

## Selected Abstracts of the 2<sup>nd</sup> Congress of joint European Neonatal Societies (jENS 2017) • Session “Quality Improvement, Parents Centered Care”

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## ABS 1

### REDUCING MEDICATION ERRORS IN NICU – A QUALITY IMPROVEMENT PROJECT

D.A. Al Masri<sup>1</sup>, B. Ofoegbu<sup>1</sup>, L. Yahya<sup>2</sup>, K. Catroon<sup>2</sup>, A. Saliba<sup>2</sup>, H. Ibrahim<sup>1</sup>

<sup>1</sup>Neonatal Department, Corniche Hospital, Abu Dhabi, United Arab Emirates

<sup>2</sup>Pharmacy Department, Corniche Hospital, Abu Dhabi, United Arab Emirates

## INTRODUCTION

Medication errors constitute the single largest group of all the patient safety incidents reported in newborns. At the beginning of 2015 the estimated medication error rate on our neonatal intensive care unit (NICU) was 34.2/1,000 patient days, which was much higher than internationally quoted rates (5-24/1,000 patient days). A quality improvement project was undertaken to tackle the problem. The

steps included: 1) Development of a customized evidence based, locally relevant neonatal formulary targeting IV medications in the first phase; 2) Alignment of the options on the electronic prescribing system to the formulary; 3) Alignment of the drug libraries on the smart infusion pumps to the formulary and electronic prescribing.

## METHODS

Data on medication errors in newborn infants during 3 time epochs in 2015 (Jan-Feb, May-Jun and Oct-Nov) were extracted from the local online incident reporting system. The errors were classified and analysed according to type of error – prescribing, dispensing, administration, logistics, documentation, communication etc. and also by medication type. Data on number of medications prescribed and the doses administered were derived from the database maintained by the pharmacy department. Chi square or Fischer's Exact test were used as appropriate to analyse the rate of medication errors between the three time epochs.

## RESULTS

- There were more prescription errors than administration or other errors during each time epoch.
- The largest proportion of reported medication errors in all three time periods were related to intermittent IV medications, mainly antibiotics.

