster K[1], On behalf of the NMPA Project Team
[1]*NMPA*

Background
Increased mortality for women and their babies from ethnic minority groups and deprived areas is well documented but poorly understood. Exploring inequalities in maternal and perinatal outcomes may help inform policy makers in their efforts to reduce the disparity.

Aim
To quantify ethnic and socioeconomic inequalities in maternity and perinatal outcomes in Great Britain (GB).

Methods
Maternity and perinatal outcomes were stratified by the woman's ethnicity and index of multiple deprivation (IMD) quintile (Q1=least deprived), using routinely collected national data in GB, 1 April 2015 to 31 March 2018.

Results
Ethnicity and IMD data were obtained for 1,241,550 of 1,370,968 births. Black women had higher rates of caesarean birth (32.5%) compared to white women (24.6%), rates were similar across deprivation quintiles. Rates of postpartum haemorrhage ≥1500ml were higher for women from Black (3.61%) and Other (3.15%) groups, compared to white (2.65%) and those from Q1 (3.06%) compared to Q5 (2.35%). Rates of birth without intervention were higher for Black women (45.9%), than white women (40.8%). Rates of breast milk at first feed were lower for babies born to white women (69.6%) compared to Black women (87.5%) and those in Q5 (60.1%) compared to Q1 (83.1%). Rates of an Apgar score <7 at 5 minutes and term neonatal unit (NNU) admission were higher for babies born to Black women (1.71%, 5.88% respectively) compared to white women (1.43%, 5.28%). Babies born to South Asian women had lower rates of an Apgar <7 at 5 minutes (0.99%) but higher rates of term NNU admission (5.73%), rates of both were higher in Q5 (1.50%, 5.59% respectively) compared to Q1 (1.08%, 4.89%).

Conclusion
Adverse outcomes experienced by women and babies from ethnic minority groups and deprived areas vary by group. By highlighting these disparities, it is hoped that care and equality can be improved.

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Antenatal and Neonatal Management Challenges in a Complex Presentation of Shwachman-Diamond Syndrome

Mullins N, Omer M[2], Redman M[1], Ewadh M[2], Rajesh U[2]
[1]Leeds Teaching Hospitals NHS Trust, [2]Hull University Teaching Hospitals NHS Trust

We report on the challenging clinical presentation of a neonate born at 35 weeks gestation with Shwachman–Diamond syndrome (SDS). SDS is a rare disorder, characterized by bone marrow dysfunction, exocrine pancreatic insufficiency, failure to thrive, and skeletal abnormalities. It is most commonly diagnosed in early childhood after the development of malabsorption & neutropenia. SDS rarely presents in the neonatal period and therefore rarely considered as a differential diagnosis delaying diagnosis.

The aim of this case report is to share the experience gained from this case and assist with a timely diagnosis in future neonatal cases.

This baby was antenatally diagnosed with short long bones, small cerebellum, echogenic bowel, atrioventricular septal defect, and severe intrauterine growth restriction. The QF-PCR and array CGH were normal. At birth symmetrical intrauterine growth restriction (IUGR), joint contractures and bilateral talipes were noted and he had significant lung hypoplasia with persistent pulmonary hypertension requiring maximal ventilation.

Progressive bone marrow failure ensued and a bone marrow aspirate showed only aplastic marrow. Skeletal survey demonstrated significant osteopenia, short long bones, bell shaped thorax, poorly ossified large skull vault and abnormal broadening ribs with cupping. Rapid trio exome sequencing identified that the baby was homozygous for a likely pathogenic EFL1 missense variant (NM_024580.5:c.2909G>A p.(Arg970His), consistent with a diagnosis of SDS Type 2. This mutation accounts for <1% of SDS cases.

Lessons learnt:
1) Always store DNA prior to blood transfusions in complex settings.
2) Normal antenatal genetic testing does not exclude a molecular diagnosis.
3) Early multidisciplinary involvement from fetal medicine, obstetrics, genetics, radiology, haematology and neonatology are essential to obtaining a diagnosis enabling e.g pre-implantation genetic diagnosis.
4) Improved communication between genetics, fetal medicine and neonatology required.
5) Low platelets are not always directly related to IUGR.
6) Neonates with pancytopenia and possible skeletal dysplasia consider SDS.

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UK National neonatal survey on the use and storage of ambulatory EEG monitoring

Osmond E
[1]*Uhbw Bristol*

Perinatal Medicine (BAPM) 2020 Abstract
Title:
UK National neonatal survey on the use and storage of ambulatory EEG monitoring
Objectives
To describe UK neonatal unit practice for use and storage of ambulatory EEG (aEEG) monitoring
Design
Electronic Survey, UK neonatal units
Methods
National UK survey, October 2018 - January 2019. All 20 networks approached.

Results
We received responses from 72 UK neonatal units (42% from NICUs, 47% from LNUs, 11% from SCBUs).
aEEG is most commonly used in patients for investigation of HIE or newborn seizures (85% of respondents).
A further 15% of respondents additionally use aEEG as a routine measure in paralysed patients.
77% of units report aEEG records, the majority of reports are from a medical consultant.
There is variability in the method that is used to report an aEEG ; 49% of units used voltage criteria, 31% used a combination of the voltage criteria with categorisation of the background pattern, 20% reported an aEEG as normal or abnormal.
68% of units stored the aEEG trace electronically and 4% of units linked this to the electronic patient record.
A variety of storage methods were used by trusts for aEEG including the aEEG machine hard drive, external hard drives, paper print-outs, hospital computer network folder, CD ROM, database, photographs of trace.
Some units did not store aEEG data.
Conclusions
This survey shows wide variation in UK practice for recording and storage of aEEG data. There are implications for patient care and in litigation cases. It might be appropriate to consider a national agreement to standardise description of aEEG and for Trusts to consider storage of such patient data.

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Thrombocytopenia - What are we missing?

Vemuri G, Kaniti A[1]
[1]*Wythenshawe Hospital*

Background:
Neonatal alloimmune thrombocytopenia (NAIT) is not uncommon condition seen in neonates, but its management depends on the results of HPA test which is 65% sensitive.
We are reporting 2 cases where Platelets were significantly low and NAIT screen being negative.

Case 1: A term baby noted to have bruising at 6 hrs of age. Baby was screened for sepsis and was started on antibiotics. Initial platelets were 82 which dropped to 18 in 3 days. Baby received transfusion which increased the platelets to 100 but kept dropping. All tests including septic, TORCH and Parvo virus screens were negative. Despite having 4 transfusions she needed treatment with immunoglobulins. After receiving the immunoglobulins, platelets improved and sustained. 2 months after birth, platelets remained above 200.

Case 2: A term baby was noted to have petechial rash and screened for infection and was started on antibiotics. Initial platelets were 13 and he was transfused with normal platelets without improvement. He had another transfusion with HPA negative platelets. As this did not have desired effect, baby was treated with immunoglobulins. Platelets increased to normal levels and remained stable. TORCH and Parvovirus screens were negative. His cranial USS showed grade 2 IVH which later resolved.

Conclusion:
NAIT is caused by HPA antibodies transferred through the placenta from the mother. Antibodies for HPA type 1 and 2 are most likely cause of thrombocytopenia but there are several other antibodies. HPA type 3, 5 and 15 are also common that can cause significant thrombocytopenia but are very hard to identify in the essays. Hence, even if the NAIT screen doesn't yield a result and the thrombocytopenia is not responding to platelet transfusion, its important to consider immunoglobulins early enough to treat it as we might be missing the other antibodies.

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Implementing a two-stage consent pathway in a neonatal trial

Mitchell E[1], Oddie S[2], Dorling J[3], Johnson M[3], Gale C[4], Ojha S[1]
[1]University Of Nottingham, [2]Bradford Teaching Hospitals NHS Foundation Trust, [3]University Hospitals Southampton NHS Foundation Trust, [4]Imperial College London

A two-stage consent pathway for perinatal trials was designed several years ago and now features in national guidance for consenting in time-critical situations. The pathway involves seeking oral assent for participation during the time-critical period, followed by written informed consent for ongoing use of data. Qualitative research to understand women's and clinicians' views about the approach was conducted previously. Overall, the pathway was considered acceptable to parents and clinicians, though some concerns were raised, including provision of the "right amount" of information and a lack of a consent form as a record.

The pathway has since been implemented in the FEED1 Trial, a randomised multi-centre trial comparing feeding preterm infants full milk feeds enterally from day 1 with gradual milk feeding. Randomisation occurs within 3 hours of birth to ensure the feeding strategy can be implemented as soon as possible after birth. Since this is a time often fraught with stress and emotion for parents, ethical approval was obtained for use of the two-stage consent pathway. As this is a relatively new process, some clinicians have been apprehensive about approaching parents to seek their oral assent for participation.

To support clinicians and parents, the FEED1 trial have implemented a number of strategies throughout the trial, including: supporting documentation, training including simulations with role-play, interactive discussions, webinars, ongoing Q&A sessions with clinicians and the production of several professionally filmed role-play scenarios available via YouTube. To assist with the provision of standardised "minimal" information to be provided to parents, an ethically-approved oral assent animation was created and distributed to all participating sites, with a QR code for easy access via an internet-enabled device.

Implementing a two-stage consent pathway in a neonatal trial is possible, with the provision of support for clinicians and parents.

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Improving Golden Hour of admission antibiotic administration for infants born before 30 weeks gestation through perinatal teamwork

Walsh V[1,2], Fox A[1], Manou A[1]
[1]Neonatal Unit, Hull University Teaching Hospitals NHS Trust, [2]Health Education Yorkshire and Humber Future Leaders Programme

Background: Antibiotics should be given within one hour of a decision to treat for sepsis [NICE NG195]. Six month baseline data identified that only 48% of infants born <30 weeks gestation received antibiotics within one hour of admission (median 50% per month, range 40-67%).

Aim: By 6 months to achieve ≥60% compliance of infants <30 weeks gestation admitted to our neonatal unit receiving antibiotics, if indicated, <1 hour after time of admission.

Methods: Two interventions were introduced, supported by education through simulation, posters, and regular presentation with discussion of results.

1. A standardised perinatal proforma for infants <34 weeks gestation encouraging team planning for intravascular access at a delivery room huddle.

2. A "Golden Hour" trolley with pre-packed line insertion equipment to reduce intravascular access preparation time.

PDSA cycles with intervention development occurred between infants according to staff feedback following simulation and admissions.

Measures:
Outcome:
Proportion of infants per month born <30 weeks gestation documented as receiving antibiotics (if indicated) <1 hour after admission.

Process:
Mean time (per month) to first antibiotics.
Mean time (per month) to first intravenous access.

Results: Improvement was seen in all measures following introduction of a perinatal proforma in November 2020 (Figures 1,2&3), with further improvement in our outcome measure following introduction of the "Golden Hour trolley" in March 2021 (Figure 1).

The proportion of infants receiving antibiotics within 1 hour of admission remained above our 60% target.

Conclusion: We achieved sustained improvement of ≥60% of infants <30 weeks gestation receiving antibiotics within 1 hour of admission after introducing a package of education, a perinatal proforma supporting team planning, and availability of pre-packed line insertion equipment.

Improvement will need to be maintained through continued education and simulation to overcome barriers to compliance including team changes with trainee rotation, and addressing emerging barriers identified through feedback.

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Feasibility of Donor Human Milk Supplementation on Postnatal Wards as an Aid to Breastfeeding in a Scottish Maternity Unit

Bilkhu A, Van Den Berg M[1], Simpson J[1], Barnett D[1]
[1]*NHS Greater Glasgow And Clyde*

Background
Scottish breastfeeding rates have improved in recent years, however figures remain lower with higher attrition compared to other countries. The Scottish Government's Becoming Breastfeeding Friendly Group aim to reduce breastfeeding drop-off at 6-8 weeks by 10% by 2025. Government funding allowed for a pilot project to offer the choice of donor human milk (DHM) to support postnatal ward infants requiring supplementation, to help meet this aim. Other units have demonstrated higher breastfeeding rates at discharge when DHM was used. We share our experiences of this pilot at the Queen Elizabeth University Hospital Glasgow.

Methods
Staff training was provided in recognising which infants would be eligible for DHM. Maternal consent was obtained, and breastfeeding attrition rates were assessed at 10-14 days at 6-8 weeks of age.

Results
From June 2020 – May 2021, 202 postnatal ward infants were supplemented with DHM.

Maternal factors
Eighty-five percent of mothers were primigravida. Half of all mothers underwent Caesarean-section, and 22% had an instrumental delivery. Sixteen percent of mothers had a history of blood loss >1000ml.

Infant factors
Infants ranged from 34 to 42 weeks' gestation (mean 38 weeks, median 39 weeks), with birthweights from 1750g to 4612g (mean 3262g, median 3304g). Documented reasons for use included prematurity, hypoglycaemia and weight loss.

Feeding outcomes
Feeding outcomes were reviewed in comparison to local figures from 2019-2020. Following introduction of the pilot, exclusive breastfeeding rates improved from 36% to 45% at 10-14 days, and from 31% to 37% at 6-8 weeks of age.

Feedback from mothers was positive, with one mother saying, "it bought me time to learn about breastfeeding and how to optimise my own milk production".

Conclusion
This pilot programme demonstrated feasibility of using DHM to protect breastfeeding and support the psychological needs of breastfeeding mothers, which may help to improve breastfeeding attrition rates.

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THE NEED FOR SPEED; IMPROVING CARE WITH DRIVE-THROUGH UPPER GI CONTRAST

Dixon C[1], Lloyd S, Adams E, Ghattaura H, Lakhoo K
[1]*Oxford University Hospitals*

AIM – Reduce strain on resources in a tertiary neonatal surgical unit for infants referred from network with bilious vomiting.

METHOD – We conducted an audit of infants referred for bilious vomiting between Jan-Dec 2019. Demographic data was collected alongside time from referral to contrast study, surgical diagnosis and length of hospital stay.
Using a multidisciplinary team approach, we developed a pathway identifying neonates suitable for a drive-through upper GI contrast study. The pathway centres around pre-selected criteria, a dedicated transport team and utilising conference calling between all 3 clinical specialities; paediatric surgery, neonatology and radiology. Post implementation, we prospectively re-audited referrals for bilious vomiting to compare to our initial dataset.

RESULTS - In the year 2019, a total of 20 infants were referred with bilious vomiting with 13 of these found to have no surgical pathology. In the year 2020, with the pathway in place and raised awareness, 18 infants have met criteria for drive through contrast, with 15 found to have no surgical pathology. In those with no surgical pathology, there was a reduction in total number of cot days from 29 days in 2019 to just 4 days in 2020, and no admissions in 2021, resulting in a cost saving of over £46,000. The median length of stay decreased from 1200 minutes in 2019 to 0 minutes in 2020 and 2021. The median time from referral to contrast study has reduced from 429 minutes (2019) to 259 minutes (2020) to 223 minutes (2021). Most importantly, time from referral to theatre for confirmed malrotation - 285 minutes.

CONCLUSION – A well designed drive through contrast pathway results in efficient utilisation of resources and prompt investigation and treatment. Those with no surgical pathology have a timely repatriation, reducing parental separation.

Criteria	Checklist	Ensure
⇨ >36weeks + >1.8kg ⇨ No abnormalities noted ⇨ Normal abdominal examination by [redacted] ⇨ Otherwise well ⇨ In [redacted] and [redacted] region only	⇨ Imaging transferred ⇨ 2 x Large bore PVL's ⇨ IV fluids (50ml syringe) ⇨ Large bore NGT on free drainage ⇨ Maternal bloods taken ⇨ IV antibiotics given ⇨ Bloods + Gas taken	⇨ Bed kept at referring hospital ⇨ Newborn Car [redacted] bed available + nurse allocated in case of admission/Unplanned referral ⇨ You have the contrast drugs pack ⇨ Transport Registrar collects patient and stays for contrast ⇨ ITU trolley [redacted] used for transfer

Suspected bowel obstruction - General management principles:

⇨ Variable presentation – bilious vomiting ± abdominal distension. May present as episodic obstruction or acutely with profound shock as result of volvulus
⇨ Urgent communication with Surgical team and proceed as instructed.
⇨ Commence continuous cardiorespiratory and oxygen saturation monitoring.
⇨ Provide respiratory support for babies whose condition deteriorates
⇨ Carefully assess patient for signs of hypovolaemia - low threshold for giving normal saline bolus.
⇨ Assess pain and initiate analgesic measures as required

Drive Through Contrast Process:

- Referral process as per "Neonatal Surgical Referral Pathway" in Hub
- Team discussion with Surgical Registrar as to whether a Drive Through Contrast would be appropriate. All teams must agree to ensure the process runs smoothly.
- Collect the patient as an Unplanned Local Immediate transfer [redacted] Registrar to assess abdomen and patient condition, does Drive Through Contrast remain the correct pathway for this patient?
- Once stabilisation complete, contact Hub with patients NHS Number, DOB, Gender, Address and Mothers details to create an MRN (see "Drive Through Contrast – A Ward Clerks Guide").
- Whilst ward clerk creates MRN, conference call via Hub to discuss case with Surgeons and inform them of ETA [redacted] Surgical Registrar to then liaise with Radiology team and book contrast.
- [redacted] ambulance to park at back entrance to the Children's Hospital, unload and proceed directly to radiology department (see attached map), where they will meet the Surgical Registrar and Radiologist.
- Once contrast complete, Surgical Registrar to examine baby.
- If satisfied that the baby is well, complete and print EPR notes and inform Referring Consultant and parents of results and plan [redacted] reloads, completes observations and contacts Hub for a planned transfer number for repatriation.
- If the Surgeon has concerns, patient to be transferred b[redacted] to the most appropriate location (may be theatres or pre allocated bed in NNU o[redacted]
- Handover from Day/Night team can happen pre or post contrast as needed.

Return Transfer	If a [redacted] Referral is taken during Drive Through
⇨ Complete new set of planned transfer paperwork ⇨ Can be nurse only ⇨ Can be done at night ⇨ Surgical report to be photocopied and maintained in [redacted] paperwork and patients notes	⇨ Hub to inform transport team immediately if an Unplanned referral is taken at any stage. ⇨ Patient to be handed over to NBC [redacted] ward for completion of contrast and admission of patient. ⇨ Transport equipment to stay with patient during contrast, second ITU trolley to be used for Unplanned transfer.

If they don't meet the Drive Through Contrast criteria, please discuss with surgical team. May be for urgent drive to contrast or admit to unit for assessment.
Keep the [redacted] hub informed at all times. Communication with [redacted] Consultant, Surgical Colleagues [redacted] and the referring hospital is of the utmost importance

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Sharing from experience on the neonatal unit at the Evelina London Children's Hospital: Collecting data from staff to establish their beliefs, ideas and anxieties pre-implementing the Family Integrated Care (FICare) programme

Crowley N, Jaques S, Wood E, Jones C, Peatman O
[1]*Evelina London Children's Hospital*

Background
The Evelina London Neonatal Unit is a level 3 surgical/cardiac unit. The introduction of FICare is a large change project requiring a change in the culture of the unit. There is a large staff group of nurses comprising 189 WTE with 12 consultants, 30 junior doctor posts, as well as allied health professionals, admin staff and medical specialists from the wider Evelina team.

Rationale
Evidence shows the correlation between a content workforce and delivery of high-quality care (Dixon et al, 2013). As a result, we have kept staff contentment, engagement and inclusion a priority throughout the planning stages of this project. We wanted to hear from all staff and ask them about their attitudes, beliefs and anxieties regarding the introduction of the FICare programme and ideas they wanted the programme to include. A strategy described by Quinn and Sonenshein, (2007) as the participatory strategy. Consequently, all members of the team working on the unit were invited and encouraged to complete an anonymous questionnaire.

Baseline data
162 staff members across MDT and non-clinical staff completed the questionnaire, results can be seen on graph 1
Staff fears and concerns can be seen in figure 1

Using the learning from the survey
We have planned and are beginning to deliver an educational programme for staff that will address their fears and concerns, provide information, training and support in specific areas. This training programme is being evaluated using the Kirkpatrick framework and results will be available soon.

Conclusion
There has been great benefit from understanding where to focus a staff education programme. Formative evaluation to assess whether there has been a change to staff's attitudes and beliefs will be carried out at 6 monthly intervals and regular staff feedback is enabling iterations to the programme.

Graph 1: All Responses from FICare staff survey

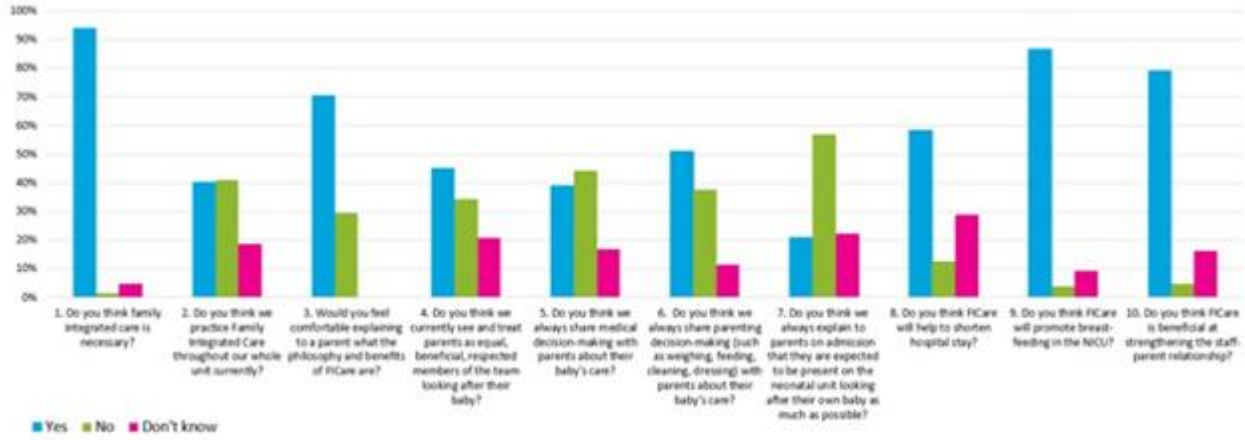
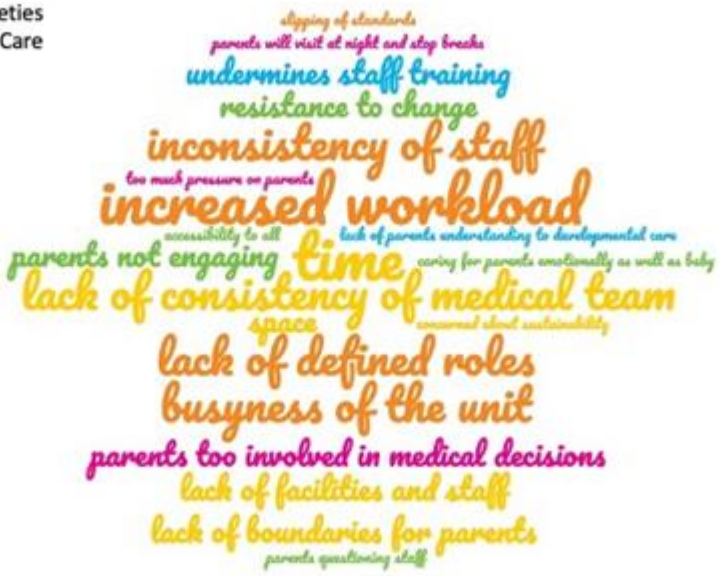


Figure 1: Staffs' anxieties about introducing FICare



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Sharing from experience on the neonatal unit at the Evelina London Children's Hospital: The process of co-producing and implementing a Family Integrated Care (FICare) programme

Crowley N, Jaques S[1], Wood E[1]
[1]*Evelina Children's Hospital*

Context
By 2025, FICare should be implemented on neonatal units (NHS, 2019). Since September 2020, FICare leads (a consultant neonatologist, neonatal sister and Darzi Fellow) and parent and staff champions have been coproducing a FICare programme which launched in May 2021.

Process diagram
See Figure 1.