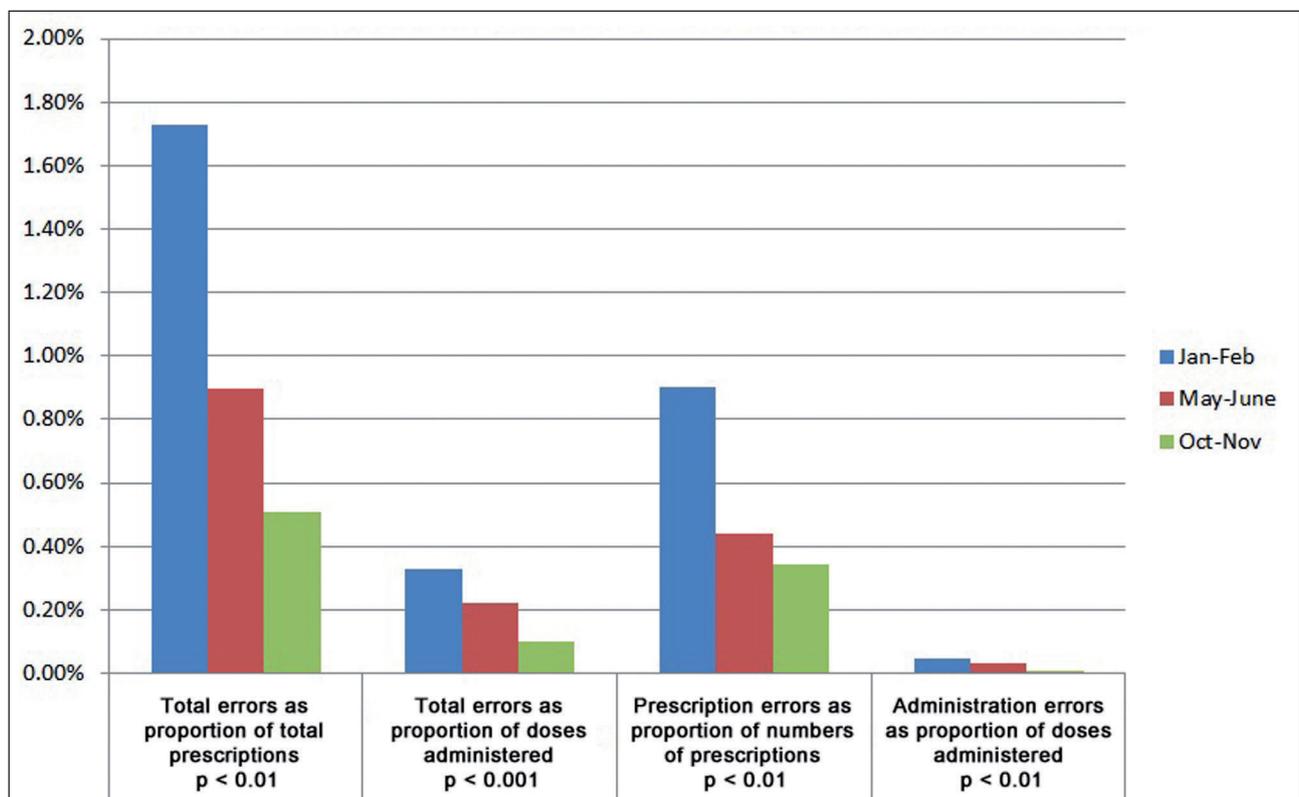


Figure 1 (ABS 1). Medication errors as proportion of prescriptions and doses administered.

- Most of the errors were near misses and none led to significant patient harm.
- The overall medication error rate fell from 23.9/1,000 patient days at the start of the QIP (Jan-Feb) to 7/1,000 patient days after completion (Oct-Nov).
- There was a statistically significant progressive reduction in the rate of prescription and administration errors reported during the three time periods (Fig. 1).

## CONCLUSIONS

Medication errors are common in neonatal intensive care. Prescription errors tend to be more frequent than other forms of errors. A multi-modality quality improvement approach with enhancements of existing systems significantly improved patient safety and reduced the reported medication errors on the local neonatal intensive care unit.

## ABS 2

### PRETERM INFANTS WITH MEDICAL COMPLEXITY: IMPACT ON HEALTH CARE RESOURCE USE, FAMILY EMPLOYMENT AND NEURODEVELOPMENTAL OUTCOMES

D. Nassel<sup>1,2</sup>, C. Chartrand<sup>2</sup>, M.-J. Doré-Bergeron<sup>2</sup>, M. Ballantyne<sup>3</sup>, F. Lefebvre<sup>2</sup>, T.M. Luu<sup>2</sup>

<sup>1</sup>Pediatrics, Université Libre de Bruxelles, Brussels, Belgium

<sup>2</sup>Pediatrics, CHU Sainte-Justine, Montreal, QC, Canada

<sup>3</sup>Holland Bloorview Kids Rehabilitation Hospital, Toronto, ON, Canada

## INTRODUCTION

Children with medical complexity represent a growing population with significant health care needs resulting from multisystem disease, neurologic condition and/or technology dependence, such as seen in some children born preterm. Objectives of this study are: to compare neonatal characteristics, health care resource use, family and neurodevelopmental outcomes at 18 months corrected age (CA) of preterm infants with and without medical complexity.

## METHODS

Data from the Canadian Neonatal Network and the Canadian Neonatal Follow-Up Network databases were retrospectively reviewed for infants born at < 29 weeks gestational age (GA) in 2009-2011 and followed at 18 months CA. Medical complexity was defined as infants discharged home with CPAP, tracheostomy, gastrostomy or ileostomy or with ≥ 2 medical assistive devices (such as home

Table 1 (ABS 2). Preterm infants with medical complexity.