Starting and the importance of data
Resisting the temptation to immediately make changes, we spent time scoping. To enable evaluation, we collected pre-implementation data from ex and current parents and staff, in the form of questionnaires and 1:1 interviews.

Designing a logo competition open to parents and staff
Our first example of working together as parents and staff, was to design and choose a logo. Badges have subsequently been produced and are worn by staff as a visual representative of us all believing in the programme.

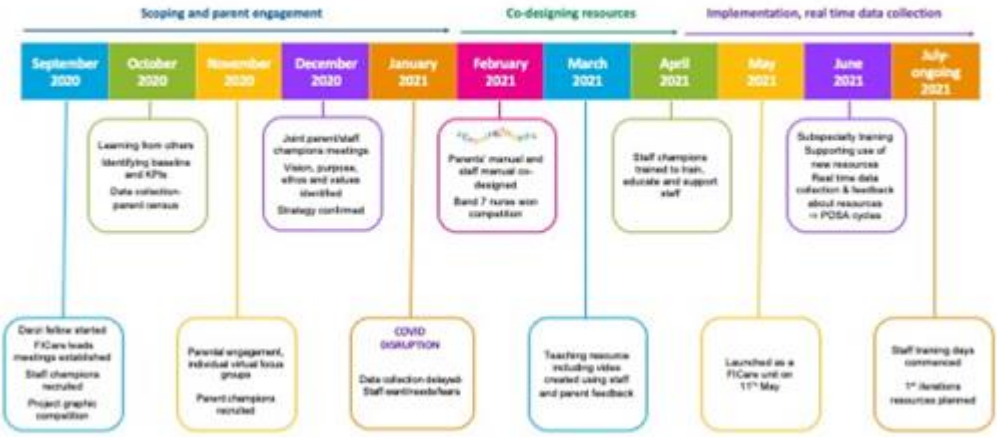
Patient stories to impact change
Having held focus groups with ex neonatal parents to determine what their need/wants were from the programme, we combined quotes and pictures with the wants and needs of staff, into a 3-minute video. This digital resource has been used in all teaching sessions and proves how powerful patient narratives are.

Co-designing the programme and training the trainers
Inspired by one of Roger Myron's Maxims, 'people own what they help create,' we invited parent and staff champions to design parts of the resources that interest them and supported them with the task. Another of the maxims, inspired the use of staff champions to train fellow staff.

Evaluation
Continuous evaluation from parents and staff has been built into the programme to determine what works and what needs to be improved. We are using iterations to make these improvements.

Going forward
This is an ongoing project which will now be further developed and embedded by a FICare nurse and psychologist alongside the project leads and champions.

Figure 1: Timeline of the process



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Sharing from experience on the neonatal unit at the Evelina London Children's Hospital: The process of establishing the 'need' and purpose of the Family Integrated Care (FICare) programme

Crowley N, Jaques S, Wood E
[1]*Evelina London Children's Hospital*

The project
In September, the process to implement FICare was commenced, led by 3 FICare project leads (a consultant neonatologist, neonatal sister and Darzi Fellow.)
We wanted to embed a FICare approach to delivering neonatal care on out unit. We coproduced this programme to benefit the needs of the population our unit serves whilst encompassing the needs, wants and ideas from staff.

Identifying the need
From parents' perspective
Rather than make assumptions, we spent time co-diagnosing with parents what the problems were to establish what future parents would benefit from. 15 parents completed a questionnaire and attend one-to-one virtual recorded interviews. The format was to ask five questions formulated with the help of our unit psychologist and a parent, to keep the discussions semi-focused. Through this method we identified parents' feelings about being on a neonatal unit and suggestions for the programme (figure 1).

From staff's perspective
Listening and understanding the needs/wants of staff, has given all staff an opportunity to have an input during the planning phases of the FICare programme. There were 163 responses to a questionnaire open to all members of staff who work on the neonatal unit. 91% of the respondents felt FICare is necessary and only 27% felt we already practised FICare. Common themes were identified throughout the free text comments (figure 2).

The purpose
Having establishing themes of both parental and staff need, it became apparent that staff and parents both want very similar outputs from the programme. The purpose became clear: to increase parents' involvement in caring and decision- making for their baby/babies by creating a consistent and standardised approach to delivering family integrated care (FICare) on the neonatal unit by implementing a FICare programme with defined roles, responsibilities and expectations for parents and staff.

Figure 1: Word cloud created following parental interviews

Figure 2: Word cloud created from free text on staff questionnaire

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Sharing from experience on the neonatal unit at the Evelina London Children's Hospital: Collecting data from parents to enable evaluation of the Family Integrated Care (FICare) programme

Crowley N, Jaques S, Wood E, Jones C, Peatman O
[1]*Evelina London Children's Hospital*

Introduction
Introducing FICare on a busy neonatal unit is a large change project which we hope will improve parent experience for >1000 admissions per year. Aims of the programme include increasing parental presence on the neonatal unit and standardising the information parents are informed by staff. To evaluate what is working and learn how to further improve the programme, it was necessary to collect baseline data from parents.

Baseline data
Parental presence at the cotside census – completed by parents for 2 weeks
The aim was 3-fold:

1. To identify the times that parents are present with their baby.
2. To determine the length of time daily that parents spend by the bedside
3. Establish what practical aspects of their baby's care they are involved in

Having established these metrics (see figures 1a, b, c), we are now able to plan the most optimal times for parental education opportunities and focus staffs' attention on supporting cotside activities.

Parental experience survey pre and post launching as a FICare unit
As part of the project, we created an evaluation plan based around the project purpose. We identified pre implementation data to collect which provided baseline metrics for measures we hope will improve. As evaluation is most effective when it is embedded in a programme, we started collecting post implementation data weekly after the introduction of the parents' and staff manual. Figure 2 shows results after six weeks, the early improvements have been enthusiastically received by staff, and will start being displayed as run charts published monthly in the unit newsletter.

Conclusion
Having codesigned resources with ex neonatal parents and produced prototypes of the resources, embedding a process of continuous evaluation through parent feedback, enables iterations to improve the programme whilst also keeping current parent need at the centre.

Figure 1a

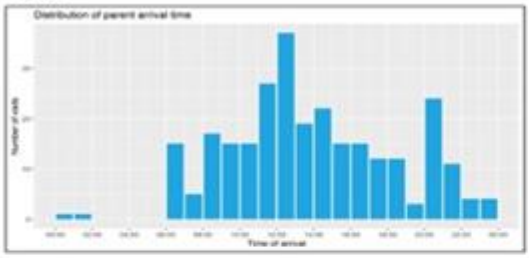


Figure 1b

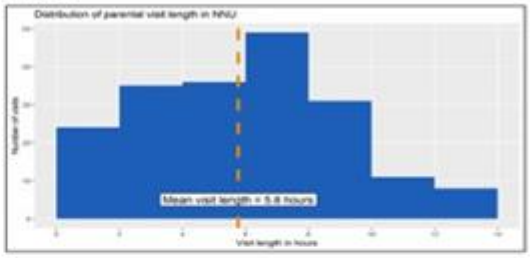


Figure 1c

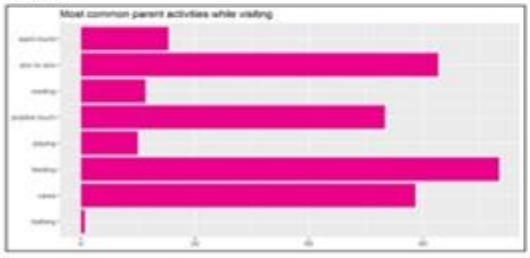
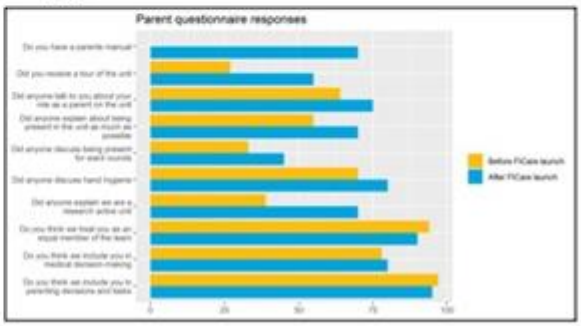


Figure 2



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Implementing Delayed Cord Clamping for Preterm Babies in a District General Hospital – A Multi-Phase Quality Improvement Initiative

Wright L[1], Sandhu S[1]
[1]*York And Scarborough Teaching Hospitals Nhs Foundation Trust*

Background:
Delayed cord clamping (DCC) is a simple intervention which can be used to improve health outcomes for all babies, particularly those born prematurely. Several benefits have been reported including reduction in mortality, reduced risk of intraventricular haemorrhage and necrotising enterocolitis and improved cardiovascular stability. We have used a phased approach to introduce this practice within our hospital.

Aim:
At least 80% of eligible preterm babies admitted to our level 2 neonatal unit should receive DCC for >60 seconds by December 2021.

Methods:
A baseline audit was conducted looking at whether DCC for >60 seconds was provided to term babies. This identified problems with documentation and clear instructions for how to record this were shared with the multidisciplinary team. We completed a retrospective case note audit to review how many babies between 32+0 and 36+6 weeks gestation received DCC between January and September 2020. A multidisciplinary team including Obstetricians and Paediatricians developed a Standard Operating Procedure and shared this prior to project implementation. Data was collected prospectively on a weekly basis to monitor progress and shared monthly with the wider teams. Interventions were made using PDSA cycles to allow for constant evaluation.

Results:
Data from January to September 2020 showed an average of 46.5% of eligible infants between 32+0 and 36+6 weeks gestation received DCC >60 seconds. Following intervention, this has increased to 63.7%.
Data from October 2020 to May 2021 showed an average of 41.7% of eligible infants < 32 weeks received DCC > 60 seconds. Following intervention in June 2021, this has increased to 100% but requires ongoing monitoring to establish trends.

Conclusions:
Through collaborative working we were able to increase the proportion of preterm babies receiving DCC. This intervention made use of existing facilities without the need for additional purchasing of specialist equipment.

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Neonatal Palliative and End of Life Care (NPELC): developing staff skills through simulation education

Peterson J, Hogan T[1], Robinson C[1], Millar H[1], Parr M[1], Gasiorowski E[1], Gottstein R[1]
[1]*St Mary's Maternity Hospital*

Background:
Palliative and end of life care can be a highly emotional and intimidating situation for paediatric and neonatal healthcare professionals. Given the highly sensitive nature of these situations there are often limited opportunities for junior staff to develop their skills in the practical, emotional, spiritual and communication aspects of palliative and end of life care.
Approach:
The NPELC 2-day course was developed with multidisciplinary team input to allow an immersive experience and discussion of neonatal palliative and end of life care topics through a mixture of online and face-to-face lectures and small group simulation sessions. A range of scenarios were developed from real life clinical scenarios and reviewed and modified in read-through testing with the faculty as well as by running through and mapping out the scenarios at the simulation centre in advance. Some scenarios were also pre-tested in in-hospital simulations on our unit. The faculty was comprised of experienced clinicians with expertise in debrief as well as counsellors and bereavement nurses. Topics covered included unanticipated death in the delivery room; decision making at the cusps of viability; antenatal counselling for terminal conditions; parallel planning and application of advanced care planning concepts, twin memory making and bereavement follow-up. The scenarios are neonatal-based but the concepts were also applicable to general paediatric situations.

Results:
Conclusions:
Simulation is an excellent methodology for healthcare professionals to develop their skills in providing palliative and end of life care. There are significant potential issues with psychological safety which need careful planning and managing by the facilitating team. However, when it is possible to provide a safe learning space and access to emotional support pre- and post-training, then simulation is a flexible and immersive training method with great potential to improve the quality of palliative and bereavement care delivered to infants and their families.

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Tranexamic Acid Use in the Non-surgical Neonatal Population

Peterson J, Pritchard K[1], Kamupira S[1], Gottstein R[1], Dady I[1]
[1]*St Mary's Maternity Hospital*

Background:

Tranexamic acid (TXA) is a synthetic lysine analogue, clinically administered for its antifibrinolytic effects. It is commonly used in paediatric trauma protocols and cardiac surgery with the intention to minimise bleeding and blood loss. Use of TXA in the neonatal population is infrequently reported.

Aim:

Review of all cases of tranexamic acid use in neonates cared for by a regional neonatal transport team and the associated regional tertiary neonatal intensive care unit (NICU).

Method:

Cases were identified through BadgerNet which searched transport and neonatal stay data throughout the network over the last 15 years. This identified eight cases of TXA use in the network (2016-2021). Data were then gathered from the patient notes and prescription charts.

Results:

Of the eight identified cases, there were two infants where TXA was used in the more standard surgical setting (1x sacroccygeal teratoma and 1x GI bleed post-duodenostomy).

There were six infants where TXA was administered in a non-surgical setting due to excessive bleeding (1x Factor XIII deficiency, 1x pulmonary haemorrhage and 1x subgaleal haemorrhage). The remaining three infants received TXA in the context of HIE and DIC with excessive bleeding.

In the four HIE cases presented in this review, administration of TXA gave a clinical improvement in blood loss. In two cases, this was sufficient for the infant to then continue active cooling and be transferred to a tertiary neonatal unit for ongoing care, and in the other two cases reduced the need for further blood products after TXA.

Conclusions:

Tranexamic acid is rarely used in the neonatal population outside of its role in cardiac surgery. This case series demonstrates the tranexamic acid could be considered for use in situations of excessive bleeding, including in cases of DIC with predominant bleeding component in HIE.

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IMPLEMENTING DELIVERY ROOM CUDDLES AS PART OF STANDARD CARE FOR BABIES BORN < 32 WEEKS GESTATION – AN OBSERVATIONAL STUDY ON SAFETY

Idriss H, James H[1], Mansfield R[1], Deierl A[1], Banerjee J[1,2]
[1]Imperial College Healthcare NHS Trust, [2]Imperial College London

Background:
Imperial neonatal service has implemented delivery room cuddles along the strong culture of Family Integrated Care. Bonding is challenging for parents with babies born extreme prematurely. Visual and physical contact in the delivery room as a first cuddle potentially can help the bonding process but so far there is limited evidence about the safety of this intervention.

Methods:
Our observational study aim was to assess the safety of the delivery room cuddles for babies born < 32 weeks' gestation. As part of the stabilization for these babies, if certain safety criteria were met during resuscitation, parents were offered a 5-15-minute delivery room cuddle while covered in plastic bag and on respiratory support supervised by a consultant neonatologist. We collected data on safety of the cuddles such as admission temperature, accidental extubations, changes in respiratory support, admission time to the unit, and availability of colostrum within 24 hours.

Results:
Between Oct 2018 and Feb 2021, 99 families experienced delivery room cuddles. Control group of 130 infants was selected between Jan 2017 and Dec 2018. GA: Cuddle group 22+5 to 31+6, Control group 23+1 to 31+5 weeks. Birthweight range: Cuddle group 430-2044g, Control 500-1800g. No accidental extubation or respiratory complications were noted in the DR cuddle group. There was no increased risk of hypothermia: 13/99 (13%) had admission temperature < 36.5 0C in the cuddle group vs 13/130 (10%) in the control group. 95/99 (96%) neonates were admitted within 1 hour of life in the DR cuddle group and 128/130 (98%) in the control group. 59/99(60 %) neonate received colostrum within 24 hours from the cuddle cohort.

Conclusion:
We present a large cohort of preterm infants showing that delivery room cuddles in babies born < 32 weeks' gestation are feasible and can be safely implemented as standard of care.

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Virtual Debrief for Neonatal Staff: A Pilot Study

Walton S[1], Archibald S[1]
[1]*Addenbrooke's Hospital*

Background
BAPM guidance recommends offering staff debrief allowing discussion of emotional responses after cases of neonatal death. Evidence shows that lack of discussion of difficult cases causes neonatal clinicians distress and that debrief reduces burnout. Before COVID-19, debrief typically involved staff meeting face-to-face to discuss their experiences. During COVID-19, restrictions made face-to-face debriefs non-viable. However, there is no guidance on running virtual debriefs for neonatal staff and scant evidence on their efficacy.

Aims
- To introduce weekly virtual neonatal staff psychology-led debrief sessions in our Trust.
- To identify challenges and barriers to running virtual debriefs for neonatal staff.
- To get staff feedback on debriefs and analyse their efficacy.

Method
Hour-long virtual debriefs, each focusing on a specific, recent, challenging neonatal case ran weekly over Zoom with our NICU Clinical Psychologist and a Neonatal Consultant over a three-month pilot from May to July 2021. During the last month of the pilot, limited face-to-face attendance was offered in addition to Zoom. Feedback gathered via anonymous e-questionnaire for virtual and face-to-face attendees was analysed.

Results
We offered 11 sessions, capturing 30 staff over the pilot.
Challenges included managing difficult dynamics between Zoom and face-to-face attendees. Six virtual and three face-to-face questionnaires were returned. Virtual participants unanimously agreed the debrief would help them better cope with subsequent clinical work. Virtual debrief advantages included better accessibility, feeling more comfortable attending from home and joining late, and being able to communicate in different ways. Disadvantages focused on not being able to read emotions and lack of face-to-face emotional support afterwards.

Discussion
Our debrief approach evolved in response to challenges and feedback. We instituted enhanced psychological safety-netting around the debrief and involved other perinatal teams including midwifery, obstetrics, and anaesthetics. Limited feedback suggests virtual psychology-led debrief can meet both neonatal and other perinatal staff needs.

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REDUCING IATROGENIC BLOOD LOSS IN MICRO PREEMIES IN FIRST WEEK OF LIFE

Siddiqui F[1], Gregory R[1], Rajeev Y[1], Farooq M[1], Gowda H
[1]*Birmingham Heartlands Hospital, University Hospitals Birmingham NHS Foundation Trust*

BACKGROUND:
Total blood volume in micro preemies is around 80-100mls/kg. Regular blood sampling can significantly reduce blood volume leading to haemodynamic instability and increased risks for IVH(intra-ventricular haemorrhages), hypotension and recurrent blood transfusion. Our study aimed to investigate blood losses in micro preemies in first week of life and detect a correlation of blood transfusion to mortality.

METHODS:
We did a retrospective observation study among micro preemies admitted from Jan 2018 to Dec 2020 (3 years) with birth weights ranging from 400-700 grams. Laboratory blood results and blood gas results were compared for Haemoglobin (Hb), Sodium(Na) and Potassium (K) levels. We also investigated incidences of IVH, NEC (Necrotising Enterocolitis), iatrogenic blood losses from sampling and adverse outcomes like mortality.

RESULTS:
*49 micro preemies were admitted during study period.
*92% had central lines placed (UVC or UAC), whereas 25% had confirmed IVH and 10% developed NEC.
*A total of 2245 blood samples were taken in first week of life, at 7.15 blood tests/neonate/day. Among 34 neonates who survived the admission, the median number of blood tests done was 7.36, whereas in 15 non-surviving neonates, the median was 7.43.
*Blood gas results correlated with lab Na, K results in 98.5% instances and with lab Hb results in 87.1% instances.
*A total of 88 blood transfusions were administered in first week of life for these micro preemies, at 0.3 transfusions/neonate/day. Surviving neonates received 0.29 transfusions/ neonate/ day, whereas non-survivors received 0.35 transfusions/neonates/day.

CONCLUSION :
*Blood gas results significantly correlated with lab test results and could potentially be used as a replacement in micro preemies.
*Number of blood transfusions was higher among non-survivors than survivors, even though not statistically significant.
*More advanced technology is urgently required to monitor micro preemies so blood tests can be reduced, which in turn can reduce transfusions and mortality.

RESULTS		
No. of admissions in study group	49	
Range of birth weights	400grams-700grams	
Central lines placed	92%	
Confirmed IVH	25%	
Confirmed NEC	10%	
No. of blood samples recorded	2245 samples	
Blood gas correlation with lab Na^+, K^+ results	98.5%	
Blood gas correlation with lab Hb results	87.1%	
	Surviving babies	**Non surviving babies**
Median number of blood tests	7.36	7.43
Transfusion rate	0.35 transfusions/ neonate/ day	0.29 transfusions/ neonates/day
Mean birth weights	559grams	554grams

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QI project: The implementation of Newborn Pulse Oximetry Screening (POS) in Thames Valley and Wessex Neonatal ODN (TVW ODN)

Yianni L, Puddy V[2], Clark P[3]
[1]*University Hospitals Southampton,* [2]*University Hospitals Southampton,* [3]*Thames Valley and Wessex Neonatal ODN*

Background:
The current UK screening program for congenital heart disease identifies around half of babies with critical congenital heart disease (CCHD). Newborn Pulse Oximetry Screening (POS) increases identification of CCHD increases to over 90%. POS also identifies babies with low saturations due to non-cardiac causes, enabling timely investigations and treatment. Despite the fact that POS is not currently part of the newborn screening program in the UK, the number of neonatal units performing POS is increasing, with 51% neonatal units in the UK undertaking POS in 2020. In 2020, only 3 out of the 14 neonatal units in TVW ODN were undertaking POS.

Aim:
In line with the NHS Long Term Plan to reduce neonatal deaths and brain injury, the TVW ODN identified the implementation of POS as a patient safety initiative. The aim is to support the implementation of newborn POS within TVW.

Methodology:
Following a successful stakeholder webinar in 2020 with multi-professional engagement from maternity and neonates within TVW, the implementation of POS was agreed.
A task and finish project group was formed, led by the Neonatal Transformation fellow. Support materials were developed (educational package, parent information leaflet, network guideline).
The project team has been instrumental in supporting local maternity and neonatal services to formulate individual implementation plans, provide staff education sessions and support with “trouble shooting” arising challenges.

Results:
Most of the units within TVW have engaged with the implementation team, with 5 more units rolling out POS in the next few months.

Conclusion:
Through the POS project, we enabled many of our neonatal units to engage in the implementation of POS. Although there is still a considerable amount of work to be done to successfully support the implementation of POS, we aim to continue our journey in ensuring every baby born in our network undergoes POS.

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Evaluation of the use of Paracetamol for treatment of PDA in a Tertiary NICU In West Midlands.

Bhat S[1], Shenvi A[1]
[1]*University Hospitals Of North Midlands*

Paracetamol is increasingly being used as an alternative to ibuprofen to treat hemodynamically significant PDA (hsPDA) in our unit since 2019.

Aim– To evaluate the clinical efficacy and safety profile of the use of paracetamol in hsPDA in our neonatal unit.

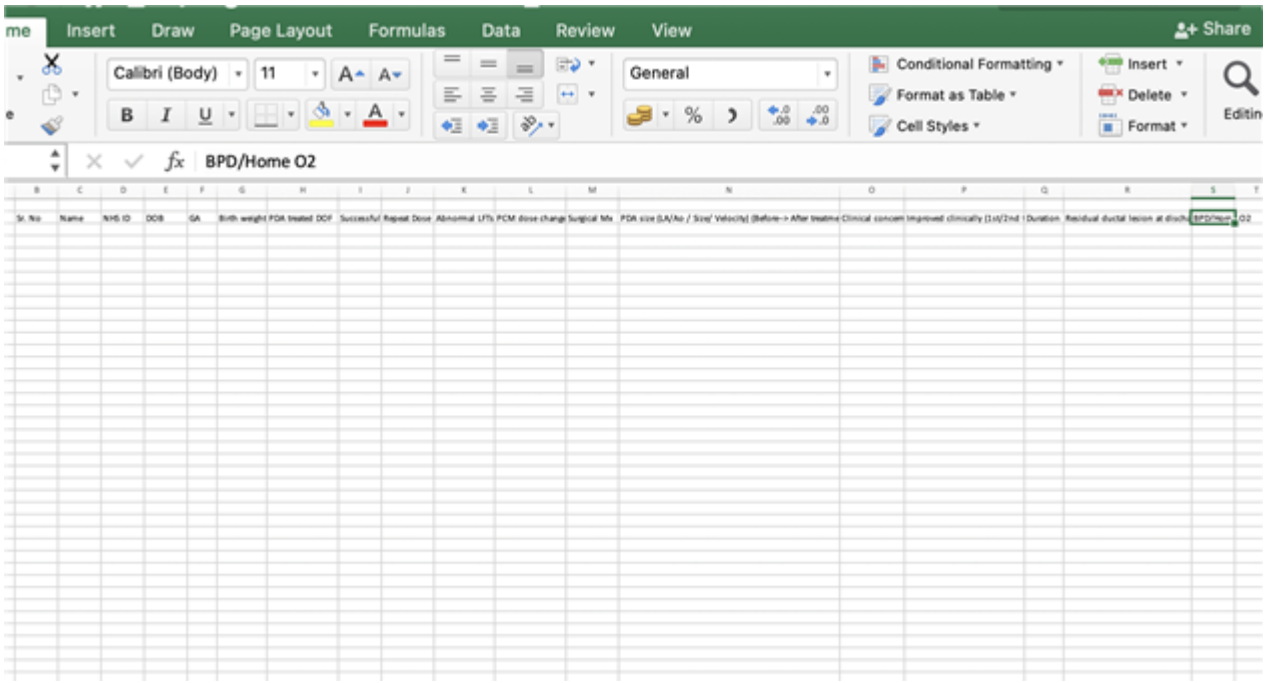
Methods-
A retrospective case note review was undertaken over 19 months from August 2019 to March 2021. All infants < 30 weeks gestation with clinical and echocardiographic evidence of hsPDA that were treated with paracetamol were included. Data were collated and analyzed using a MsExcel worksheet.

Results-
A total of 25 preterm newborns with hsPDA were eligible to receive paracetamol. 7 babies died before receiving paracetamol due to other complications of prematurity. Data for 18 neonates were analyzed.

Mean gestational age was 26 weeks and median birth weight and age at the time of treatment was 1015 grams and at 7 days.
Efficacy in ductal closure: None of the infants had received Ibuprofen before paracetamol (all had contraindications to Ibuprofen), five babies received the 2nd course of paracetamol, 3 babies were referred for a PDA ligation due to non-response, suggesting that paracetamol had had some effect on the PDA in 15/18 (83%), which is comparable to international studies. 11/18 (61%) neonates had residual PDA at discharge requiring out-patient cardiology follow-up.

Safety profile: It was noted that seven babies had elevated transaminases, but one of the babies had any features of liver failure during stay or discharge and following treatment with paracetamol, 13 babies needed dose alterations to maintain a level.

Conclusion– Our data shows efficacy of 83% in producing some restrictive effect on hsPDA. 72% of our babies required a dose alteration to maintain non-toxic paracetamol levels. Transient elevation of liver enzymes was noted in 33% of babies highlighting the need for careful monitoring of LFTs and paracetamol levels.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Impact of 2016 All-Wales neonatal feeding policy on growth velocity

Pryjda P[1], Abelian A[1], Harkness D[1], Patel I[1], Callaghan F[1]
[1]*Betsi Cadwaladr University Health Board*

Introduction
This study examined the impact of the 2016 All Wales neonatal feeding policy (AWNF) on postnatal growth velocity (PGV).

Aim
To determine if the 2016 All Wales Neonatal Feeding Policy provides better outcomes regarding neonatal growth and development in respect to current standards.

Method
All babies treated on the neonatal unit at Wrexham Maelor Hospital for at least two weeks within 18 months prior and after the implementation of AWNF policy were included. Babies were weighed twice weekly. A two-point average weight model was used to calculate PGV in gram/kg/day. The Mann-Whitney test was used for statistical analysis.

Results
There were 90 and 72 babies in the pre and post AWNF policy groups, respectively. From birth to discharge, PGV was similar (7.6 vs 8.1; p=0.147). Once birth weight (BWt) was regained, PGV was greater in the AWNF group (13.9 vs 15.9; p=0.009). There were no significant differences in days to regain BWt and days to discharge after regaining BWt.
Across all gestations, AWNF policy was associated with a reduced use of intravenous fluids and with fewer days of volumes >150 ml/kg/day. The duration of the period of NBM, the use of breast milk (BM), BM fortifier, formula, parenteral nutrition, and time to full feeds were similar and so were the incidence of necrotizing enter-ocolitis and raised CRP.
Babies <32 week gestation had a significantly shorter period of NBM and attained full feeds faster with AWNF policy.

Conclusions
The 2016 All Wales neonatal feeding policy was associated with a small, but significant increase in PGV once BWt was regained.

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Minimising donor exposure in neonates who require multiple packed red cell transfusions: A QI Project

Simpson R[1], Howarth D[2], Shore H[1]
[1]Leeds Children's Hospital, Leeds Teaching Hospitals NHS Trust, [2]Leeds Teaching Hospitals

Introduction

Premature and sick neonates frequently require multiple packed red blood cell (PRBC) transfusions. It is possible to minimise donor exposure by reserving for an individual neonate up to six units from a single donor. We sought to assess and improve the donor exposures experienced by babies who have more than one transfusion during their neonatal stay.

Methods

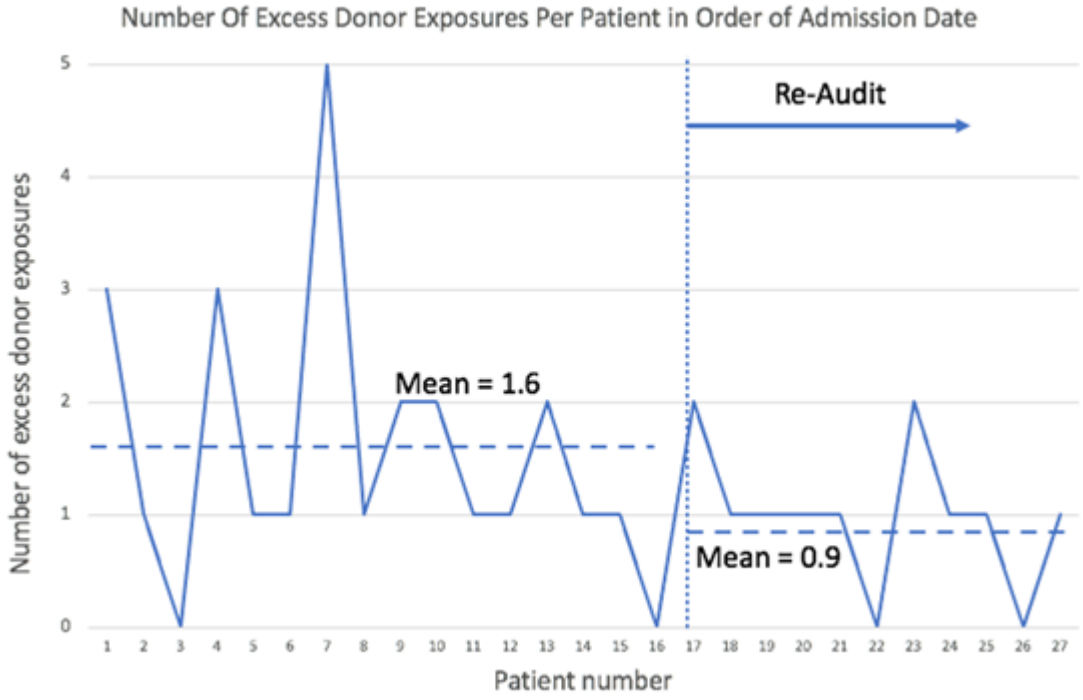
The number of transfusions and donor exposures were recorded retrospectively for patients admitted in January and February 2021. The NICU team were encouraged to request units be reserved for patients likely to need multiple transfusions. Data collection was repeated for patients admitted in May and June 2021. Additionally, patients were described according to gestational age, birth weight and comorbidities to identify risk factors for multiple transfusion.

Results

16 patients admitted in January and February 2021 had multiple PRBC transfusions (between 2 and 14 transfusions from between 1 and 8 different donors). Mean excess donor exposures per patient was 1.6 (defined as exposures that could have been avoided were six units reserved at the first transfusion). 11 patients admitted in May and June 2021 had multiple PRBC transfusions (between 2 and 7 transfusions from between 1 and 4 donors). Mean excess donor exposures per patient was 0.9. Of the 28 patients admitted between January and April 2021 who needed multiple PRBC transfusions, all had one or more of three risk factors: <29 weeks gestation, surgery or blood loss.

Discussion

Interventions thus far have been associated with a reduction in donor exposures. Characterising risk factors for multiple transfusion has potential to aid the recognition of babies who should have units reserved. Donor exposure is still rarely fully minimised. Further actions will include amendments to guidelines for blood transfusion and management of the preterm infant and inclusion in induction for the next cohort of trainees.


Number Of Excess Donor Exposures Per Patient in Order of Admission Date
Re-Audit
Mean = 1.6
Mean = 0.9
Number of excess donor exposures
Patient number
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4
5
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

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A quality improvement initiative to improve parental participation in neonatal unit ward rounds in a district general hospital

Prakash R[1], Sandhu S[1]
[1]*York And Scarborough Teaching Hospitals*

Background: BAPM guidance advocates that parents should be seen as partners in their baby's care. It urges neonatal units to encourage parental involvement at all times including during ward rounds. We noted that parents were not regularly attending ward rounds on our level 2 neonatal unit and have tried to identify ways to improve this.

Aim: To improve parental participation during the daily ward rounds

Methodology: The initial part of the project involves a survey among parents of all admitted babies to get a better understanding of their perception of ward rounds, factors which impact on attendance and current level of confidence to present their baby's update. The survey is given out by nursing staff at the time of discharge to cover experiences of the full admission period. The questionnaire is adapted from Bliss Baby Charter for family-centred care and will be given to parents from 1st July to 31st August. The areas where considerable progress can be made will be discussed and pragmatic actions for improvement will be taken. Re-auditing will be done by October after one month of implementing actions.

Results: The results will be expressed as percentage improvement in parent involvement in neonatal unit rounds. The following aspects will be specifically noted:

a) Parental perspective regarding usefulness of daily rounds and their opportunity to raise concerns
b) Parental wish to be present at bedside during daily unit rounds
c) Parental interest and confidence in updating doctors about their baby's condition
d) Parental views on alternative methods to get updated and participate in rounds e.g. videoconference.

Conclusion: We see this as a small step in integrating parents into neonatal care with expected improvement in parental participation in the unit.

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Prolonged jaundice reviews: a QI initiative to streamline follow-up requirement

Yasmeen T[1], Farquharson S[1,3], Robson J[1], Adams M[2], MacIntosh C[3], Mitchell J[1,3], Jackson A[2], Jackson L[1], Conetta H[1,3], Robertson E[4], Abernethy C[2]
[1]Royal Hospital For Children, [2]Princess Royal Maternity Hospital, [3]Royal Alexandra Hospital, [4]University of Glasgow

Background:
Prolonged jaundice is a common reason for neonatal clinic referral. It is usually benign(1), but small numbers have a significant underlying disorder requiring timely intervention. We undertook a revision of our local prolonged jaundice pathways.

Aims:
1. Detection of important pathology requiring neonatal assessment
2. Avoid over-investigation of well babies.
3. Reduce unnecessary hospital visits for patients.

Methods:
A screening tool was developed, placing babies into pathways which determined subsequent management:

1. Green Pathway: Well, thriving, breast-fed, no G6PD risk
2. Amber Pathway: Well, thriving, breast-fed, < 37 weeks, no G6PD risk
3. Red Pathway: Formula fed, G6PD risk, pale stools/dark urine or clinical concerns.

Green Pathway infants can be managed by community midwives, with a split bilirubin (SBR) from day 7 onwards. If total bilirubin <250umol/l (term) / <200umol/l (preterm) with conjugated fraction <10umol/l, patients were discharged.

If levels outwith above, or Red Pathway indicators present, neonatal review was organised.

Clinic attendances at three sites were reviewed pre and post guideline change.

High numbers attended solely for G6PD investigation. A secondary review assessed if it was possible to predict these infants, with earlier investigation, preventing later clinic attendance.

Results:
Overall reduction in total patients being seen due to Green Pathway babies being managed in the community (see Table 1).
RAH attendances fell further (0.67/week) with more managed in the community.

High numbers attended solely for G6PD investigations (n=34); or other Red Pathway indicators (see Table 2).

One baby had a conjugated hyperbilirubinaemia and was referred to Gastroenterology.

G6PD screening alone: most never had early jaundice therefore no opportunity for earlier blood testing.

Message/Conclusions:
Higher risk infants are being identified, with fewer Green pathway patients attending clinic.

Prediction of babies from G6PD areas returning with prolonged jaundice is difficult, and wider pre-emptive screening would subject many to unnecessary investigations.

Table 1: Weekly neonatal prolonged jaundice attendances

Hospital	Pre-change	Clinic reviews/week	Post change	Clinic reviews/week
Royal Hospital for Children (RHC)	**21 per month** (Dec 2019-July 2020)	**5.3 per week**	**17.6 per month** (Aug 2020-Oct 2020)	**4.4 per week**
Royal Alexandra Hospital (RAH)	**5.8 per month** (Sept 2019-Feb 2020)	**1.5 per week**	**5.2 per month** (Aug 2020 – Dec 2020)	**1.3 per week**
Princess Royal Maternity Hospital (PRM)	**6.5 per month** (Jan 2020 – June 2020)	**1.5 per week**	**6.8 per month** (July 2020 – Dec 2020)	**1.6 per week**

Table 2: Reasons for clinic attendance

Reasons for clinic referral	Number of patients
Community midwife / Health visitor unable to perform bloods	30
Formula feeding	19
G6PD screen required	34
Clinical concerns	10
High SBR	12

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Measuring Oxygenation in Newborn Infants with Targeted Oxygen Ranges (MONITOR)

Christie F[1,2], Kelly R[1,2], Boardman J[2,1], Stenson B[1,2]
[1]NHS Lothian, [2]University of Edinburgh

Objective
The optimal oxygen saturation (SpO2) range for premature babies is unknown. The Neonatal Oxygenation Prospective Meta-analysis (NeOProM) Collaboration showed that higher (91-95%) rather than lower (85-89%) SpO2 targets reduced mortality and necrotising enterocolitis, but increased retinopathy of prematurity requiring treatment. Survival was associated with higher than intended achieved SpO2. Trials are required to determine whether raising SpO2 targets higher can increase survival. This study aimed to explore the achieved oxygenation patterns observed when targeting the SpO2 range 92-97%.

Design
Single centre, prospective randomised crossover study. Manual FiO2 adjustment by nursing staff. Total study time 12 hours for each infant. 6 hours targeting 90-95% and 6 hours targeting 92-97%.

Patients
Twenty infants <29 weeks gestation at birth, greater than 48 hours of age, and receiving supplemental oxygen.

Outcomes
Percentage time spent above SpO2 of 97% and below SpO2 90%. Secondary outcomes included the time spent with transcutaneous PO2 (TcPO2) <6.7kPa (50mmHg) or >10.7kPa (80mmHg).

Results
Median (IQR) gestation at birth was 26+5 (25+5 - 27+2) weeks, postnatal age was 22 (11 - 38) days and study weight was 878 (739 - 1108) grams.

[Table 1]

Figure 1 shows cumulative % time at each SpO2 value. Figure 2 shows cumulative % of time spent at aggregated TcPO2 values.

[Figures 1&2]

Conclusions
Targeting the SpO2 range 92-97% produced a controlled right shift in SpO2 distribution, with reduced time at low SpO2 (<90%), without increasing time with high TcPO2 (>10.7 kPa). Findings of this study will inform the design of larger trials with the power to assess clinical outcomes.

	SpO_2 target group		
% Time	**90-95%** **Mean (range)**	**92-97%** **Mean (range)**	
>97%	7.8 (0 - 17.2)	11.3 (0.6 - 21.1)	*p*=0.02
<90%	17.9 (4.6 - 35.4)	13.1 (3.0 - 23.5)	*p*=0.003
≤80%	1.6 (0 - 4.6)	1 (0 - 3.0)	*p*=0.119
>10.7kPa	1.8 (0 - 25.8)	1.4 (0 - 8.2)	*p*=0.746
<6.7kPa	55 (17.8 - 99.5)	49.6 (0 - 96.6)	*p*=0.63

Figure 1

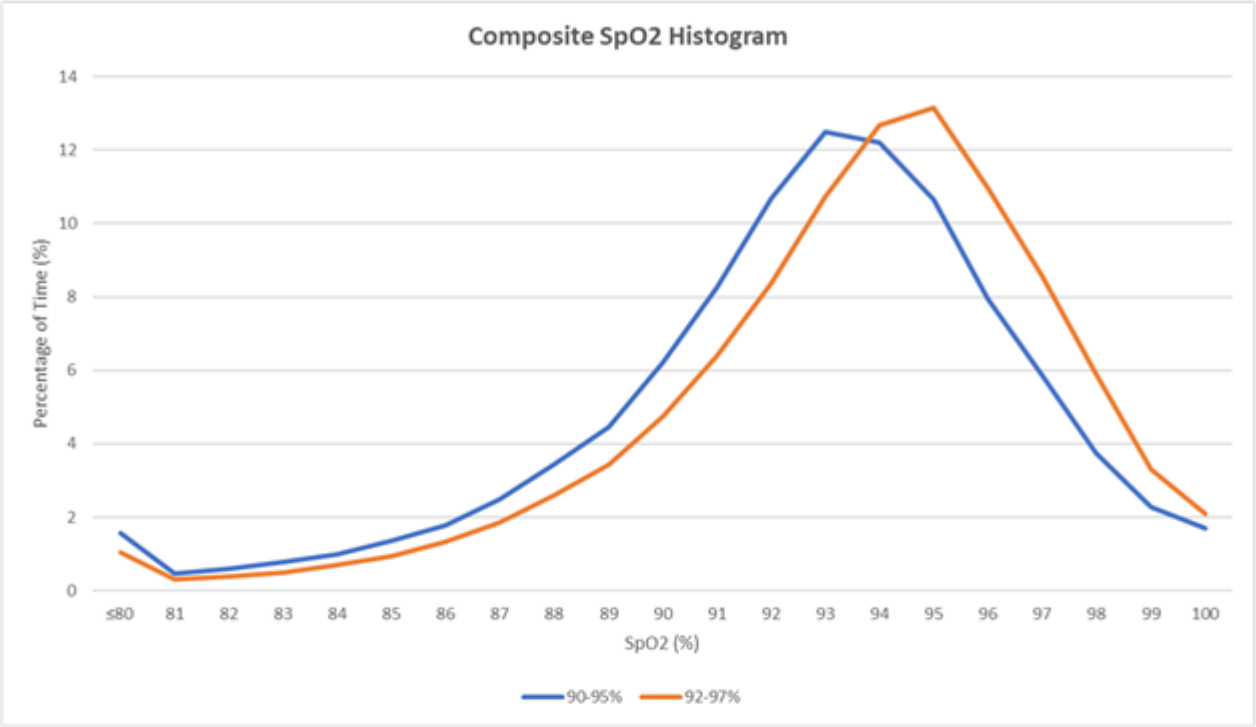
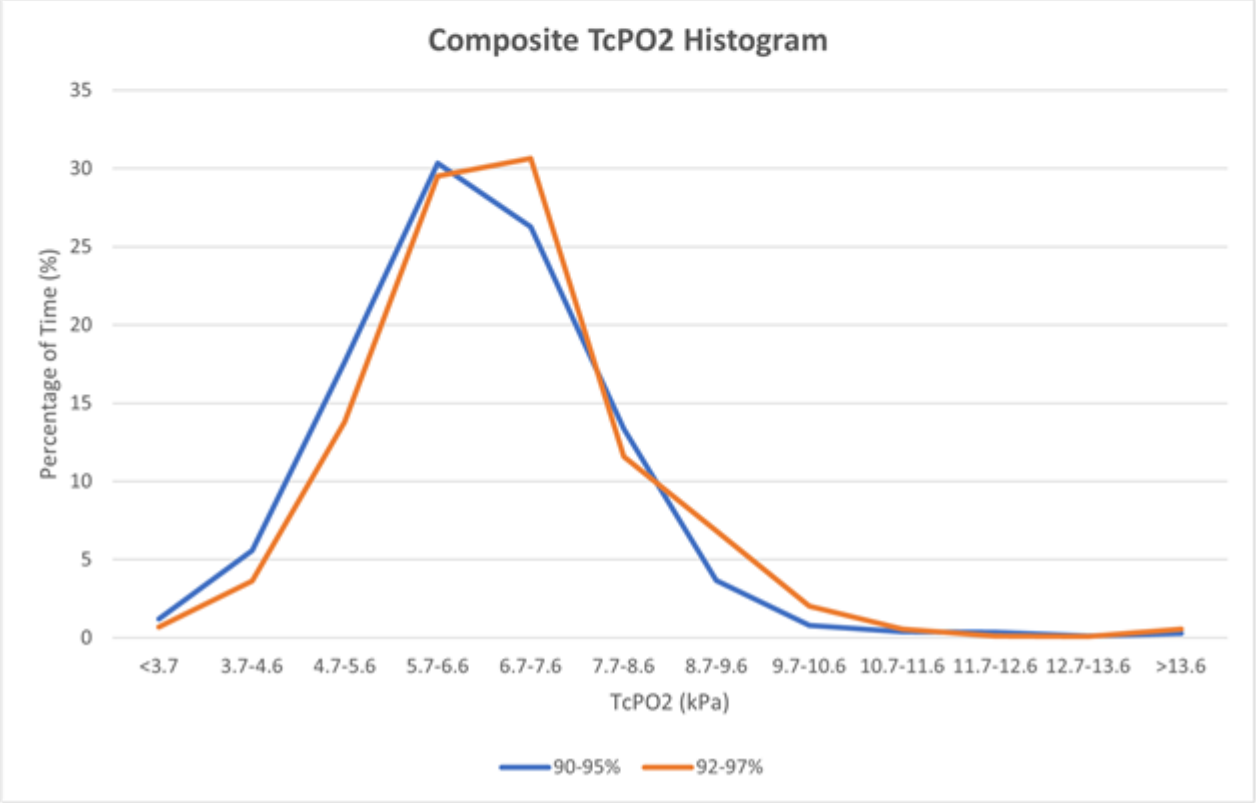


Figure 2



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Monitoring uptake of antenatal magnesium sulphate to improve 2-year follow outcomes in preterm infants

de Sousa E[1], Ojha S[1,2]
[1]Neonatal unit, University Hospitals of Derby and Burton NHS Foundation Trust, [2]Division of Graduate Entry Medicine, School of Medicine, University of Nottingham, Nottingham, United Kingdom

The PReCePT (Prevention of Cerebral Palsy in Preterm Labour) study was instrumental in highlighting the relatively low administration of neuroprotective Magnesium Sulphate (MgSO4) to mothers in preterm labour. With increased awareness, we expect increased administration.

Aims:
1. Do all eligible mothers receive MgSO4 before preterm delivery?
2. How many infants were diagnosed with cerebral palsy by 2 years corrected gestational age?

We conducted a retrospective analysis of routinely collected electronic patient records. Descriptive statistics were used to describe the infant and maternal characteristics. Group who received MgSO4 were compared to those who did not using t-test (parametric continuous data), Mann-Whitney test (non-parametric continuous data), or Chi-squared test (categorical data).

236 infants among a total of 332 admission ≤30 weeks gestational age at birth were inborn and eligible for the study. Percentage of eligible mothers who received MgSO4 improved from 52% in 2016 to 85% in 2020 (Figure). The number of infants with “unknown” also reduced in this period.

In total, mothers of 179/236 (66%) infants received MgSO4, 57/236 (24%) did not and this was unknown for 37/236 (16%). Mothers who received MgSO4 were more likely to have received antenatal steroids and their infants were lighter at birth and had shorter hospital stay but were otherwise statistically similar to those whose mothers did not receive MgSO4.

Two-year follow up data were available for a similar proportion in the two groups (MgSO4, 64/179 (43.8%); No MgSO4, 23/57 (43.4%)). Very few infants were diagnosed to the have CP (MgSO4, 3/64; No MgSO4, 2/23) hence groups were not compared statistically. Other short term (up to hospital discharge) and two-year available outcomes are given in the Table.

Conclusions: Efforts put in with the PReCePT initiative have improved delivery of MgSO4 but continued long term follow up is required to monitor the benefits of this intervention.

Figure 1. Percentage of total eligible infants (born at ≤30 weeks gestational age) whose mother received MgSO4 during labour (red, no MgSO4; green, received MgSO4; yellow, not known)

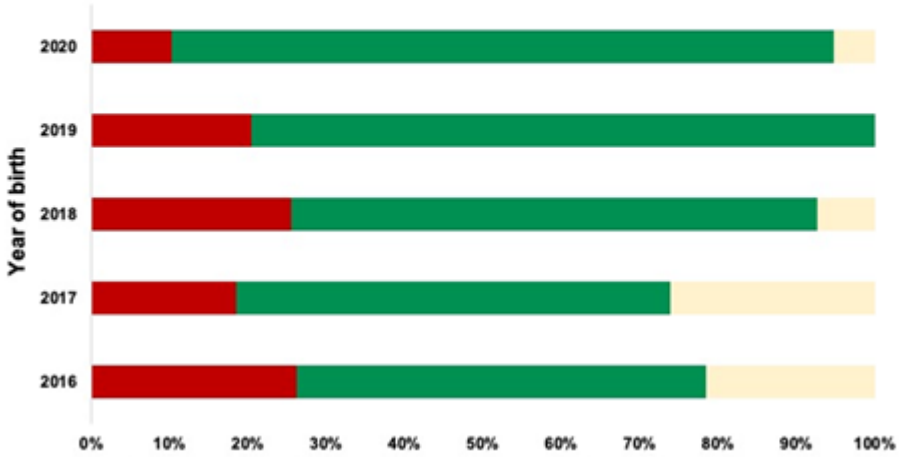

Table 1. Description of and outcomes in infants who received and did not received antenatal MgSO4

Baseline characteristics	MgSO4 N=179	No MgSO4 N=57	p-value
Females, n (%)	86 (48.0)	19 (33.0)	0.05
Singleton, n (%)	126 (70.4)	44 (77.2)	0.32
Gestational age at birth (weeks), median (IQR)	28 (27 to 30)	28 (27 to 30)	0.12
Birth weight (g), mean (SD)	1075 (304)	1200 (283)	0.006
Head circumference at birth (cm), mean (SD)	26.5 (2.2)	27.3 (1.6)	0.08
Antenatal steroid, n (%)	174 (97.2)	41 (71.9)	<0.001
Admission temperature (degree C), mean (SD)	36.9 (0.5)	37.0 (0.5)	ns
5 min Apgar score, median (IQR)	9 (7 to 9)	8 (6 to 9)	ns
Outcomes up to hospital discharge			
Chronic lung disease, n (%)	59 (33.0)	22 (38.6)	ns
Necrotising enterocolitis, n (%)	25 (14.0)	12 (21.1)	ns
Sepsis suspected or confirmed, n (%)	165 (92.2)	53 (93.0)	ns
Retinopathy of prematurity, n (%)	21 (11.7)	5 (8.8)	ns
Cranial ultrasound abnormal, n (%)	63 (35.2)	21 (36.8)	ns
Postnatal steroid, n (%)	8 (4.5)	2 (3.5)	ns
Length of hospital stay (days), median (IQR)	56.5 (37.5 to 79.2)	62.1 (39.8 to 76.3)	0.04
Two-year corrected age follow-up			
Follow-up data available, n (%)	64 (43.8)	23 (43.4)	ns
Cerebral palsy (clinician diagnosis)	5	4	ns
Any neurological problem	7	5	ns
Any cardiorespiratory problem	2	2	ns
Any gastrointestinal problem	9	7	ns
Any renal problem	0	0	ns
Weight in kg, mean (SD)	11.6 (1.7)	11.5 (1.7)	ns
Height in cm, mean (SD)	85.2 (5.6)	85.6 (4.2)	ns

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Evaluation of extubation failure in preterm neonates <28 weeks' gestation in a tertiary neonatal intensive care unit

Pieridou C[1], Mabor C[1], Gowda H[1]
[1]*Birmingham Heartlands Hospital, University Hospitals Birmingham NHS Trust, Neonatology*

Background:
Prolonged mechanical ventilation can lead to bronchopulmonary dysplasia, retinopathy of prematurity and neurological sequelae. Clinicians aim for early extubation to non-invasive ventilation to minimise such risks, however this is often unsuccessful.

Objectives:
Aim of this study was to evaluate extubation failure of extreme preterm infants following extubation to high-flow nasal cannulae (HFNC) compared to continuous positive airway pressure (CPAP).

Methods:
Retrospective observational study of preterm infants less than 28+0 weeks born at a single tertiary neonatal unit over a period of 2 years, between 1st January 2019 to 31st December 2020. The data was collected retrospectively via electronic notes. Extubation failure is defined as need for re-intubation within 48 hours after extubation due to respiratory failure.

Results:
Total of 72 infants were identified via BadgerNet using the above criteria, 61 infants were included as they were intubated at or soon after birth. All infants received curosurf. 17 infants (27.9%) were extubated onto CPAP; mean gestation 24+0 weeks (range 23 to 27+2 weeks), mean birth weight 704.4 grams (range 408 - 1045 grams), mean length of ventilation 20 days. Extubation failure in 3 infants (17.6%).

44 infants (72.1%) were extubated onto HFNC; mean gestation at birth 25+6 (range 23+3 to 27+4 weeks), mean birth weight 818.5 grams (range 500 - 1070 grams), mean length of ventilation 11.7 days. Extubation failure in 9 infants (20.5%). Escalation from HFNC to CPAP/BiPAP was attempted in 3 infants without success.

Conclusions:
In extremely preterm infants there is no significant difference in extubation failure either in HFNC and CPAP group. Limitations include smaller birth weight babies in extubation to CPAP group. Large studies are required to evaluate efficacy and safety of extubating extreme preterm infants onto CPAP vs HFNC.

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Perinatal care and management of babies born with exomphalos: 5-year experience in a tertiary centre and creation of new standardised clinical guidelines

Vecchione S, Khalifa B[1], Shore H[1]
[1]*Leeds Children's Hospital NHS Trust*

Background: Exomphalos is a common abdominal wall defect with a prevalence of 1.4:10000. Presence of associated abnormalities is crucial in determining morbidity and mortality. The aim of this study is to develop a standardised approach in managing these complex patients based on our centre experience and literature review.
Methods: Retrospective review of patients born between 2015 and 2020 with any type of exomphalos, gestational age and birth weight. Patients with umbilical hernia of the cord were excluded. Exomphalos major was defined as a defect ≥ 5cm in diameter, minor as < 5cm.
Results: 30 patients were collected (F=18), 15 with exomphalos major. 2 had a ruptured sac (1 intrauterine at 32w, 1 at delivery). Median GA at delivery was 37+5w and BW was 2855g. 60% of the patients were born via C-section (of which 61% emergency). 29 patients were antenatally diagnosed. 15 patients had genetic investigations of which 5 positive (4 Beckwith-Wiedemann syndrome; 1 AN diagnosed). All 15 exomphalos major had associated abnormalities (Cardiovascular=14, Respiratory=5, Gastrointestinal=2, Urogenital=3). 13 patients required ventilation up to 86 days (9 major). Median time on ventilator for major was 10d, for minor 1d. 22 underwent primary closure (3 with mesh/patch), 1 had a closure by secondary intention with mesh, 4 were treated conservatively.
Conclusion: Exomphalos is often associated with other anomalies. From this study and up-to-date evidence, we implemented standardised and comprehensive guidelines on perinatal care and management, including genetic testing (QF-PCR/SNP), echocardiography, renal USS, blood sugar testing to improve quality of care and outcomes.

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Amniotic Fluid Sludge on Ultrasound and its Relationship to Early Preterm Birth

Webley E, Suff N[1], Hall M[1], Chandirimani M[1], Shennan A[1]
[1]*Department of Women and Children's Health, King's College London, St Thomas' Hospital,*

Background: Preterm birth (PTB) is the leading cause of global under five mortality, however predicting delivery and outcome is notoriously difficult. Amniotic fluid sludge (AFS), thought to indicate intra-amniotic infection, has recently been investigated as a possible biomarker of PTB risk. Chorioamnionitis and poorer neonatal outcomes are strongly related to reduced gestational age, so we have determined the significance of AFS at various gestations.

Aim: To analyse whether the presence of AFS at different gestations correlates with PTB risk and early neonatal outcomes.

Methods: A retrospective cohort study analysing the effects of AFS presence on PTB risk in high-risk asymptomatic women with a short (<25mm) cervical length (CL) at St Thomas's hospital, London. AFS was detected through transvaginal ultrasound scans.

Results: 147 women with short CL were identified, 54 of whom presented with AFS. Women presenting with AFS were at increased risk of delivery <24 gestational weeks (17% vs 4.2% p = 0.0156) and delivered infants with a reduced mean gestational birthweight (2439g vs 2786g, p = 0.0188). However, women presenting with AFS were not significantly more likely to deliver before 37 gestational weeks (37% vs 33%, p = 0.5886). The rates of NICU admission (22% vs 17%, p >0.999) and mean Apgar scores at five minutes (8.68 vs 8.75, p = 0.6228) were similar between infants born to women with and without AFS at all gestations. Logistic regression analysis further concluded that AFS presence was not independently associated with increased risk of PTB 24+0-36+6 weeks (aOR = 0.7710).

Conclusion: In our cohort of high-risk asymptomatic women with short CL, the presence of AFS is associated with increased risk of extremely premature delivery. However, the addition of AFS to currently used clinical biomarkers does not improve the prediction of PTB <37 weeks or appear to influence early neonatal outcomes.

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ASSESSING PARENTAL EXPERIENCE USING EMOTIONAL MAPPING FOLLOWING DELIVERY ROOM CUDDLE FOR BABIES BORN < 30 WEEKS GESTATION

Kimkool P, Huang S[1], Gibbs D[2], Deierl A[1]
[1]Imperial College NHS Healthcare Trust, [2]Barts Health NHS Trust

Background: Imperial neonatal service has a strong culture of Family Integrated Care and supports parents to become partners in care from admission. Bonding is challenging for parents with a baby born prematurely. Visual and physical contact in the delivery room as a first cuddle potentially can help the bonding process and reduce the trauma of separation. Emotional mapping has been recognised as an effective tool to capture and share patient experience.

Methods: Our aim in this study was to assess parent experience by collecting qualitative feedback via emotional mapping following the delivery room cuddles for babies born < 30 weeks' gestation. Semi structured interviews were performed with 6 mothers following consent via zoom or phone. AI Otter was used for transcription and interviewer checked correctness based on recordings.

Results: The positive and negative emotions and experiences were coded along the journey. This coding and in-depth analyses is currently undergoing thematic analysis.

Conclusion: Mothers expressed different fears at the time of delivery, but all reported positive emotions about the cuddle with their baby, highlighting that the moments of this physical contact was often the only positive and 'normal' birth experience they had from the time of delivery.

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If you care for me, use the H&C! Quality improvement project in RJMH, Belfast

Stefkova K, Walker A, Toner M, McDowell J, Donnelly B
[1]*Belfast Health and Social care trust*

Background: The Health and Care number (H&C) is a single patient identifier generated after birth that follows the patient throughout life and is carried across all hospitals in Northern Ireland.
It is the only number that should be used on notes and blood samples, however in reality a temporary 'RMH' number is often used within the Royal Maternity Hospital. This can lead to data being lost and unnecessary venepuncture, especially when used for Blood Bank requests.
The creation of printed stickers and printed armbands with the H&C number enables its use across the notes and requests.
Aim: To increase the inclusion of H&C number on the labelling of blood bank samples to 80%, over a period of 6 months. Our secondary aim was to increase the use on H&C number on samples sent to biochemistry and haematology, to over 85%.
Methods: The project was done as a series of PDSA cycles. The 4 cycles consisted of highlighting the importance of H&C number use and designing posters, expanding our QI team and developing further teaching and infographic materials. In the background, ongoing meetings were held with stakeholders and the IT department, which confirmed purchase of additional armband and addressograph printers to facilitate H&C use.
We audited the H&C use on Blood Bank, biochemistry and haematology lab samples on monthly basis.
Results: The use of H&C number on the Blood Bank requests rose from 70% in November 2020 to 81% in May 2021. The use of H&C number on biochemistry and haematology rose from 85% in November 2020 to 89% in May 2021.
Conclusions: We have reached our aim, however ongoing effort needs to be put in to ensure the change has been sustained. We are expanding the QI team and planning further teaching sessions across the multidisciplinary team.

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Time to Talk: Introducing a Paediatric Debriefing Project within a District General Hospital

Kirubakaran A, Lek E[1]
[1]*Hillingdon Hospital*

Introduction and Aims
Significant events are rare and highly stressful occurrences with a lasting impact on staff. Among trainees there are high levels of anxiety and stress, with a potential for burnout. Within one paediatric department, this project aimed to:

- Improve the quality and frequency of debriefing
- Observe common psychological and medical themes arising from significant events
- Improve teamwork, identify training needs and enhance patient safety through debriefs

Methods
An attitudes survey was sent to multidisciplinary team members in Hillingdon Hospital during December 2020. A debriefing tool was introduced during a five-month period between February and June 2021, with a subsequent post-intervention survey distributed. Discussion content was reviewed for qualitative analysis, whilst learning points were shared in a weekly teaching bulletin.

Results
Survey respondents wanted debriefs to resolve both psychological and medical issues (100%; n=24). Twelve debriefs were held, with 10 documented discussions. Neonatal events were common (75%), with cardiac arrest being the most frequent debrief trigger (58%).
Anxiety and shock were the most common emotions described (67%, n=6). Other themes included sadness (44%), frustration (33%), regret and gratitude (22%). Team dynamics (78%), communication (67%) and professionalism (44%) were frequently praised whilst oversight (33%), communication (44%) and situational awareness (33%) were cited as requiring improvement.
Patient safety concerns included equipment issues (33%), individual learning needs (22%) and organisational strategies (22%). Post-intervention survey respondents (n=11) reported improvements in clinical practice (100%), wellbeing (100%), safety and communication (91%).

Conclusions
Our data highlights the importance of supporting colleagues during traumatic events. Debriefs offer frontline staff a platform to voice their concerns: negative emotions such as anxiety, stress and sadness were frequently reported, with human factors featuring prominently in further discussions. Staff wellbeing is a collective responsibility: regular debriefing sessions enabled improvements in clinical practice, enhancing patient safety and interdisciplinary communication.

Theme	*n* (%)	Examples
Anxiety	6 (67%)	Heavy workload prior to event Lack of initial assistance Inexperience/unfamiliarity Previous negative experiences Not feeling in control
Sadness	4 (44%)	Visible parental anguish Unfavourable clinical outcome Extremely rare, traumatising occurrence
Shock	6 (67%)	Unanticipated deterioration, diagnosis or event Lack of preparation time Difficulty in separating personal feelings relating to event
Regret	2 (22%)	Difficulty in communicating with parents Perceived avoidable outcome Parents requiring further support
Frustration	3 (33%)	Communicating with specialists Perceived inability to help Locating equipment in a rush COVID restrictions (PPE, visitor policy)
Gratitude	2 (22%)	Closure after discussing case Able to share workload with colleagues Parents able to spend time with patient Good parental support

Positive Topics	*N* (%)	Examples	Negative Topics	*n* (%)	Examples
Communication	6 (67%)	Role delegation Maintaining oversight Vocalising thought processes Closed loop communication Exploration and clarification of parental wishes Excellent handover to colleagues	Communication	4 (44%)	Partial recollection of handover Timely use of crash call Minimising further distress to colleagues Sensitive communication of prognosis Perceived inertia of tertiary centres Dissemination of information post-event
Decision-Making	4 (44%)	Appropriate withdrawal of care Addressing preventable causes of deterioration Recognising need for senior assistance Early call for help	Decision-Making	3 (33%)	Timing of interventions Deviation from protocol
Technical skills	4 (44%)	Successful Intubation Standard of written communication Timely administration and identification of key medications Real-time feedback during resuscitation	Situational awareness	3 (33%)	Practical difficulties of transferring to unit Awareness of equipment location Preparation for unwell patient Appropriate environment for intervention
Team Dynamics	7 (78%)	Supportive atmosphere Willingness to help			
Professionalism	4 (44%)	Calm/controlled behaviour Emotional support of parents/carers			

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A Retrospective Review of the antenatal and postnatal course for infants born into homelessness

Leahy C[1], Cullen R, Murphy C[1], Cunningham K[1], McCallion N[1], Malone F[1]
[1]*Rotunda Hospital, Dublin*

Introduction: Homeless women and their newborn infants often suffer from an intersection of multiple social and biological determinants of health, including comorbidities, language barriers and financial constraints. International data suggests that homelessness and housing insecurity are independent risk factors for adverse neonatal outcomes such as prematurity and low birth weight however to date most studies on the matter have been American based, with a quite different social and healthcare system. Our centre in Dublin, Ireland possesses a disproportionately high number of homeless patients due to the socio-economic profile of our catchment area and data by homelessness charities suggest that the number of children born into homelessness in Ireland is unfortunately rising. Our aim was to identify any particular vulnerabilities in this population and potential opportunities for service improvement.

Methods: We conducted a retrospective study of 152 Liveborn infants and their mothers, where the mothers came into contact with the Rotunda Hospital's Medical Social Worker department at some point in the calendar year 2020 and either A. gave a dedicated homeless accommodation site as an address or B. self identified as homeless to the social workers. 40 data variables were chosen, encompassing a range of antenatal and postnatal care outcomes for the infants in question, and this data was then compared to hospital averages for the year.

Results: At the time of writing data analysis is ongoing but clear patterns emerging include a relatively high rate of failures to attend (both antenatal and postnatal), of admissions to the NICU, of a need for Paediatric Outpatient Department follow up and of low breastfeeding rates on discharge.

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Early Use of Parenteral Nutrition in Low Birthweight Infants (< 1250 grams)

Pappa O, Barratt E, Vecchione S, Mak K, Forster C, Smith D[Clinical Research Fellow, Leeds Teaching Hospitals NHS Trust]
[1]*Leeds Teaching Hospitals NHS Trust*

Background: The very preterm neonate has a large metabolic demand combined with an immature gut that necessitates the use of parenteral nutrition (PN). European consensus guidance suggests a target of this being commenced within the first day of life 1,2. Locally the target has been set at 6 hours, given the impact on growth and neurological development a lack of nutrition can have in this patient group.

Methods: This project is a re-audit. We studied the results of an initial audit (March- July 2019), which showed a delay in administering PN beyond 6 hours in 50% of cases. Reported issues were line placement, nursing delays and unavailability of starter PN. We educated medical and nursing staff, designed posters to display and ensured that starter PN was available. We mainly highlighted that Starter PN can be commenced prior to X-Ray confirmation of line position or given peripherally if required. We re-audited 12 weeks following the implementation of change (May- July 2020) to review whether there was an improvement in the outcome.

Outcome: Twenty-six babies fitted our weight and gestational age criteria; twelve of them were excluded as they were outborn. Of those included 85.7% received PN within six hours of birth, with a 100% success rate in securing central access within five hours. Two babies were delayed due to unavailability of starter PN in our Special Care Unit.

Discussion: We decided on the importance of updating the local guideline and also continuing the teaching sessions mainly as part of the Induction Programme. When Starter PN stock is not available at our Special Care Unit, a recommendation has been made for a taxi transfer from the local NICU.

References

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2. ESPGHAN guidelines on Paediatric Parenteral Nutrition 2018

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IMPROVING NEONATAL INTUBATION CONFIDENCE – THE DEVELOPMENT OF A SKILLS TRAINING PACKAGE

Myers L, Sirisena A, Peirce E, Dyson H
[1]*Sheffield Children's Hospital*

Competency in neonatal endotracheal intubation is vital for the trainees to develop when looking after unwell or premature neonates. Intubation is also a mandatory RCPCH skill to have achieved during level one training. There is a trend in neonatal medicine for reduced incidence of intubation. It has been shown that reduced opportunities to practice this skill has led to reduced success rates. (1) (2) (3).
Methods:
In order to support general paediatric trainees, within a tertiary neonatal unit, an intubation training package was created and implemented. The package included: a trainee directed competency sheet; self-directed learning resources; and a rota for practicing intubation skills on a range on mannequins. The rota was designed to pair experienced practitioners with those that had less experience. Confidence and experience of trainees were evaluated the at the start and end of the placement by self-assessed likert scales.
Results:
The data showed that all trainees felt confident to attempt intubation by the end of the placement, after using the intubation skills package. 40% of respondents felt confident to intubate unsupervised in standard intubation procedures and 10% felt confident even in extreme preterm babies. This is compared to 25% who felt confident to intubate without supervision at the start of the placement.
Conclusions
The project demonstrated that a structured training package can help support practical experience to increase trainee confidence in neonatal intubation. The varied nature of neonatal intensive care and reduced frequency of intubation has resulted in some doctors not utilising taught skills regularly. Therefore confidence in ability and simulated practice are important for improving practice. Further work will implement the package across the neonatal regional network, along with educational packages aimed at level two trainees and consultants. This will also look at incorporating the use of video laryngoscopes as clinical and educational aides.

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Huddle to Kuddle(H2K): a quality improvement initiative to increase timely developmental care in premature babies

Samanta Bharadwaj S, **Teh W[1]**, Seet A[1], Ereno I[1], Yuan H[1], Seto D[1], Foo R[1], Bte Shaik Ismail B, Tay Y[1], Poon W[1]
[1]*Singapore General Hospital*

Background
Neuro-developmental(ND) outcome is a benchmark in determining effectiveness of neonatal care. Neuro-developmental Care(NDC) interventions, including parental involvement(PI), decrease stress on preterm infants(PTI) in NICU, and promote optimal ND.
Existing NDC practice is initiated in mature, non-ventilated PTI in Singapore. A survey conducted locally in 2018 demonstrated only 40% PTI had DC initiated in NICU with average PI of 20%, including Skin-to-skin care(SSC). The median post-menstrual age (PMA) at initiation was 33 (29-34)weeks.

Aim
Improve NDC in NICU in all PTI born <32weeks from 40% to 100% over 12months and increase average PI from 20% to 80%. Secondary outcomes addressed length of stay(LOS), time to regain birth weight(BW), days to achieve full feeds, and Test of Infant Motor Performance(TIMP).

Methods
A multi-disciplinary team (HUDDLE) embarked on a Quality Improvement(QI) initiative to improve NDC & PI in the NICU including early and timely implementation. Gap analysis was conducted, root causes analysed using Cause and Effect diagram and Pareto chart to identify vital few selected from trivial many. Iterative Plan-Do-Study-Act(PDSA) cycles were conducted using a NDC Bundle (KUDDLE).
PDSA 1a: Parental education & handling (within 3weeks of life)
PDSA 1b: SSC (<30weeks)
PDSA 1c: Infant care (30-32weeks)
PDSA 1d: Stimulation, feeding assessment (≥32weeks)

Results
All PTI <32weeks had NDC initiated at median PMA 30 (27-32)weeks. Average PI increased from 20% to 62% ($p<0.05$). Mean LOS, time to regain BW and achieve full feeds improved by 4, 1 and 4days respectively. Mean TIMP score improved by 2 points. PTI born ≥1000g regained BW 3days earlier ($p<0.05$), LOS shortened by 7days ($p<0.05$) and achieved full feeds 7days earlier ($p=0.069$) compared to PTI born <1000g.

Conclusion and Sustainability
QI initiatives can lead to system strengthening and overcome barriers to achieve early NDC and improve PI. Systems measures with parental empowerment are essential for sustainability.

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Patient Satisfaction Regarding NIPT Screening: Recall or Reflex?

Manzar A[1], Aquilina J[1]
[1]*Royal London Hospital and Barts Health Trust*

Background
Non-Invasive Prenatal Testing (NIPT) was put forward by the UK National Screening Committee in 2016 as an additional step following the combined or quadruple tests for trisomy screening. NIPT is implemented in Barts Health, Liverpool and Kingston Hospital Trusts using a 'Reflex DNA pathway', where over 100,000 have been screened to date. Public Health England recommend NIPT to be delivered through the 'Recall pathway', which varies from the 'Reflex pathway'.

Aim
To explore whether the Reflex pathway compromises women's reproductive autonomy, by withholding screen positive combined test results, and automatically reflexing to NIPT, as opposed to the Recall pathway, where women are recalled back to discuss screen positive combined tests.

Methods
We conducted a face-to-face anonymised survey with 100 women attending for their 12 week dating scan at the Royal London Hospital. The Reflex pathway and the Recall pathway were explained to the women. The survey used a Likert scale to explore women's understanding of NIPT, the information they had received, and how comfortable they felt undergoing either pathway.

Results
15.9% of women felt more comfortable with the Reflex pathway compared to the Recall pathway.
5% of women felt more comfortable with the Recall pathway compared to the Reflex pathway.
63.8% of women had no preference to either the Recall or Reflex pathway.
1 in 2 women felt the NIPT screening pathway was not explained to them clearly at their midwife appointment.

Conclusions
Majority of women did not feel the Reflex pathway was affecting their autonomy compared to the Recall pathway. However, improved information sources on antenatal and NIPT screening pathways should be considered, at booking, to increase women's confidence in their decision-making. The survey should be repeated at the 20 week scan, once women have fully undergone screening to provide a more accurate impression of their screening experience.

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Neonatal Teaching in the UK during COVID-19: Results from a National Survey of Neonatal Trainees

Brown S, Stockley E[2], Negrine R[3]
[1]The Royal Wolverhampton NHS Trust, [2]University Hospitals Birmingham NHS Foundation Trust, [3]Birmingham Women's and Children's NHS Foundation Trust

Introduction

During COVID-19, healthcare practitioners have not only had to adapt to new ways of managing clinical workloads, but later how to adapt their teaching and training.

Aim

We undertook a questionnaire of neonatal GRID trainees, with the aim of understanding how teaching was currently being carried out for them and how this may have changed in response to COVID-19.

Methods

Invites to complete an online questionnaire were sent to neonatal GRID trainees across the UK, via email, between January and February 2021. Descriptive statistics were used to examine nominal and ordinal data.

Results

We received 32 individual responses, covering 25 separate NICUs.

The majority of units (60%) reported formal teaching occurring 2-3 times per week (12% reporting weekly sessions, 12% four-times per week, and 16% daily sessions). Reassuringly, over half of respondents said their unit's teaching frequency had stayed the same (54%), with some reporting it had even increased 'slightly' (21%) or 'a lot' (8%).
The vast majority (96%) of respondents reported that their units had changed their method of delivering formal teaching, with 54% describing an even mix of online and face-to-face sessions, and 37% reporting sessions being mostly or all online. Only one unit reported that all sessions were face-to-face.

Thirty respondents (94%) felt that attendance at teaching whilst at home (and not on duty) had changed during COVID-19, with 21 (65%) reporting this 'sometimes' occurs (and 8 (25%) either 'usually' or 'always').

Twenty-two respondents (69%) felt pressure to attend meetings/webinars in their own time, with 27 (84%) having attended regional sessions, and 24 (75%) having attended national meetings/conferences in their own time.

Conclusion

Neonatal units have adapted to COVID-19 to preserve training opportunities, shifting to online sessions. However, pressure to attend teaching in trainees' non-work hours can pose a risk to a healthy work-life balance.

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An uncommon complication of a life-saving intervention – Life-Threatening Subcapsular Liver Haematoma Rupture following CPR

Abood L[1], Webb J[1]
[1]*Swansea Bay Health Board*

Introduction

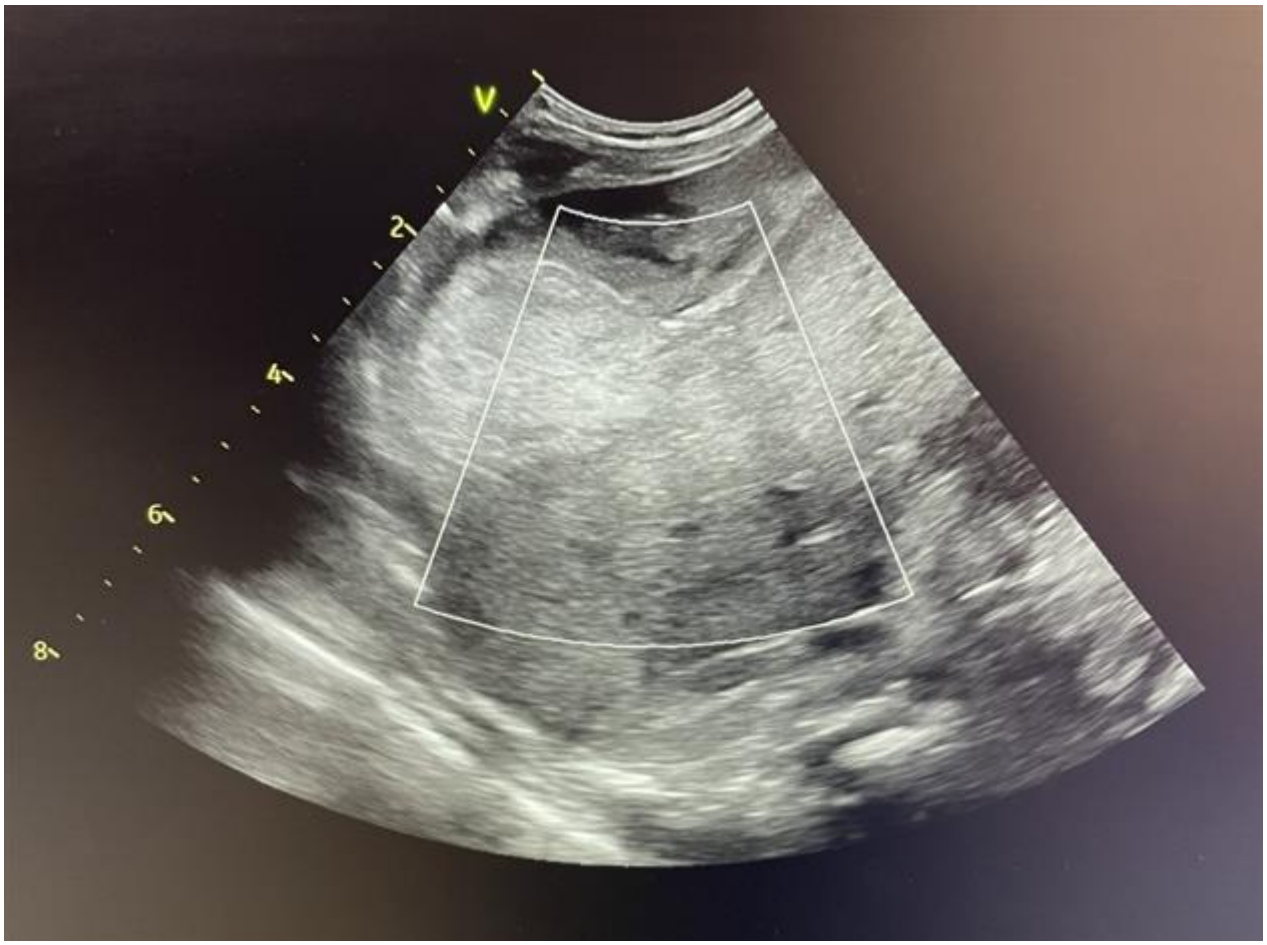
Subcapsular haematoma of the liver (SHL) rarely occurs in live born neonates. Rupture of a SHL results in extensive intra-abdominal bleeding, a catastrophic condition associated with a high mortality rate. A high index of suspicion is essential for early identification and stabilisation.

Case Description

A late preterm neonate was born at home following rapid onset of spontaneous labour and placental abruption. The pregnancy was complicated by intermittent bleeding, gestational diabetes and hypertension. He was born in very poor condition, requiring extensive cardio-pulmonary resuscitation for >40 minutes. Following initial stabilisation, he developed hypovolaemic shock, abdominal distension and tenderness accompanied by disseminated intravascular coagulopathy and multi-organ failure. He required fluid resuscitation and inotropic support to achieve haemodynamic stability. Abdominal paracentesis revealed frank blood and abdominal ultrasound confirmed blood in the peritoneal cavity and a hepatic subcapsular haemorrhage. A conservative approach to management was taken following discussion with the surgical team. With supportive therapy he made a remarkable recovery.

Discussion and Learning Points

Intra-abdominal haemorrhage in a newborn infant is a dramatic event. It is an uncommon yet severe and life-threatening consequence of birth trauma deriving from either hypoxia and ischaemia or mechanical stress during labour and delivery.
Systemic non-specific symptoms are followed by sudden circulatory collapse when the haematoma ruptures through the capsule and blood enters the peritoneal cavity. Abdominal ultrasound allows the diagnosis. Conservative therapy is the treatment of choice.
It is likely that SHL in this case was caused by prolonged requirement for cardiac compressions in addition to hypoxia-ischaemia. Cardiac compressions are a life-saving intervention and this case illustrates the potential for life-threatening complications. Healthcare professionals need to consider SHL in any acutely deteriorating infant who has required CPR. Recognition of this phenomena is also critical to the institution of optimal chest compression technique.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Improving Carer Experience in a Neonatal Surgical Unit during the COVID-19 Pandemic: Rapid Research to Address Needs

Littlejohns A[1], McKechnie L[1], Sutcliffe J[1], Lakshminarayanan B[1], Mernenko R[1], Crouzen E[1], Chauhan H[1], Moni-Nwinia W[1], McElwaine J[1], Sagoo G[2], Lawson E[2], McConachie D[2], Latchford G[1,2]
[1]Leeds Teaching Hospitals NHS Trust, [2]University of Leeds

Background
Improved parental experience is related to better outcomes for the infant as well as improved long-term mental health and neurodevelopment.

Impact
The COVID-19 pandemic abruptly impacted on healthcare delivery and services need information to shape planning for on-going disruption, recovery and to respond promptly to any future challenges.

Objective
Our multi-disciplinary team aimed to develop a validated process to capture parent experience of their neonatal surgical healthcare journey during the pandemic.

Methods
We identified relevant stakeholders who were service users, service providers, service managers and service funders. Using semi-structured interviews we explored three key themes.

1. How to recruit and collect data from representative parents?
2. What questions should be asked?
3. How to disseminate results for service development?

The 26 interview transcripts were analysed using thematic analysis by a three-person team. The main responses were that we should recruit with posters, social media and word of mouth. They highlighted the importance of translating all information and providing interpreters. The proposed questions grouped into five main topics: information before admission; in-patient experience; information and support during admission; the effect of COVID-19 on experience; discharge and post-hospital experience. The recommendation for dissemination was verbal presentations and written publications, as well as feeding back to participants about the changes made.

Based on this we developed a new semi-structured interview for use with parents, which underwent pre-pilot and pilot phase testing, and the questions underwent cognitive testing.

Conclusions
We used robust methodology to develop our validated parent experience interview. The next step is to use it to assess parental experience in a large neonatal surgical unit. We hope that the protocol could be adapted and used by other groups.

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Neonatal Thermoregulation during Long line insertion

Babalola A, Gasmalseed H, Aleshaa H, Dyson H
[1]*Sheffield Teaching Hospital*

Introduction
Preterm infants often require line insertion and are known to be at high risk of temperature instability during these procedures. Both hypothermia and hyperthermia adversely affect patient condition and can impact long term morbidity and mortality.
Having recognised temperature at line insertion as a clinical concern anecdotally and through the mortality review process a quality improvement project was designed to review process and identify areas for change.

Previous Studies
In 2018, an audit highlighted poor neonatal thermoregulation during line insertions and a new guideline 'Thermoregulation for central line insertion' was created. In 2019 the re-audit made adjustments to the long line (LL) insertion checklist to improve temperature monitoring and thermoregulation interventions. Moreover, recommended that temperature should be displayed on the main monitor.

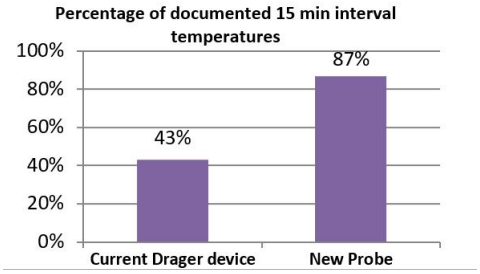
Aims
To evaluate LL documentation on the pre-existing LL checklist. Also to evaluate the accuracy of thermoregulation interventions with the current Drager temperature display (situated behind the incubator) and the new probe that displays the temperature on the overhead monitor and alarms when out of range (36.5 – 37.5℃)

Method
Most recently, over six weeks we evaluated the documentation of LL insertion procedures to assess and compare with the current standard of 100%. We also compared the continuous documentation of temperature using the Drager temperature display with the overhead monitor temperature display.

Results
33% of the LL proforma were completed against the standard of 100%. Using the new probe, LL documentation of temperature had improved to 87% in comparison to the 43% using the current Drager temperature display.

Conclusion
The new probe has shown to be effective, as documentation of temperature and intervention had improved.

We recommend the new probe be stocked, included with line insertion equipment and the checklist modified. Lastly, an assistant should be available to assist with documentation and to re-audit in 6-12 months.


Percentage of documented 15 min interval temperatures
100%
80%
60%
40%
20%
0%
43%
87%
Current Drager device
New Probe

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Hospital stay in babies exposed to maternal selective serotonin reuptake inhibitors (SSRIs)

Spierson H, Subhedar N[1], McCormack V[1]
[1]*Liverpool Women's Hospital*

Background
SSRI use is relatively common in pregnancy and can be associated with neonatal abstinence syndrome (NAS), with central nervous system, respiratory, and gastrointestinal signs. The Canadian Paediatric Society recommends observation in hospital for at least 48 hours but no similar recommendations exist for the UK. We aimed to assess the potential impact of a 48 hour observation period on our service.

Method
Women being treated with an SSRI immediately prior to delivery between July and December 2020 were identified using an electronic patient record database. Various data items were extracted including duration of hospital stay and need for neonatal unit (NNU)/transitional care (TC) admission.

Results
A total of 127 babies (median gestation and birth weight 38 weeks and 3200g, respectively) were born to mothers receiving SSRIs. 30 babies (24%) were admitted to the NNU and a further 11 (9%) were admitted to TC.

Overall, median (range) hospital stay was 2 (0-31) days with 59 mothers/babies staying < 2 days. Babies who remained on the postnatal ward had a median (range) stay of 1 (0-6) days. Nine babies were formally monitored for signs of NAS, often because of concomitant (non-SSRI) drug use, including two admitted to TC and two admitted to the NNU. Overall, three babies had confirmed signs of NAS.

The introduction of a policy of 48h of observation for babies exposed to maternal SSRIs would have led to an additional hospital stay for 59 mothers/babies amounting to 10 mothers/babies per month (or 12 bed days/per month) on a background of approximately 650 deliveries per month at our hospital.

Conclusion
1) One-third of babies exposed to SSRIs were admitted to NICU or TC.
2) A policy of 48 hours of observation for babies exposed to maternal SSRIs is likely to have a relatively minor impact on maternity services.

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A unifying diagnosis for intraventricular haemorrhage and porencephaly in preterm twins: a case series of Col4A1 mutation.

Gibbons R, Jain S[1]
[1]*Bolton NHS Foundation Trust*

Background:
Type 4 collagen is a major constituent of basement membranes encoded by the gene Col4A1. Mutations in Col4A1 results in variable phenotype: from asymptomatic carrier, HANAC syndrome, haemolytic jaundice, haematuria, small vessels disease including stroke, antenatal cerebral haemorrhage, porencephaly to intraventricular haemorrhage (IVH). There are various inheritance patterns described, predominantly autosomal dominant.

Case Series:
A pair of dichorionic diamniotic twin male infants were born at 31+1 weeks gestation. Cranial ultrasound scans were performed as per routine care for this gestation.
Twin 1 had bilateral periventricular flare, subsequent scans showed bilateral cystic formations. MRI brain and CrUSS showed extensive bilateral haemorrhagic periventricular ischaemia and subsequent fronto-parietal cavitations.
Twin 2's initial CrUSS had right sided grade 4 IVH, left grade 3 IVH with associated bilateral ventriculomegaly and right fronto-parietal cyst with haemorrhage. These changes were confirmed on MRI with additional findings of periventricular haemorrhagic ischaemia.
Review of mother's 29 week antenatal scan by Radiology consultant identified these haemorrhages to be present antenatally.
The mother had previously undergone a 36 week termination of pregnancy due to large antenatal bleed, confirmed on post-mortem as right porencephalic cyst and associated IVH.
The infants were discussed with paediatric neurology and DNA from twins and saved sample from terminated foetus sent for genetic testing. They were heterozygous for the same Col4A1 gene mutation.

Following review by clinical geneticist the mother underwent genetic testing showing her to be a currently asymptomatic carrier.

Both twins were under paediatric follow up with symptoms of cerebral palsy. Unfortunately Twin 2 died in May 2021 of apparent Sudden Unexplained Death in Infancy pending post mortem investigation. Surviving twin is under the multidisciplinary team involving community paediatrics, occupational and physiotherapy teams.

Antenatal haemorrhage and porencephaly are rare presentations and may be the phenotypic presentation of underlying genetic diagnosis warranting further investigation.

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Less Invasive Approach to Neonatal Stabilisation: Is there a role for Delivery Suite LISA?

Smith A[1], Gowda H[1]
[1]*Birmingham Heartlands Hospital, University Hospitals Birmingham*

Background: Invasive positive pressure mechanical ventilation is a recognised risk factor for Bronchopulmonary Dysplasia(BPD) and death in extreme preterm infants. Randomised Control Trials(RCT) showed delivery suite stabilisation using non-invasive ventilation(CPAP) resulted in fewer ventilation days compared to intubation and surfactant, but rates of BPD and death were not significantly reduced. Less invasive Surfactant Administration(LISA) is associated with reduced need for mechanical ventilation. Despite evidence supporting stabilisation of preterm infants with non-invasive ventilation and LISA, consensus is lacking on the optimal timing of surfactant administration in these non-intubated babies. Here we perform a literature review of delivery suite LISA for preterm infants with respiratory distress.

Method: A literature search was performed using CINAHL, EMBASE, MEDLINE, PUBMED, CLINICAL Key and NICE EVIDENCE databases. Abstracts were reviewed for relevance to the clinical question (Figure.1).

Results: Of 92 papers identified, 5 were deemed relevant; 1 prospective observational cohort study, 1 retrospective observational study, 1 cohort quality improvement study and 2 review articles. Herting et al(2020) describe LISA as a component of the delivery suite care bundle adopted in Germany to provide a 'soft landing' approach to supporting transition of extreme preterms to extra-uterine physiology, but acknowledge that rigorously designed RCT to evidence this practice is missing from the literature. Templin et al(2016), Berneau et al(2018) and Ambulkar et al(2021) have demonstrated feasibility of LISA on the delivery suite without serious adverse effects, showing trends towards improved respiratory status including less need for mechanical ventilation.

Conclusion: There is a lack of robust evidence looking at delivery suite LISA or optimal timing of surfactant administration. Significant limitations of study design limit extrapolation of results, but findings are encouraging and further support the call for a multicentre, RCT comparing early delivery suite LISA against criteria-led LISA on the neonatal unit in extreme preterm infants stabilised on CPAP.

Figure 1. Clinical Question:

Population	Preterm infants <32weeks' gestation with Respiratory Distress Syndrome
Intervention	LISA on Delivery Suite (Immediately after birth)
Comparator	LISA on the neonatal unit (Guided by oxygen requirement and effort of breathing)
Outcome	Bronchopulmonary Dysplasia, Death

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Benefits of Video Messaging in the Neonatal Unit During the Covid-19 Pandemic and Beyond; the Parent View

Fleming R[1], Hendry J[1], Monnelly V[1]
[1]*NHS Lothian*

Background
Family integrated care (FiCare) advocates parents as primary caregivers. There is growing evidence supporting its association with improved neonatal outcomes.

Covid-19 has presented new challenges with neonatal unit entry restrictions resulting in family separation being a more pertinent issue than ever. Benefits of asynchronous video messaging have been documented by Patel et al. and in April 2020, during the Covid-19 first wave, a new, secure video messaging service – vCreate – was introduced to our unit.

Aim
To evaluate parent experience of vCreate in a tertiary neonatal unit during the Covid-19 pandemic.

Methods
Parents were asked to provide free text responses about their opinions on vCreate, any negative experiences, how vCreate use could be improved and if they would recommend vCreate to other parents. They were asked about number of vCreate messages received and if this was too few, just right or too many. Duration of stay was documented.

Anonymous free text responses underwent qualitative analysis to identify common themes.

Results
Themes across 26 parent responses included reduced anxiety, less feeling of separation and not missing out on significant moments in their baby's journey. Many responses commented on positive effects on breast milk expression, particularly overnight. All parents would recommend vCreate to other parents.

Overall median number of videos/photos sent to a family was 0.8/per day. 16(62%) parents felt they received too few messages, 10(38%) felt it was just right. Parents responding "too few" received a median of 0.7messages/day.

Conclusion
Initial responses are very positive and emphasise the important role of vCreate, particularly in reducing separation anxiety and in breast milk expression. They provide invaluable insight into parent vCreate experience. We will now aim to send at least one message per day, particularly in the early days, assisting breast milk expression.

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An Unusual Cause of Neonatal Respiratory Distress: A lesson in challenging the diagnosis when the clinical picture is not as expected

Smith A[1], Patelis V[2], Gowda H[1]
[1]Birmingham Heartlands Hospital, [2]Great Ormond Street Hospital

Background: A baby girl was diagnosed antenatally with a cardiac difference suspicious of mixed pattern anomalous pulmonary venous connection, perimembranous ventricular septal defect (VSD) and left superior vena cava to left atrium, and unilateral renal agenesis. Amniocentesis revealed normal microarray.

Clinical Course: Delivered at term by elective caesarean section, she developed respiratory distress and an oxygen requirement requiring Neonatal Intensive Care Unit (NICU) admission for Humidified High Flow Oxygen (HHFO2) support. She had no obvious dysmorphia, except a unilateral accessory biphalangeal thumb.

Initial chest radiograph (CXR) (Figure1A) showed a small left anterior pneumothorax which resolved with conservative management, and an abnormal appearance of the right hemi-diaphragm which persisted. Infection screen was negative, and intravenous antibiotics were discontinued at 48 hours.

Post-natal echocardiogram (Figure1B) showed a single left Superior Vena Cava (SVC) draining into the coronary sinus, 3 pulmonary veins (PV) and a small mid-muscular ventricular septal defect (VSD). The Pulmonary Artery (PA) appeared confluent with laminar flow. She became dependent on maximum non-invasive ventilatory support, with markedly increased work of breathing of an obstructive pattern but without stridor. Ultrasound demonstrated an intact diaphragm with no defects or eventration, but reduced excursion of the right hemi-diaphragm was observed compared to the left.

Following multidisciplinary discussions she was transferred for tertiary cardiology, respiratory and radiological assessment. Chest Computed Tomography (CT) showed left pulmonary artery (LPA) sling, long segment tracheal stenosis from thoracic inlet to carina with severe narrowing of the carina and proximal bronchi, and a hypoplastic right lung. Bronchoscopy showed complete tracheal rings.

Conclusion:
This case represents the important learning point that when a baby's clinical behaviour is outside that which would be expected of the clinical condition/presumed diagnosis, then further investigation is warranted.

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The first donor breast milk bank (DBMB) in Sri Lanka: Experience with pasteurized donor breast milk (PDBM) in the first 11 babies.

Lahanda Purage S[1], Weerakoon Mudiyanselage P, Karunarathna J, Ranasinghe H
[1]*Castle Street Hospital For Women, Colombo*

The first donor breast milk bank (DBMB) in Sri Lanka: Experience with pasteurized donor breast milk (PDBM) in the first 11 babies.
L.P.C.Saman Kumara1, W.M.P.Weerakoon2, H.M.S.J.Karunarathna3, H. Ranasinghe4

Background: In Sri Lanka the birth rate is ~ 320,000/year & neonatal mortality is ~ 8/1000, prematurity is the main cause. Standard TPN is not available. Therefore, most premature babies (PB) receive own mother's breast milk (OMBM) on day 1. However, sometimes OMBM is not available or enough, especially with twins/triplets. Thus, sometimes they receive formulas with inherent risks. We observed few cases of NEC with formula milk and decided to start a DBMB.
Methods: Kimie (India), a new, automated, user friendly breast milk pasteurizer was imported. While maintaining international standards, PDBM was used for selected premature babies when there was a lack of OMBM or mothers were very sick. Women who delivered premature babies at our hospital some time ago & had enough breast milk were approached for donation while they were still in the hospital with their babies. PDBM was discontinued when OMBM was available.
Results: We have treated 11 babies/8 pregnancies (6 singletons, 1 twin, and 1 triplet) with PDBM. Gestation 24-35 weeks and birth weight 520g- 2300g. Expressed breast milk was donated by 16 women. Babies received PDBM for average 12days (2-32). One died at day 3 due to pulmonary hemorrhage. Others were discharged without any complications. None of them had gastrointestinal problems while receiving PDBM.
Conclusion: 1) With the use of Kimie we were able to start a DBMB, the first in Sri Lanka. 2) It is cost-effective & safe for premature babies till OMBM is available. 3) We were able to use PDBM obtained from women who had a premature rather than a full-term delivery. This will be superior in the management of premature babies worldwide.


Doctor
kimie
kimie

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Reducing inequity in services and improving outcomes across the Northern Neonatal Network (NNN) through a newly established Care Coordinator (CC) team

Hodgson A, Campbell C, Thompson S

Introduction:
Due to inequity across the northern region, some families are unable to access psychology, Allied Health Professionals (AHPs) or financial and logistical support, factors which would enable better partnership in their babies' neonatal care and improved outcomes. The Neonatal Critical Care Guidelines (NCCG) recommend investment in CCs, to facilitate the development of local priorities to enhance the experience of all families.
Who we are:
A team of three healthcare professionals from different professional backgrounds, who share a passion for Family Integrated Care (FIC) and parental involvement.
Aims:
To reduce inequalities and improve access to services, promote FIC, and enhance the family experience by listening to and involving parents.
To provide support and share good practice with other CCs nationally.
Method:
1. CCs meet weekly for strategy review and development.
2. Determine priorities and identify barriers with Parent Advisory Group (PAG).
3. Identify objectives utilising transformation frameworks e.g. 'Shared Commitment to Quality'.
4. Scope access to AHP and psychological services with reference to 'Getting It Right First Time' and other guidance.
5. Liaise with relevant stakeholders including charities and commissioners.

Outcomes:
Within the first 3 months the CC team set up:
- Regional PAG
- FIC working group
- National CC Group

In addition:
- Highlighted the role of neonatal AHPs and the added value they bring
- Identified access to psychological services
- Established positive relationships with the units and all stakeholders

Impact:
The CC Team have changed the landscape of neonatal services through building positive relationships with families, units and services, promoting FIC and access to AHPs and psychology. Parents have "welcomed the roles and feel it is long overdue towards promoting FIC" and that "CCs are a passage to get parent's views implemented." Future steps include, expanding the PAG to ensure broader representation of experiences and cultures.

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NeoPIG (Neonatal Perioperative Improvement Group): Striving for excellent perioperative care

O'Brien F, Campbell S, Collins E, Lakhoo K
[1]*Oxford University Hospitals NHS Foundation Trust*

Background
Neonatologists, although experts in intensive care, are not trained to provide optimal surgical conditions; paediatric anaesthetists, surgeons and scrub staff are unfamiliar with the NICU environment. NICU operating has potential for complications and human error, and variability exists in provision of surgery to neonates too sick to transfer who might benefit from surgery.
NeoPIG is a multidisciplinary team consisting of a neonatologist, paediatric surgeon, paediatric anaesthetist, neonatal and paediatric surgical nurses.
Aim
To reduce morbidity in preterm neonates undergoing surgery and facilitate operating in a timely manner, in a safe environment by happy staff; by means of a quality improvement project by NeoPIG.
Methods
An extensive review of surgical cases was performed to establish baseline data and identify specific problems and areas for improvement. Data were reviewed by NeoPIG and ideas generated for PDSA ('Plan, Do, Study, Act') cycles.
Findings from audits (eg perioperative pCO2 and thermoregulation) and proposed changes were communicated to each team and feedback was sought from all staff participating in NICU surgery by post-operative survey at various time-points as changes were made.
Results
Changes included tripartite discussions determining surgery location, introducing a standard operating procedure (SOP) for NICU surgery (including positioning team members (figure 1a), and equipment (figure 1b), and introducing CritiCool® for thermoregulation. Surgery on NICU became mandatory for all babies <1000g and those too unstable for transfer.
NICU operating resulted in less out of range pCO2 (figure 2) and use of CritiCool® significantly reduced hypothermia (figure 3). Feedback after introduction of the SOP and facilitation of NICU surgery was exceedingly positive, reflecting excellent team working, co-ordinated execution of tasks and a supportive environment.
Conclusion
The original and innovative NeoPIG approach facilitated reducing morbidity and NICU operating; staff felt supported and confident. Providing an improved environment, supporting staff and seeking feedback were paramount.

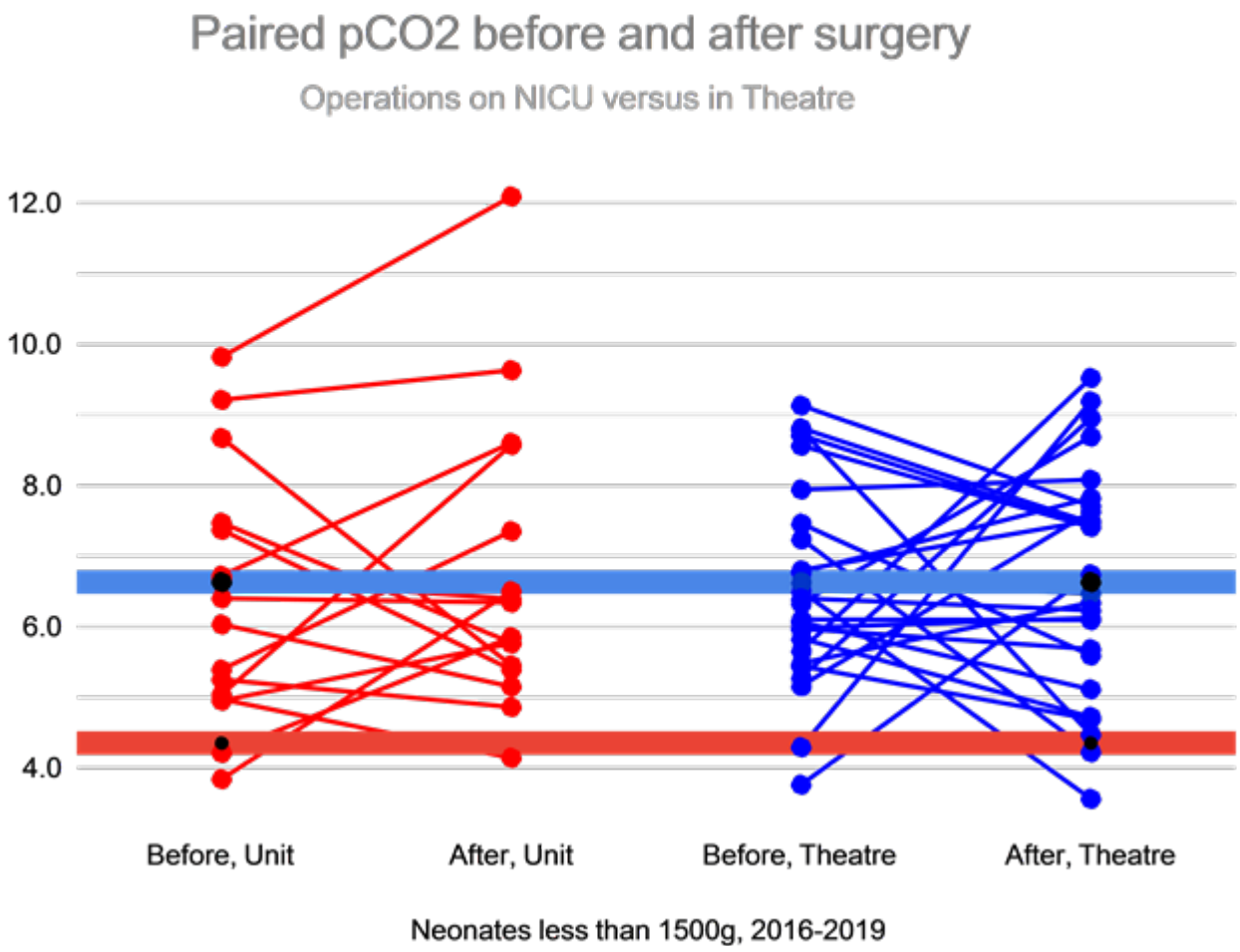
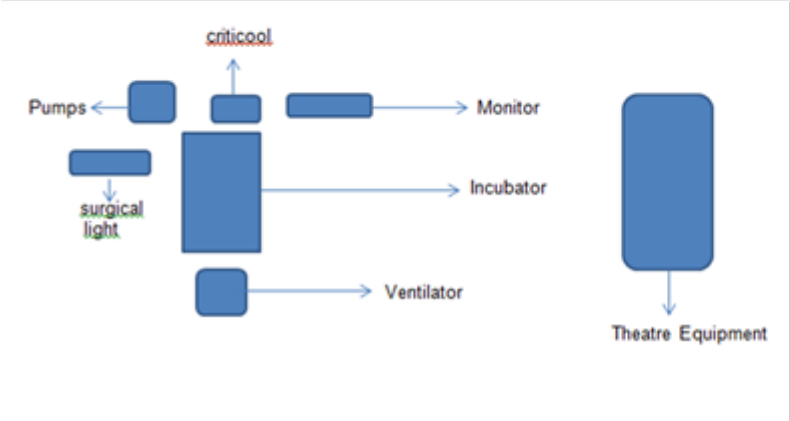

Paired pCO2 before and after surgery
Operations on NICU versus in Theatre
12.0
10.0
8.0
6.0
4.0
Before, Unit
After, Unit
Before, Theatre
After, Theatre
Neonates less than 1500g, 2016-2019

Figure 1a: Senior medical and nursing staff from surgical, anaesthetic and neonatal teams are present during surgery. Positioning of team members is crucial in this unfamiliar environment where space around the incubator is at a premium.

Figure 1b: Schematic produced to guide staff about positioning of equipment relative to baby's incubator



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An evaluation into the use of Procalcitonin levels as a biomarker of bacterial infection to aid the management of Intrapartum Pyrexia

Walker S[1], Harding I[1], Soomro K, Bamber A[1], Carrick S[1], Waheed A[1], Liebling R[1]
[1]*University Hospitals Bristol and Weston NHS Foundation Trust*

Objective:
Chorioamnionitis is reported to complicate 1-4% of births worldwide and can be associated with adverse perinatal outcomes. Consequently, there is a low threshold to commence empirical antibiotics in women who develop intrapartum pyrexia. There is growing evidence that suggests exposure to intrapartum antibiotics is associated with alterations in infant intestinal microbiome which could impact on early immune development. Procalcitonin (PCT) is an established biomarker for sepsis in the non-pregnant population, with better diagnostic and prognostic value for bacterial infections. We aimed to investigate PCT levels in women and their neonates in those managed for intrapartum sepsis.
Design:
An observational cohort study carried out at UHBW Foundation Trust, averaging 5500 deliveries a year. Over a 5-month period (June–October 2020), PCT levels were measured in addition to maternal and neonatal septic screen bloods for women who developed intrapartum pyrexia during the study period.
Results:
We included 117 women in our study (7% of our delivered population in the study period). A raised PCT of >0.5 ug/L at the time of the septic screen was found in two women (1.7%), compared to a raised CRP>10 in 100 women (86%). Blood cultures were done in all women and was positive in two cases (1.7%). A high proportion, 56/79 (70.8%), of placentas showed varying degrees of chorioamnionitis.
Conclusion:
In a cohort of women managed for intrapartum sepsis during labour, we found that 98% had normal PCT levels whilst in labour, at the time of the septic screen. This provides the basis for further research to assess the sensitivity and specificity of PCT levels in the accurate diagnosis of causes of intrapartum sepsis. The low number with a positive PCT was in accordance with the low number of confirmed bacteraemia. In contrast the majority of women (71%) had features of chorioamnionitis on placental histology.

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Improving education for neonatal GRID trainees through the COVID-19 pandemic

Lim Y, Bhayat S[1], Howarth C[2]
[1]St Thomas's Hospital, [2]Homerton University Hospital

Introduction
The London neonatal GRID teaching programme aimed to assist trainees in completing the curriculum and transitioning into a consultant role. National lockdowns and restrictions since the COVID-19 pandemic in March 2020 led to disruption of monthly face to face education days and this lack of targeted curriculum teaching potentially could delay trainees achieving their required competencies prior to CCT

Aim
To continue providing neonatal GRID curriculum teaching in an innovative way despite restrictions to neonatal trainees.

Methodology
Quality improvement PDSA methodology was used (image 1)

Results
29 trainees responded to initial survey and all expressed interest in a virtual teaching programme.
This was rapidly set up with host centres delivering a 'themed' teaching month mapped to the curriculum, with 1-2 sessions per week. Recordings of teachings were made accessible via an online platform (Trello) to enable sharing of resources.

After 6 months, a further survey with 41 responders (Figure 1) demonstrated that on a scale of 1 to 10, 73.2% ranked the programme between 9-10. (Figure 2)

82.9% would prefer a mixed of virtual and face-to-face teachings when restrictions ease. (Figure 3)
Interestingly, no responders wanted to go back to just face-to-face teaching; Easier accessibility and a wider range of speakers due to the virtual nature of the programme were cited as the main reasons.

Conclusion
The need for rapid adaptation to the restrictions of COVID-19 led to the development of a virtual teaching programme, which due to its success extended to an inter-regional programme involving London, East of England, Oxford and KSS. Recordings meant trainees could catch up at a time that suited their personal lives.

However, social interaction and networking is lacking, and simulations and technical skills teaching are impaired. Moving forward, with easing of restrictions, we will provide a mix of virtual and face-to face teaching


•Subsequent teachings planned according to survey results
•Lack of targeted curriculum teaching identified
•QI project to continue providing GRID teaching despite restrictions
•Intial survey sent to gather interest and teaching practicalites
Act
Plan
Study
Do
•Further survey sent out after 6 months to both trainees and hosts
•Results from surveys reviewed
•Virtual teaching programme set up after discussion with host centres about feasibility
•Pilot month held in July 2020
•Use of Zoom and Microsoft teams as online platforms

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Neonatal Outreach - Safety and Cost-effectiveness of a home nasogastric (NG) feeding service.

Warnock A, Inglis C[1], Mittal S[1], Fawke J[1]
[1]*Leicester Neonatal Service*

Background

Neonatal outreach teams play a vital role in the safe discharge of infants. Leicester Neonatal Outreach team developed a home NG feeding pathway in 2018; aiming to support early discharge, promote breast-feeding and focus on family-centred care. This review aims to assess overall safety, benefits and cost effectiveness by analysing potential bed days saved, breastfeeding rates and re-admissions.

Methods

We conducted a retrospective review of Badger records of all infants discharged NG feeding from Feb 2018 - Dec 2019. Data included: demographics, feeding intention, co-morbidities, number of home visits, re-admissions due to feeding/weight concerns and final infant feeding data.

Results

98 infants were discharged home NG feeding. 50% were born between 32-34 weeks, 78% discharged between 34-36 weeks corrected. 84% had no co-morbidities. Infants required a median of 8 home visits (IQR 6-10) and spent an average 14 days home NG feeding (range 1-46).
6/98 infants had static growth or weight loss noted, 4/6 had underlying co-morbidities.
97% of infants had successful NG removal on first attempt once oral feeding was established.
74% of mothers intended to breast-feed when admitted, 15% of these were formula feeding at hospital discharge. 74% of mothers who were giving their infants any breast-milk on discharge continued to do so on completion of home NG feeding, with 22% exclusively breast-feeding. Family feedback data was overwhelmingly positive.
Potential total hospital days saved was 1325 (median 11 days/infant). Using published reference costs for special care[1] (£605/day), gave a gross cost saving of £801,625 over the data collection period.

Conclusion

Home NG feeding is safe, effective and sustainable to provide. It allowed discharge a median of 11 days earlier, resulting in over £800,000 cost savings. It is liked by parents and facilitates breastfeeding by taking pressure off families to get feeding sorted quickly to get home.

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Reference range for cerebrospinal fluid values in neonates- Retrospective study

Gunti S, Loganathan P, Nair V, Mccune V
[1]*James cook University Hospital*

Title:Reference range for cerebrospinal fluid values in neonates- Retrospective study

Authors: Swathi Gunti, Vrinda Nair, Victoria McCune (Consultant Clinical Scientist in Microbiology), Prakash Loganathan

Objectives: To report the normative values for CSF parameters in neonatal population.

Methods: Single center, retrospective study from 2015 to 2020. All the data were obtained from Hospital database. (Ethics approval:297505).

Results: We had total of 518 neonatal CSF results with 6 positive CSF culture, 62 positive blood culture and 37 positive urine culture results. After exclusion (Gram stain positive:1, CSF culture results:6; CSF PCR:6, Traumatic CSF defined as ≥500 Red Blood Cells (RBC)/µL:273), we had 232 CSF results for analysis. Median gestational age and birth weight of infants in our cohort were 38 weeks (35-40) and 3030 grams (1965-3565). Median age at the time of lumbar puncture was 4 days (2-16). Median RBC count, White cell count, CSF protein Glucose were 15/ µL (3-85), 3/ µL (0-8.5), 0.72 mmol/dl (0.53-1.06) and 2.8 mmol/dl (2.4-3.3) respectively. On performing non-parametric test, there was significant difference in CSF RBC (23 vs 10 p 0.005) and CSf protein content (0.8 vs 0.6 p0.001)between neonates age <7 days as compared to neonates age >7 days and also Higher CSF protein(1.2 vs 0.6 p<0.001) in preterm neonates (<37 weeks) as compared to neonates >37 weeks. Neonates receiving antibiotics prior to CSF testing had higher CSF protein content (0.9 vs 0.6 mmol/dl, p<0.001) and higher CSF glucose levels (3 vs 2.7 mmol/dl, p=0.01).

Conclusion: In this study we have provided normative CSF values in neonatal population.Neonates receiving antibiotics prior to CSF testing had higher CSF protein content and CSF glucose levels .Significantly higher protein in neonates age <7 days and preterm neonates (<37 weeks) comparatively.
Prevalence of viral meningitis is higher in Paediatric patients (15%)vs NICU patients(3%).

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TWO-YEAR NEURODEVELOPMENTAL FOLLOW UP – AN AUDIT OF PRACTICE

Mundeshi V, Yasmeen A[1]
[1]*Victoria Hospital NHS Fife*

Authors: Vijaykumar Mundeshi, Asma Yasmeen
Hospital: Victoria Hospital Kirkcaldy, NHS Fife

BACKGROUND

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE (NICE) criteria advise enhanced developmental support and surveillance for up to 2 years (corrected age) for the babies:

1) Born before 30+0 weeks gestation
2) Born between 30+0 and 36 +6 and had:
   a). Grade 3 /4 Intraventricular Haemorrhage (IVH) or Cystic Periventricular Leukomalacia (PVL)
   b). Grade 2/3 Hypoxic Ischaemic Encephalopathy (HIE)
   c). Neonatal Meningitis
   d). Herpes simplex virus (HSV) Encephalitis.

CLINICAL AUDIT DESIGN
OBJECTIVES
To check the compliance of neurodevelopmental follow up in at risk group at Victoria Hospital Kirkcaldy (VHK) as per NICE recommendation

STANDARD
NICE criteria (mentioned above) used as standard.

METHODOLOGY:
Retrospective observational study

Inclusion Criteria:
All babies born in 2018 at VHK who were:
1)Born before 30+0 weeks gestation.
2)Born before 36+6 weeks gestation and had:
   a) IVH Grade 3 or 4 or cystic PVL
   b)HIE Grade 2 or 3
   c)Neonatal meningitis or
   d)HSV encephalitis

Exclusion Criteria:
• Babies who died before reaching 2year corrected gestation or were discharged to other health boards

DATA COLLECTION:
• From patient records on Badgernet and Clinical Portal.

RESULTS

1). Total 26 infants were eligible, 10 excluded due to discharge to other health board or death. (Figure 1 and 2 for demographic details).
2). Sixteen babies were studied in detail:
    a). 2-year Follow up Completed: 81% (13)
    b). Follow up Documented on Badgernet:62% (10)
    c). Standardised developmental tool used:12.5%(2)

We fulfilled NICE recommendations in 81% of at-risk infants.

RECOMMENDATIONS:

1. Adapting standardised Developmental Assessment Tool
2. Education and training of professionals involved
3. Organising funding for allied professionals at the follow up clinic.

RE-ADUIT

We aim to reaudit in 1-2 years with recommendations in place and expect to improve Neurodevelopmental follow up rates and use of standardised tests for assessment.

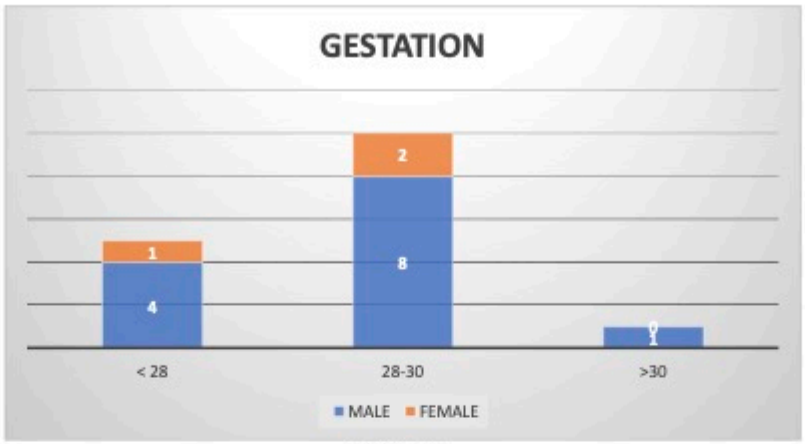

FIGURE 1

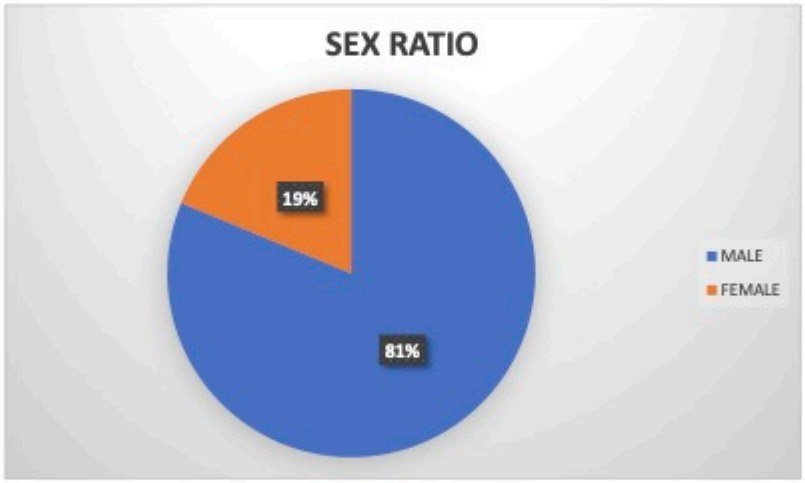

FIGURE 2

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20 is the new 10; improving antibiotic stewardship in suspected early onset neonatal infection

Brown K, Gurung A
[1]*University Hospital Southampton NHS Foundation Trust*

Background

Suspected neonatal early onset infection (SEOI) is a large workload at UHS (11% births >35 weeks). 48% of babies were continuing antibiotics following negative blood culture. Decision making is mostly based on CRP. In comparison to its predecessor the NICE neonatal infection guideline (NG195) has no guidance about CRP threshold (10 in CG149). The majority of infants treated for SEOI are well and we note that CRP can be raised in healthy newborns (1). The 95th percentile CRP in healthy infants at 48hrs is 12-14 but this can be up to 50 (2).

Aim

To safely reduce antibiotic days for well babies treated for SEOI

Methods

Our project involved accepting CRP up to 20 in well babies from March 2021. If blood culture is negative at 36 hours, antibiotics could be stopped and the baby discharged with safety-net advice. Education was given at induction, local guideline updated, posters and the tag line “20 is the new 10” promoted change. Badgernet identified babies March-April 2021 >35 weeks; <3 days old on cefotaxime.

Results

11 babies had a CRP 10-20. Of these 10 (91%) stopped their antibiotics at 36 hours. None of these babies were readmitted with infection. 30 bed days and 60 doses of cefotaxime have been saved. The number of babies having antibiotics >36hrs is reduced by 16%.

Conclusion

Accepting CRP up to 20 in well babies with SEOI has safely reduced antibiotics, enabling savings in bed days and medication.

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From foetus to postnatal surgery: A comprehensive longitudinal pathway for management of Congenital Diaphragmatic Hernias (CDH) from the womb to the neonate.

Bhayat S[1], McCorquodale A[2], Taune A[1], Bredaki E[1], Attilakos G[1], Kortsalioudaki C[1], Hannam S[2]
[1]University College Hospital London, [2]Great Ormond Street Hospital

Background
Following CDH diagnosis (incidence of 0.025% of live-births), patients are seen in Fetal Medicine Units(FMU) for multidisciplinary counselling.

Aim
To identify factors associated with outcomes in order to tailor individualised counselling and enable informed decision-making. Secondary aim was to recognise factors associated with poor outcomes and guide family discussions.

Method
We conducted a single-centre cohort study of CDH cases over 5 years(2014-2018). During this period Fetoscopic Endoluminal Tracheal Occlusion was not offered in our centre. Data were collated from maternal and baby records. Descriptive statistics were used for data analysis while Mann-Whitney-U and chi-2-square tests were used to compare variables.

Results
59 fetal cases with CDH were identified (92% were referred from other centres for specialised FMU input). Following counselling, 37%(n=22) opted for termination (TOP). 54%(n=32) underwent an amniocentesis, of which 22%(n=7/32) had abnormal genetics(6/7 had TOP). Women who had TOP were older(mean-age:31 vs 28, p=0.026). The hernia side did not influence the TOP decision[13.6% right-sided CDH in TOP-group versus 21.6% in non-TOP group, p=0.44], nor did the O/E LHR(for TOP-group 39% vs 43% for non-TOP group, p=0.27).
Out of 36 livebirths, 30 were in-born(Table1). Overall mortality of babies born alive was 31%(n=11) but dropped significantly to 23%(n=7)(p=0.03) when the single-centre care pathway was followed.
Of the 24/30(80%) who underwent corrective surgery, 9(30%) had thoracoscopy versus laparotomy. Median time-to-surgery was 6-days(IQR:4-12.5). 91% required nitric-oxide, and 74% inotropic-support prior to surgery. Amongst the survivors, median duration-of-ventilation post-operatively was 5-days(IQR:2-8). 9(39%)babies developed surgical complications.

Conclusion
Cases of CDH should be referred and counselled at a specialised tertiary regional-centre where an individualised approach can be offered. Delivery in the regional-centre is advised as associated with better survival(77%). Low O/E LHR ratios, associated anomalies, need for ECMO, are linked with higher risk of mortality. Survival to surgery is associated with a favourable outcome.

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Facilitating family integrated care of the dying neonate within Covid-19 restrictions

Colwell P, Colwell P[1], Gottstein R
[1]*Saint Mary's Hospital, MFT NHS*

Background
As national and local guidance directs, individuals testing positive for Covid-19 are required to self-isolate at home. Some may be parents of a critically ill baby in the neonatal unit and be unable to be with their baby. When their baby is dying, discussions around redirection of care, meeting family needs and the safety of staff posed completely new challenges.
Methods
Due to the deterioration of a critically ill baby, the neonatal team used a problem-solving approach and multidisciplinary team working to enable a Covid-19 positive parent to be with their baby during death. The neonatal team used virtual methods to have discussions around end of life decisions and to show the family where they could be with their baby, as identified and assessed as appropriate. Facetime conversations with parents created the opportunity for two-way decision making, enabling preparations that met parental wishes.
Meeting the needs of the parents and their dying baby was highly important. However, the safety of the hospital, neonatal staff and other families required careful consideration. The neonatal team considered multidisciplinary views with the support and guidance of the Infection Control and Neonatal Bereavement teams.
Results/Conclusions
Created by the Covid-19 pandemic, with what initially seemed an impossibility, the neonatal team successfully enabled a Covid-19 positive parent to be with their baby during the end of life. Parents and cross-departmental staff were included in discussions, decision making and supported using alternative facilities and communication methods.


ROP Screening/
Treatment Room
PPE
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Mode of conception and neurodevelopmental outcome in preterm-born children at age 5: the EPIPAGE-2 cohort

Morgan A, Verhaeghe C[1,2], Marchand-Martin L[1], Kaminski M[1], Gascoin G[3], Foix L'Hélias L[1,4,5], Ancel P[1,6], Bouet P[2]

[1]Université de Paris, CRESS, Obstetrical Perinatal and Pediatric Epidemiology Research Team (EPOPé), INSERM, INRAE, [2]Department of Obstetrics and Gynaecology, CHU d'Angers, [3]Department of Neonatal Intensive Care, CHU d'Angers, [4]Sorbonne University, [5]Department of Neonatal Pediatrics, Trousseau Hospital, APHP, [6]Clinical Investigation Center P1419, APHP, [7]Elizabeth Garrett Anderson Institute for Women's Health, UCL, [8]Department of Neonatal Intensive Care, Maternité Port-Royal, APHP

Introduction: Prematurity is a risk factor for neurodevelopmental impairment. Pregnancies conceived following assisted reproductive technology (ART) have a higher risk of delivering preterm. We studied neurodevelopmental outcomes at 5½ years of age in children born preterm according to whether conception was spontaneous or following ART.

Methods: Children born from 24 to 34 weeks of gestation surviving to 5½ years of age from the prospective French national EPIPAGE-2 cohort were included. Follow-up included assessment of IQ (using the WPPSI-IV), vision, hearing, cerebral palsy (CP, using the Gross Motor Classification System (GMFCS)) and fine motor ability (using the Movement Assessment Battery for Children (MABC-2)). Effects for children born following ART compared to spontaneous conception were assessed using generalised estimating equations after multiple imputation of missing data and adjustment for social factors (maternal education, smoking, employment, partnership status, birth country, socio-economic status); subgroups of children born after simple stimulation (SS) or intra-uterine insemination (IUI), and in vitro fertilisation (IVF) or IVF with intracytoplasmic sperm injection (ICSI) were also examined.

Results: 4349 survivors were included: 814 following ART and 3535 following spontaneous conception. There were no differences following ART in mean IQ (adjusted difference: 0.1, 95% confidence interval (95%CI) -1.4 to 1.6) or MABC-2 scores (adjusted difference 0.0, 95%CI -0.3 to 0.4), or in CP (adjusted odds ratio (aOR) 1.01, 95%CI 0.65 to 1.57). No differences were seen for subgroups of SS/IUI or IVF/IVF-ICSI. Moderate-severe neurodevelopmental disability (CP≥GMFCS-2, IQ <-2SD from reference group mean, moderate-severe sensory deficiency) was the same for ART (aOR 1.08, 95%CI 0.80 to 1.45) and ART subgroups (SS/IUI: aOR 1.03, 95%CI 0.71 to 1.51; IVF/IVF-ICSI: aOR 1.13, 95%CI 0.75 to 1.69) compared to spontaneous conception.

Conclusion: In this cohort of preterm-born children, there was no evidence of the mode of conception impacting neurodevelopment at 5½ years of age.

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The legacy of maternal SARS-CoV-2 infection on the immunology of the neonate

Chandiramani M, Gee S[2], Seow J[3], Pollock E[2], Modestini C[1], Das A[2], Tree T[2], Doores K[3], Tribe R[4], Gibbons D[2]
[1]Department of Women's Health, Guy's and St Thomas NHS Foundation Trust, [2]Peter Gorer Department of Immunobiology, School of Immunology and Microbial Sciences, King's College London, [3]Department of Infectious Disease, School of Immunology and Microbial Sciences, King's College London, [4]Department of Women and Children's Health, School of Life Course Sciences, Faculty of Life Sciences and Medicine, King's College London, St Thomas' Hospital

Introduction
Despite extensive and ongoing studies of SARS-CoV-2 and evidence that pregnant women are at increased risk of severe COVID-19, the effect of maternal infection on the developing neonate remains unclear. To determine the potential impact of exposure to SARS-CoV-2 in utero on the neonate, we assessed the immunological status of neonates born to mothers with confirmed SARS-CoV-2 infection that occurred at different stages of gestation.
Methods
Umbilical cord blood (and paired maternal peripheral blood) was collected over the COVID-19 pandemic (28/5/20-1/3/21) at the time of birth from neonates born to mothers who were SARS-CoV-2 Exposed (SE) attending the maternity unit at GSTT, London in heparinised blood tubes at the time of birth to investigate the immune status (REC 19/SC/0232). Maternal and neonatal SE plasma samples were used for antibody and cytokine testing. Neonatal cell samples were used in flow cytometry and in SARS-CoV-2 reactive cell testing experiments along with their paired mother cell samples.
Results
Transfer of maternal SARS-CoV-2 specific IgG to neonates was apparent although neonates born to mothers with recent/ongoing infection had reduced SARS-CoV-2 specific IgG compared to those born to mothers with recovered infection. Despite equivalent levels of B cells and CD4 and CD8 T cells in neonates irrespective of their mother's SARS-CoV-2 status, enhanced percentages of NK, NKT and FOXP3+ regulatory T cells were seen in neonates born to mothers with recent/ongoing infection compared to those neonates born to mothers with recovered infection or uninfected mothers. Interestingly, cytokine functionality was enhanced in neonates born to mothers exposed to SARS-CoV-2 at any time during pregnancy compared to those born to uninfected mothers.
Conclusions
This study indicates that maternal SARS-CoV-2 infection influences in utero priming of the fetal immune system. In most neonates, this immune imprinting was non-specific, providing evidence that vertical transmission of SARS-CoV-2 was limited.

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Conservative management of complex pulmonary pneumatoceles – two different approaches

Datir S[1], Meena V[1], Vass G[1]
[1]*John Radcliffe Hospital*

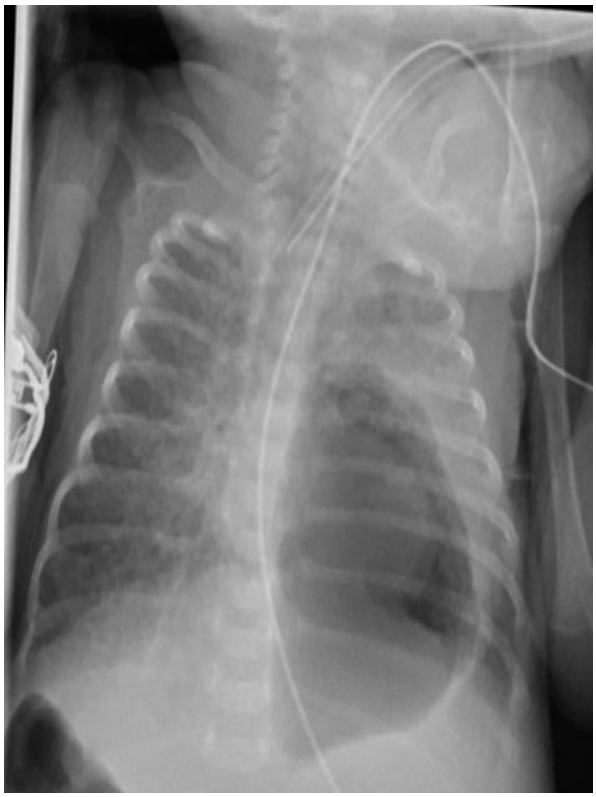
Introduction: Pneumatoceles are thin walled air-filled cystic lesions of the lung. Extreme premature infants are susceptible to develop pneumatocele, particularly secondary to ventilator-induced lung injury and pneumonia. Management options range from conservative approaches to surgical lobectomy depending upon severity and clinical status.

We report two cases where pneumatoceles were managed with different conservative approaches.

Case 1: A twin girl born at 26+6 weeks via vaginal delivery with background of oligohydramnios and chorioamnionitis required higher settings of mechanical ventilation in the first week of life. She was extubated on day 9 to high flow therapy. She was re-intubated on day 75 for a right sided multi-cystic lesion in upper/mid lobe causing mediastinal shift and left lung collapse. Initial management with high frequency oscillation ventilation (HFOV) was not beneficial. Selective intubation of left main bronchus combined with low pressure HFOV resulted in complete resolution of pneumatocele followed by successful extubation on day 93.

Case 2: A twin girl born at 25+5 weeks after emergency Caesarean section with background of chorioamnionitis had significant respiratory distress requiring mechanical ventilation and two surfactant doses. On day 12, chest x-ray showed bilateral cystic lesions. The right cyst showed spontaneous resolution while the left one enlarged significantly causing high ventilator requirements. She had pneumonia on three occasions. Low pressure HFOV, steroids, and selective right sided intubation were unsuccessful; she remained ventilator-dependent. On day 49, a pigtail catheter was inserted into the pneumatocele using ultrasound guidance. The pneumatocele collapsed; with successful extubation on day 51 and drain removal on day 65. Her treatment is ongoing and pneumatocele being monitored.

Conclusion: Pneumatocele may resolve spontaneously but may follow a complicated course if extensive and persistent. While there is no consensus management, selective ventilation and ultrasound guided percutaneous catheter drainage are effective management strategies prior to surgical approach.



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Changes in perinatal activity in a region of England in 2020 associated with the coronavirus pandemic according to ethnicity

Morgan A, Bradford C[4], Farrow H[5], Draper E[6], Harrison C[7]
[1]Université de Paris, CRESS, Obstetrical Perinatal and Pediatric Epidemiology Research Team (EPOPé), INSERM, INRAE, [2]Elizabeth Garrett Anderson Institute for Women's Health, UCL, [3]Department of Neonatal Intensive Care, Maternité Port-Royal, APHP, [4]Yorkshire & Humber Neonatal ODN, [5]Y&H Maternity Clinical Network, NHS England and NHS Improvement - North East and Yorkshire, [6]The Infant Mortality and Morbidity Studies, University of Leicester, [7]Embrace Yorkshire & Humber Infant & Paediatric Transport Service

Background: Public health measures implemented for COVID-19 may have impacted perinatal activity. Rates of stillbirth, extreme preterm birth (EPT, <27 weeks' gestational age (GA)), hypoxic ischaemic encephalopathy (HIE), meconium aspiration syndrome (MAS) and perinatal transfer in the Yorkshire & Humber region during the pandemic were compared to previous years.

Methods: Weekly totals (29/12/2014 to 28/12/2020) of: women delivering, births, live births and stillbirths were collected from hospitals; antenatal transfers and neonatal admissions of infants born EPT or at 36+ weeks' GA with MAS (definition: requirement for nitric oxide within 5 days of birth) or HIE (treatment with active hypothermia following birth) were collected from regional databases. Outcome rates during the a) first lockdown (20/03/2020 to 14/06/2020); b) entire coronavirus period (after 20/03/2020); c) different pandemic periods (first and second (09/11/2020 to 03/01/2021) lockdowns, and in between); were compared to historical baseline using interrupted time series analysis, adjusted for time trend, population and seasonal variation, and repeated according to ethnicity using Office for National Statistics classifications.

Results: Stillbirths fell from 3.7/1000 deliveries pre-pandemic to 2.9/1000 afterwards; EPT admissions decreased from 2.5/1000 to 1.8/1000 live births. Following adjustment, during the first lockdown there were non-statistically significant increased stillbirths (relative risk (RR) 1.07, 95% confidence interval (CI) 0.77-1.49 with) decreased antenatal transfers (RR 0.73, 95%CI 0.57-0.94) and EPT admissions (RR 0.88, 95%CI 0.60-1.29). Over the entire coronavirus period, antenatal transfer (RR 0.65, 95%CI 0.55-0.76) and EPT admissions (RR 0.73, 95%CI 0.56-0.94) decreased; stillbirths showed non-statistically significant increases (RR 1.21, 95%CI 0.98-1.49) but with increasing trend across pandemic periods (RR 1.11, 95%CI 1.00-1.22 per period). No changes were seen for HIE, MAS, or in subgroup ethnicity analyses.

Conclusion: Following implementation of pandemic public health measures, fewer antenatal transfers and EPT admissions occurred, and stillbirths appeared to increase. There were no differences according to ethnicity.

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Exploring the organ and tissue donation potential in a Neonatal Intensive Care Unit

Chase R[1], Williams C[1], Morris A[1], Singh A[1]
[1]*Birmingham Women's And Children's Nhs Foundation Trust*

Background and aims
Hepatocyte transplantation and Organ Donation (OD) awareness is enabling families and staff in Neonatal intensive care units (NICU) to seek information on donation as an option in the 'End of life care' process. We performed a retrospective study to evaluate the number of potential referrals to the Specialist Nurses for Organ Donation (SNOD) for OD/ tissue donation (TD) screening over a 6-year period.
Methods
Badgernet database was investigated to screen all deaths from 2015-2020 in our NICU, to identify potential neonatal organ/ tissue donors.

Results
There were 58 term / corrected term deaths over the study period. The death diagnosis included Hypoxic Ischemic Encephalopathy (11), congenital diaphragmatic hernia (14), sepsis (2), congenital cardiac disease (11), renal conditions (6), congenital abnormalities (6) and others (8). All deaths were diagnosed by circulatory criteria with no neonate having structured neurological death testing. There were 4 hospice deaths. 47 babies were ventilated at the time of reorientation of care / death. There was no consistent documentation to accurately identify controlled deaths for commencement of the OD process. All deaths could have been considered for TD.
Conclusion:
There was potential in the study cohort for SNOD referral for OD screening. There should be an on-going education drive in order to prospectively identify and refer patients in a timely fashion in controlled neonatal deaths. Even though most neonates will die as a result of circulatory death, there should be a willingness by trained professionals to do neurological death testing.

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Understanding Staff Culture Towards Breast Milk and its use in the Neonatal Intensive Care Unit

Stanley E[1], Doherty C[1]
[1]*University Hospital of Wales*

Background
Maternal breast milk has many benefits on short and long-term outcomes in neonates, improving neurodevelopmental outcomes and reducing the risk of complications and morbidities. However, breast-feeding rates in Wales and our large tertiary unit remain low especially when compared to similar high-income countries with 42% of premature infants (<32 weeks) not receiving any maternal breast milk (MBM) at discharge.
Aim
To understand the culture among medical and nursing staff in a large regional tertiary neonatal unit on the use and promotion of breast milk and support of the parent-baby relationship, in order to realise a baseline for change and introduce a platform for staff empowerment.
Method
To assess current attitudes and beliefs amongst staff, a questionnaire was designed and distributed to medical and nursing staff on the NICU (n=50). An independent survey of ward round discussions (n=96) was also undertaken to appreciate the frequency of discussions on topics related to breast milk and the parent-baby relationship.
Results
The majority of staff (60%) hold a neutral or an 'agree' stance that they would benefit from more training on teaching and advising about maternal expression of breast milk, colostrum, and providing skin-to-skin. Many would also like to improve interprofessional communication between the NICU staff and the maternity team with regard to giving early colostrum (94%), and supporting and empowering parents with expression (72%). On ward rounds, topics relating to skin-to-skin, maternal expression of breast milk and EBM volume are more infrequently discussed (range 50-60%) compared to staff estimations and expectations.
Discussion
Variance between 'work as imagined' versus 'work as done' highlights the importance of human factors in relation to maternal breast milk on the NICU. Educational interventions on MBM and support of the parent-baby relationship would be of benefit to both medical and nursing staff.

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Management of a neonate with Cardiac Rhabdomyoma

Datir S[1], Poulose L[1]
[1]*John Radcliffe Hospital*

Introduction: Primary cardiac tumors are rare in neonates. Rhabdomyomas are the most common cardiac tumors, with a prevalence of approximately 0.25% in infants and young children.

We present a case of preterm neonate with cardiac rhabdomyoma.

Case history: A 2.6 kg male baby was born by elective caesarean section at 36+3 weeks to a primiparous mother with medically managed gestational diabetes mellitus and history of supraventricular tachycardia during pregnancy. The 20-week anomaly scan was normal. However, on 28-week scan, there was a large mass noted occupying right ventricular cavity. This was confirmed in fetal cardiology review which showed a large mass, possibly rhabdomyoma, arising from tricuspid valve papillary muscle very close to the septum within the right ventricular cavity with preserved right ventricular function and no impact on either right ventricular inflow or outflow, and consistently in sinus rhythm. However, no genetic testing was done.

Baby was born in good condition and was admitted to NICU for monitoring. The cardiac examination was unremarkable. There were no dysmorphic features or evidence of neuro-cutaneous markers. An echocardiography (ECHO) confirmed diagnosis with no right ventricular obstruction. ECG monitoring for 72 hours was unremarkable.

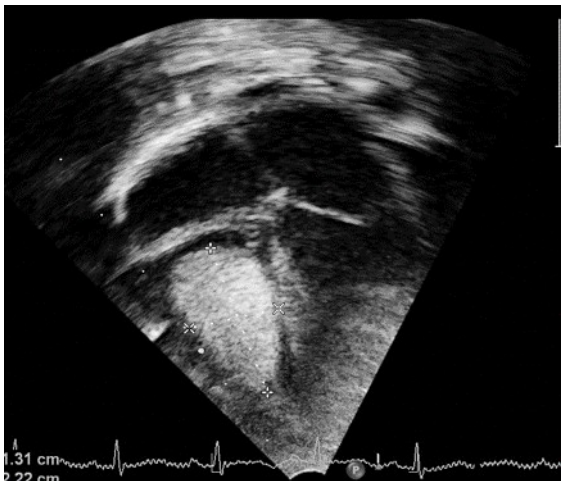
Genetic testing for Tuberous Sclerosis was negative. The ophthalmology review revealed normal fundus examination. The renal and abdominal ultrasound were unremarkable.

Baby remained asymptomatic with no arrhythmias or hemodynamic compromise and was discharged home.

Cardiac MRI at 2 months confirmed that the mass was arising from the tricuspid valve apparatus and was more likely to be rhabdomyoma.

Conclusion: Neonatal cardiac rhabdomyoma has excellent prognosis and spontaneously regress over time. Serial ECHO and ECG assessments is crucial in monitoring and early identification of babies at risk of ventricular outflow obstruction requiring surgery.

In addition, prenatal genetic testing for Tuberous Sclerosis gene should be considered due to strong association with Tuberous sclerosis.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Siblings matter!; development of a care-package to tackle inequality of COVID-19 visiting restrictions within families

Chamberlain H[1]
[1]*Leeds Centre for Newborn Care*

Background/introduction

COVID-19 has forced a stark inequality between members of the same household; parents are allowed to visit their newborn but siblings are not. Whilst this is somewhat justifiable, not being able to visit alongside their parents is leaving siblings confused, frightened & frustrated. This, in turn, is burdensome for parents.

Aim

By developing a care-package to be sent home to siblings, we aimed to investigate whether or not we could:
1. improve sibling inclusion (directly mitigate against the inequality of visiting restrictions)
2. improve sibling mental health
3. reduce reported parental anxiety
4. stimulate safe discussion/reflection within families

Protocol/method

The care-package was developed with input/suggestions sought from staff, education providers & parents themselves.

Semi-structured interviews were conducted with parents. For each of the four areas highlighted above, generic opinions as well as numerical ratings were sought. Interviews were done with two groups – (1) had not been offered the care-packages (because they were not yet developed/established) and (2) had been offered the care-packages (one month after launch).

Eligibility included parents of babies who:
- had a sibling
- <30 weeks gestation
- inpatient for at least 4 weeks
- English-speaking

All eligible parents were approached on a given week and were interviewed within seven days of agreement to participate.

Results

Thematic analysis and direct scoring comparison revealed that the care-packages had a positive effect in all areas. Of particular interest was that parental anxiety regarding sibling wellbeing was reduced with parents commenting that they were more fulfilled by their own visiting, knowing that their older children were happier at home.

Conclusions

We advocate that siblings should be included in the neonatal journey and recommend the use of similar care-packages in the COVID era and beyond. This will, no-doubt, serve to improve sibling mental health & reduce parental anxiety.

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Staff Experience of Introduction of Video Messaging to the Neonatal Unit During the Covid-19 Pandemic

Fleming R[1], Monnelly V[1]
[1]*Nhs Lothian*

Background
Family integrated care (FiCare) advocates parents as primary caregivers. There is growing evidence demonstrating its associated improved outcomes for babies.

Benefits of asynchronous video messaging have been documented by Patel et al. and in April 2020, during the first wave of Covid-19, a new, secure video messaging service – vCreate – was introduced to our unit.

New changes can be challenging for staff, particularly at a time when workload is high. We sought to obtain an insight into staff perception of vCreate in order to maximise engagement and address any challenges faced.

Aim
To evaluate the neonatal unit staff experience of vCreate in a tertiary neonatal unit during the Covid-19 pandemic.

Methods
Neonatal unit nursing staff completed free text responses to the question "what do you think about vCreate?"

Anonymous free text responses underwent qualitative analysis to identify common themes.

Results
Responses were received from fifty members of staff. Engagement has been good with 96% of staff surveyed having used vCreate for video messaging and/or to send photos. Common themes in free text responses were ease and speed of use of the equipment and the vCreate application and family appreciation of the videos. Staff reported liking being able to accompany videos and photos with messages and that it helped parent staff relationships. The few negative comments pertained to staff wishing for further education on vCreate account setup.

Conclusion
Initial responses from staff are extremely positive and demonstrate the ease of use of vCreate and the important role that it plays in delivery of FiCare. They have helped direct training in setup of vCreate accounts and vCreate education is now included as part of induction for new staff.

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Neutrophil-to-lymphocyte ratio in women with late miscarriage or preterm birth - a potential diagnostic aid in the clinician's armamentarium to diagnose placental inflammation/infection and facilitate timely delivery.

Modestini C, Trowsdale Stannard M[1], King E[1], Ridout A[1], Shennan A[1], Chandiramani M[1]
[1]*St Thomas' Hospital*

Introduction
Placental inflammation and infection is often implicated in the onset of late miscarriages and preterm birth and is associated with poor neonatal outcomes. A raised neutrophil-to-lymphocyte ratio (NLR) >6 has been shown to be associated with systemic inflammation in critically ill patients, as well as an independent risk factor for all-cause mortality in the elderly. It remains unclear if the altered immune state in pregnancy lends itself to NLR being used as another tool in the diagnosis of subclinical chorioamnionitis. We sought to determine the relationship between placental inflammation and NLR, as well as other inflammatory markers.

Methods
We undertook a retrospective study of all women who delivered between 16 and 36+6 weeks' gestation at St Thomas' Hospital over a two-year period (31/1/2019-31/1/2021). Clinical signs of sepsis (temperature, pulse and respiratory rate), NLR within 24 hours of delivery, C-reactive protein, total white cell count and placental histology were collected. The NLR in women with histological evidence of placental infection/inflammation was compared with those without evidence of infection/inflammation. Performance of the other collected markers were compared.

Results
Clinical data and placental pathology was collected for 613 women. Of these, 97% (592/613) of women had a WCC/CRP undertaken within 24 hours prior of their delivery. 42% (248/592) had confirmed histological chorioamnionitis. The mean NLR was raised in this group compared to those with non-inflammatory placenta (n=344), 9.8 vs 5.7. In women with placentas showing signs of histological chorioamnionitis, 56% had an NLR>6 compared to 27% in those without inflammation.

Conclusions
Further work is underway to determine if test performance in this group of women is superior to that of our traditional clinical signs, whether this can further aid decisions to deliver women before they show overt signs of clinical chorioamnionitis, and whether timely delivery has longer term benefit to the neonate.

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Improved nutritional outcomes with neurally adjusted ventilatory assist (NAVA) in premature infants: A single tertiary neonatal unit's experience.

Shetty S, Benn K[1], De-Rooy L[1], Cornuaud P[1], Kulkarni A[1], Shetty S[1,2]
[1]St Georges Hospital, [2]St Georges University of London

Background: During NAVA/NIV (non-invasive) NAVA, a modified nasogastric feeding tube with electrodes monitors the electrical activity of the diaphragm (Edi). The Edi waveform determines the delivered pressure from the ventilator. Infant breathing is in synchrony with the ventilator and therefore is more comfortable with less work of breathing. Our aim was to determine if infants on NAVA had improved weight gain compared to infants managed on conventional respiratory support.

Methods: A retrospective study was undertaken. Infants on NAVA were matched with two conventionally ventilated controls by gestational age, birth weight, sex, antenatal steroid exposure and whether inborn/or transferred ex utero. NAVA/ NIV-NAVA was delivered by the SERVO-n® Maquet Getinge group ventilator. Conventional ventilation included pressure and volume control ventilation and non-invasive ventilation included biphasic positive airway pressure, CPAP and heated humidified high flow oxygen. Outcomes measured were discharge weight z scores.

Results: Eighteen "NAVA" infants with median gestational age (GA) 25.3 range (23.6-27.1) weeks and birth weight (BW) of 765 (580 -1060) grams were compared with 36 controls with GA 25.2 (23.4-28) weeks (p=0.727) and BW 743 (560-1050) grams (p=0.727). There was no significant difference in the rates of post-natal steroids (61% versus 36% p=0.093), necrotising enterocolitis (22% versus 11% p=0.279) and type of milk at discharge (Breast 78% versus 58%, Formula 11% versus 31%, mixed 11% versus 11%, p=0.275) in the NAVA/NIV NAVA compared to the control group. There was no significant difference in the birth Z scores 0.235 (-1.56 to 1.71) versus -0.05 (-1.51 to -1.02) p=0.248 between the groups. However, the discharge Z score was significantly in favour of the NAVA-NIV-NAVA group -1.22 (-2.66 to -0.12) versus -2.17 (-3.79 to -0.24) in the control group (p=0.033).

Conclusion: The combination of NAVA/NIV-NAVA compared to conventional invasive and non-invasive modes may contribute to improved nutritional outcomes in premature infants.

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Adherence to Element 5 Saving Babies Lives Care Bundle (v2) at a Level 3 neonatal unit

Modestini C, Caunt O[1], Shennan A[1], Chandiramani M[1]
[1]*Guys and St Thomas NHS Foundation Trust*

Introduction:
Preterm birth is the most important single determinant of adverse infant outcome with regards to survival and quality of life. The national ambition addressed in Saving Babies Lives Care Bundle (v2) – Element 5 is the reduction of preterm birth from 8% to 6%, and where preterm birth is unavoidable, maternity units should focus on better preparation of babies for their imminent birth. We undertook an audit to determine how we were performing in relation to these targets.

Methods:
All preterm births over a 10-week period were identified. Clinical data including delivery data and medication records were collected.

Results:
30 women were delivered at less than 34 weeks' gestation over this period. Of these women, 50% had a pre-labour caesarean section. 87% received a complete course of antenatal corticosteroids within 1 week of delivery, 7% received their course more than a week before delivery and 6% received no antenatal corticosteroids. 2 of these women were admitted to ITU on ECMO with COVID-19. Over 90% of these women received magnesium sulphate for neuroprotection in the 24 hours prior to delivery. All of the women gave birth in hospital, the appropriate care setting, with access to a Level 3 neonatal unit.

Conclusion:
Our local preterm birth rate is 6.7%, despite our urban socially deprived population and one of the biggest preterm birth prevention services in the country. This is a testament to our screening for preterm birth risk at booking and serial surveillance and intervention during pregnancy. Despite good overall adherence to national targets, ongoing shared local learning will facilitate continued understanding of the reasons this small group of women did not receive timely antenatal corticosteroids and magnesium sulphate in preparation for birth.

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Review of the outcome and efficacy of larger bore pigtail chest drains on a Neonatal Intensive Care Unit

Taylor J[Royal Bolton Hospital Manchester United Kingdom]

Background
Pigtail catheters are commonly used on neonatal intensive care units in the UK for drainage of pneumothoraces. However, formal guidance doesn't exist regarding size of pigtail catheters. A previous audit on our unit showed that size 8.5 and 10Fr were superior in draining pneumothoraces compared to smaller sizes with a marked reduction in the complication rate such as re-accumulation post insertion with larger catheters. Consequently, our unit currently only use size 8.5 and 10Fr.

Methodology
A retrospective review using BadgerNet and case notes of all babies cared for at Royal Bolton Hospital who developed pneumothoraces from 1st January 2015 to 31st December 2019. The aim of the review was to quantify any complications related to larger chest drain use and to confirm an improvement seen by a previous change in practice.

Results
21 infants with a pneumothorax required chest drain insertion during this period. Gestation varied between 25+0 weeks to 39+2 weeks. Out of 21 infants, only two initial chest drains were found to be ineffective requiring insertion of second drain.

Conclusion
Use of 8.5Fr pigtails resulted in no re-accumulation of a pneumothorax in all but two infants during a 4-year period. There were no adverse incidents with a larger size pigtail catheter in both preterm and term infants. This review of a switch in practice to the use of larger chest drains confirmed our previous findings that they are more effective in treating pneumothoraces and carry no higher risk of complications.

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Highlighting strategies for the reduction of term admissions at a Level 3 Neonatal Unit.

Keen D[1]
[1]*East Kent Hospitals University NHS Foundation Trust*

Separation of unwell term infants from their mother's after delivery is associated with delayed establishment of breastfeeding, impaired bonding and increased stress for mother and baby [1]. Reducing term admissions to neonatal units has been a major target for trusts across the country. Facilitating neonatal care at the bedside, or transitional care, has been championed by the British Association of Perinatal Medicine (BAPM) and is outlined in their framework for practise [2].

Aims

• Identify the most common reasons for term admissions at William Harvey Hospital, Level 3 Neonatal unit

• highlight strategies to facilitate transitional care on the Postnatal Ward in line with BAPM's framework of care

Methods

• Term admissions to the Neonatal Unit from May 2020 to May 2021 were identified

• After review of their care, cases were classified into avoidable or unavoidable admissions

• With reference to BAPM Transitional care framework, strategies for avoiding admission were generated from cases of avoidable admission

Results

There were 128 term admissions identified. The most common categories of admission were; Respiratory (55%), Hypoglycaemia (8.5%) and Feeding Concerns (7.8%). Of 128 admissions it was concluded that 27 cases were avoidable (21%). These cases highlighted that transitional care at the bedside could have been provided, had the facility for nasogastric tube assisted feeding and enhanced observations with pulse oximetry were available.

Conclusions

In this quality improvement project, we have identified that one fifth of term admissions would be preventable with the availability of transitional care facilities as outlined in the BAPM framework of care. These principles can be adopted in units across the country to reduce the incidence term admission.

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Evaluation of the accuracy of oscillometric blood pressure measurement in comparison to invasive arterial blood pressure readings among preterm infants born at less than 29 weeks gestation

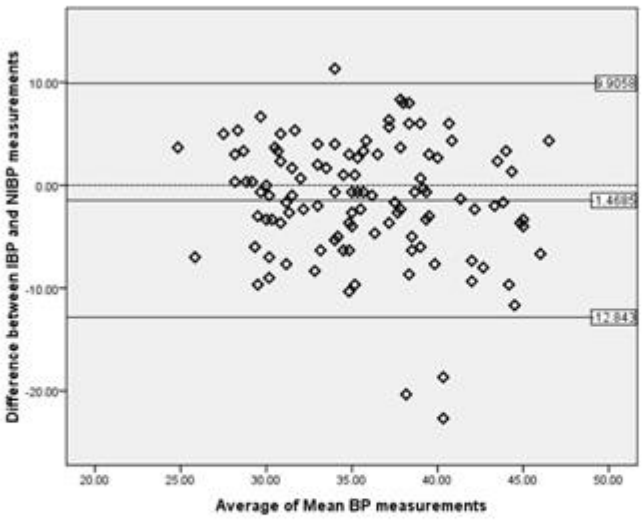
Moharram A, Akuma A[2]
[1]*Corniche Hospital,* [2]*Corniche Hospital*

Evaluation of the accuracy of oscillometric blood pressure measurement in comparison to invasive arterial blood pressure readings among preterm infants born at less than 29 weeks gestation
Purpose of the study:
To compare blood pressure (BP) in preterm neonates, born at less than 29 weeks, obtained from oscillometeric monitor with simultaneously measured invasive arterial BP.
Methods:
Eligible neonates born at gestational age of less than 29 weeks and admitted to the neonatal intensive care unit (NICU) were targeted by the study. Averages of BP readings and Mean differences between Intra-arterial and oscillometric readings were calculated and used for comparisons and correlations.
Results:
A total of 111 paired average readings for each systolic, diastolic and mean BP measurements were taken from 19 eligible neonates. There was statistically significant positive correlation between invasive and oscillometric BP that was weak for systolic BP readings and moderate for both diastolic and mean BP readings. Similarly, systolic BP measurements showed a higher mean difference of (-6.69 ±8.153 mmHg) between Invasive and oscillometric measurements as compared to a smaller variation in diastolic (-1.12 ±6.315 mmHg) and Mean BP (-1.47 ±5.803mmHg) readings. Likewise, the ±2SD limits of agreement for systolic BP was (-22.67mmHg to +9.27mmHg); diastolic BP (-13.50mmHg to +11.26mmHg) and mean BP (-12.84mmHg to +9.91mmHg).
The mean difference (bias) between Invasive and oscillometric mean BP measurements was not statistically significant for any of the clinically pertinent variables and sub-categories evaluated. However, the bias between invasive and oscillometric systolic BP measurements was statistically significant in relation to gender, birth weight and size of catheter used for the invasive measurement while the bias for diastolic BP readings varied significantly depending on the gestational age. Incidentally, these observed bias differences between invasive and oscillometric readings were not significant on correlation testing.
Conclusion:
The agreement between oscillometric and invasive BP measurements found in our study suggests that oscillometric BP is a reliable alternative technique to monitor BP in this group of neonates. This concordance relates most to mean BP readings; especially when taken within 23-50mmHg range. However, caution must be applied when utilizing oscillometric systolic BP reading clinically as it tends to give overestimation of the BP in comparison to invasive arterial systolic reading.

Table 2: Average of Invasive and Non-invasive BP measurements and Mean difference between both measurements

	Average of IBP and NIBP	IBP	NIBP	Mean difference between IBP and NIBP	Pearson's correlation (r value)
Systolic	49.08 ±6.009	45.74 ±7.736	52.43 ±6.754	-6.69 ±8.153	r= 0.373 p=0.000
Diastolic	27.79 ±4.915	27.23 ±5.206	28.35 ±6.416	-1.12 ±6.315	r= 0.425 p=0.000
Mean	35.74 ±5.012	35.00 ±5.368	36.47 ±6.186	-1.47 ±5.803	r= 0.503 p=0.000

C-



Figures 1A-C: Bland–Altman plots showing agreement between oscillometric and intra-arterial blood pressure measurements. (A) Systolic, (B) diastolic, and (C) mean arterial blood pressure.

_____ represents mean bias with upper and lower limits of agreement.

..... represents zero line.

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Exploring Potential for Neonatal Organ Donation in a Regional NICU.

A Service Evaluation

Jackson C[1], Timmis V, Shetty V, Kirkbride V
[1]*Sheffield Teaching Hospitals*

Background: Recent advances in adult organ donation (OD) have seen a decrease in the transplant list following an increase in deceased donors. This is not reflected within paediatrics. In 2019, NHS Blood Transfusion (NHSBT) released a Strategic Plan aiming to increase rates of paediatric/neonatal OD. Neonatal OD is a relatively new concept. NHSBT is tasked with determining the potential for neonatal OD in all UK NICUs (1).
Aim: To determine the number of patients in a regional NICU who may have been suitable for OD.
Method: Retrospective data collection was undertaken of all patients who died after 36/40 CGA, over a 5-year period between 01/01/2016 and 31/12/2020. Any absolute contraindications were identified. Further analysis was undertaken on criteria relevant to OD including weight, pathology, organ impairment and whether the death was planned etc.
Results: 23 patients fulfilled inclusion criteria. 1 patient was felt to be suitable for OD and 9 were classed as 'Possible', with the Specialist Nurse in Organ Donation (SNOD) advising that they may have been suitable donors based on further assessment and screening. Only 4 cases had OD actively considered.
Conclusion: Although only 1 patient was felt suitable for OD, a much higher proportion were identified as being possible donors dependent upon further screening. This data suggests that a more proactive approach to considering OD and liaising with the OD team on potential cases could be beneficial. In addition, developing systems to raise awareness such as staff training, embedding OD discussions within morbidity and mortality meetings, and development of an OD guideline could help increase this service; ultimately aiming to increase rates of organ or tissue transplantation.
References:
1. UK Paediatric and Neonatal Deceased Donation – A Strategic Plan, British Transplantation Society; NHS Blood and Transplant, Publication date: 04 March 2019.

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The HI-5S: An inter-professional Quality Improvement initiative using LEAN methodology to improve staff and parental experience on Post-natal ward and NIPE clinic

Eyo T[1], Singh N[1], Nath P[1], Davies H[1], Sebastian N[1], Carpenter M[1], Gouldingay S[1], Johnson-Howe E[1], Wasif M[1]
[1]*University Hospital Coventry And Warwickshire*

Background: Post-natal wards are busy and risk not delivering safe and effective care. It was a shift junior doctors dread to cover, and midwifery staff members found difficult to co-ordinate care. This impacted parental experience.
Consequent to the keen awareness of impact of stress and anxiety on wellbeing, a dedicated team of interdisciplinary professionals set out to improve the postnatal experience for all.
Aim: To improve parental and staff experience on postnatal ward and new-born infant physical examination (NIPE) clinic
Method: Using the lean methodology, 5S process- the task was to:
Sort reviews,
Set in order NIPE clinic by reducing interruptions and last-minute tasks, via a non-urgent jobs book and dedicated team of support staff to man the clinic 'NIPE champions'
Shine at timely discharges,
Standardise process in the clinic via use of 'NIPE survival booklet'
Sustain the process via education.
We used fishbone cause and effect analysis and driver diagram to identify key drivers for change.
Results: The initial analysis showed high anxiety levels of 5 or more (out of 10) in 2 of 3 junior doctors.
The general experience common themes were busy, frequent interruptions and late finish.
First intervention as part of the QI was to reduce volume of interruptions via a non-urgent jobs book.
A re-survey saw reduced rate of interruptions for 70% of respondents (fig. 3).
Discussions: The non-urgent jobs book has seen reduction in interruptions and helped junior doctors to focus on a single task per time, mitigating the risk of errors.
Next steps include senior review slots and 2 junior doctors assigned to a NIPE clinic with a survey of staff and
patient experience afterwards.
Conclusion: The QI has led to more awareness of challenges and better interdisciplinary teamwork to achieve change. Continued efforts will lead to improved overall experience of NIPE clinic.

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A SURVEY TO ASSESS CURRENT CLINICAL PRACTICE AROUND DELAYED UMBILICAL CORD CLAMPING IN THE NEONATAL UNITS ACROSS THE UK

Peshimam N[1], Ayling H[1], Deierl A[1], Banerjee J[1]
[1]*Imperial College Healthcare NHS Trust*

Background: Based on randomised studies and metanalyses, delayed cord clamping (DCC) improves short and long-term outcomes of preterm infants and is part of the recommendations in all newborn resuscitation guideline updates published in 2021. Developments in equipment facilitate lung aeration, ventilation and thermoregulation of extremely preterm infants whilst placental transfusion stabilises their cardiopulmonary physiology. Studies have demonstrated variability in optimal cord management practices worldwide and highlighted the logistical challenges and barriers in its implementation.
Objective: To determine current practice of delayed cord clamping (DCC) in neonatal units across the UK.
Design: An electronic survey prepared in Qualtrics (Qualtrics XM, Utah, US) was distributed to all 195 UK neonatal units in May 2021, via a link on a standardised email correspondence.
Setting: Neonatal units across the UK
Interventions: None
Results: We received responses from 76 neonatal units: 12 SCBU (Special Care Baby Units), 27 local neonatal units and 37 neonatal intensive care units, the majority were geographically located in London and the South West. (72/73). 63/75 (84%) of units practice DCC for all deliveries, 37 (52.9%) units doing so for over 2 years and 45/72 (62%) following a local guideline/ SOP. Only 4 units (5.3%) reported not practising DCC at all, and 8/75 (10%) of units reported practising DCC for term deliveries only. 32/72 (43%) units offered DCC for preterm infants not making immediate respiratory effort however out if these only 22 units started respiratory stabilisation with the cord intact using specialised equipment. 8 units (10%) are currently using the LifestartTM trolley, other units described extended tubing on the Neopuff circuit with standard resuscitaire.
Conclusions: The survey demonstrates varied national practise, highlighting a priority in wider implementation of optimal cord management inclusive of lung inflation/ airway support for extreme preterm infants who are not making immediate spontaneous respiratory effort.

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A descriptive analysis of Coronial prevention of future death reports relating to neonatal patients in England & Wales (2015-2020)

Veeraraghavan N

A descriptive analysis of Coronial prevention of future death reports relating to neonatal patients in England & Wales (2015-2020)
Veeraraghavan N, Dubus M, Brown S, Vasu V
Background
Prevention of future death (PFD) reports are issued where a Coronial investigation gives rise to concern that future deaths may occur unless actions are taken to reduce the risk of this occurring [1].
Aim:
A descriptive analysis of neonatal PFDs to understand Coronial reasons for issuing PFDs and learning themes.
Methods:
Publicly available data regarding all neonatal PFDs (0-28 days) issued in England and Wales were reviewed for the period between January 2015 and December 2020 (https://www.judiciary.uk/subject/child-death- accessed). The following details were collected: Age, sex, Coroner's area, circumstances around death, coroner's concern and recommendation, cause of death and the organisations to whom it was directed. Thematic content analysis was used to analyse qualitative data [2]
Results
A total of 52 PFDs relating to neonatal deaths were issued during the 6-year evaluation period of which 35 (67%) were related to male neonatal deaths. Perinatal asphyxia (56%), sepsis (15%) and prematurity (11%) accounted for over 80% of the causes of death. With regards to events leading to death, over 80% were obstetric related. The majority of PFDs (69%) were directed toward an NHS Hospital Trust. More than 70 % (37/52) of neonatal PFD reports had more than one Coroner's concern and the most common was related to communication.
Conclusions
To our best knowledge, these are the first data to qualitatively describe the content of PFD reports issued in the field of neonatology. In addition, these data are not easily accessible in a summated thematic format for individual or organisational learning. This is of concern and methods to more widely share and disseminate the themes from PFDs would be of benefit and should be considered.

References
1. https://www.judiciary.uk/wp-content/uploads/2020/11/GUIDANCE-No.-5-REPORTS-TO-PREVENT-FUTURE-DEATHS.pdf
2. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol 2006;3:77–101.