	Preterm infants with medical complexity n = 612	Preterm without medical complexity n = 1,725
GA (weeks), mean (sd)	26.1 (1.4)	26.5 (1.3)
Birth weight (g), mean (sd)	887 (213)	956 (225)
Male, n (%)	24 (53.0)	907 (52.6)
Multiple births, n (%)	153 (25.0)	509 (29.5)
Maternal age, mean (sd)	30.6 (5.7)	30.9 (5.9)
Maternal education, n (%)		
Less than high school	61 (11.2)	178 (11.2)
High school	87 (16.0)	268 (16.9)
Some college and above	395 (72.7)	1,138 (71.8)
Outborn	97 (15.9)	228 (13.2)
Antenatal steroids	538 (9.2)	1,523 (90.0)
BPD	477 (78.2)	564 (32.7)
Postnatal steroid	191 (31.2)	440 (25.5)
PDA ligation	117 (19.1)	177 (10.3)
Sepsis	195 (31.9)	460 (26.7)
NEC surgery	30 (4.9)	18 (1.0)
IVHg3/PVL	71 (12.1)	174 (10.3)
ROP treatment	61 (12.3)	120 (8.5)
Re-hospitalization, n (%)		
No	320 (52.3)	1,190 (69.0)
1-2 times	208 (34.0)	458 (26.6)
More than 3 times	84 (13.7)	77 (4.5)
Medication use, n (%)		
Antibiotics	115 (18.8)	248 (14.4)
Anti-reflux drugs	87 (14.2)	76 (4.4)
Inhaled steroids or bronchodilators	140 (22.9)	304 (17.6)
Diuretics	23 (3.8)	20 (1.2)
Anticonvulsants	16 (2.6)	13 (0.8)
Home assistive devices at discharge		
Home oxygen, n (%)	510 (83.3)	248 (14.4)
CPAP/respirator, n (%)	116 (19.0)	
Tracheostomy, n (%)	17 (2.8)	
Gavage feeding, n (%)	537 (87.8)	540 (31.3)
Jejunostomy, ileostomy, colostomy, n (%)	127 (20.8)	
Number of out-patient services, n (%)		
None	163 (26.6)	560 (32.5)
1	138 (22.6)	406 (23.5)
2	93 (15.2)	301 (17.5)
3 or more	218 (35.6)	458 (26.6)
Hearing aids, n (%)	19 (3.1)	39 (2.4)
Visual impairment, n (%)	12 (2.2)	23 (1.5)
Cerebral palsy, n (%)	49 (8.1)	97 (5.8)
Bayley-3 developmental standard scores, median (IQR)		
Cognition	95 (85-105)	95 (90-105)
Language	89 (77-100)	91 (79-103)
Motor	94 (82-100)	94 (85-100)
Neurodevelopmental impairment, n (%)	311 (50.8)	758 (44.3)
Severe neurodevelopmental disability, n (%)	129 (21.1%)	255 (14.9)
Employment status at 18 months CA, n (%)		
2 identified child caregivers	n = 530	n = 1,550
All working	275 (53.0)	910 (60.0)
One working	218 (42.0)	529 (34.9)
All not working	26 (5.0)	78 (5.1)
1 identified child caregiver	n = 42	n = 125
Working	13 (33.3)	58 (52.7)
Not working	26 (66.7)	52 (47.3)
Caregiver employed at birth, employed at 18 months CA	9 (1.7)	19 (1.3)

GA: gestational age; CA: corrected age.

oxygen or gavage). Health care resource use and family outcomes were collected through parental questionnaires. Neurodevelopmental outcome was assessed using the Bayley Scales of Infant and Toddler Development (Bayley-III). Regression analyses were performed.

## RESULTS

Study population comprised of 1,725 preterm infants without and 612 (26%) with medical complexity. Among them, 88% had gavage feeding, 83% home oxygen, 21% gastrostomy or ileostomy, 19% CPAP, 3% tracheostomy, including 16% who required  $\geq 3$  assistive devices. Children with medical complexity were of lower GA (26.1 vs. 26.5 weeks,  $p < 0.01$ ), birth weight (887 vs. 956 g,  $p1$  severe neonatal complications [18.9% vs. 9.6%,  $p < 0.01$ ]). Re-hospitalization was more frequent, especially for respiratory or surgical reasons. As expected, health care resource use was greater in this population (**Tab. 1**). Two-parent households were less likely to be both working (53% vs. 60%,  $p = 0.01$ ) and single parents were more frequently unemployed (67% vs 47%,  $p = 0.04$ ). Finally, rates of neurodevelopmental impairment were more important among children with medical complexity.

## CONCLUSIONS

One quarter of preterm infants  $< 29$  weeks have complex medical conditions which significantly impact on health care resource use and family employment. Efforts should be made upon discharge home to facilitate care coordination and better support families.

## ABS 3

### BREAST MILK DONATION IN THE MUSLIM POPULATION

S. Jebali<sup>1</sup>, E. Ayachi<sup>2</sup>, R. Terki Hassaine<sup>3</sup>, A. Giuseppe<sup>4</sup>, D. Vaiman<sup>5</sup>, S. Brunet<sup>4</sup>, V. Rigourd<sup>1,4</sup>

<sup>1</sup>Lactarium Régional d'Ile-de-France, Hôpital Necker Enfants Malades, Paris, France

<sup>2</sup>AP-HP, SAMU 93 Centre Hospitalier Intercommunal André Grégoire, Montreuil, France

<sup>3</sup>Oran, Algérie

<sup>4</sup>AP-HP, Hôpital Necker Enfants Malades, Service de Néonatalogie, Paris, France

<sup>5</sup>Génomique, Epigénétique et Physiopathologie de la Reproduction, U1016 INSERM-UMR 8104 CNRS, Faculté de Médecine, Hôpital Cochin, Paris France

## INTRODUCTION

It is well known that for newborns and especially preterm infants, breast milk is the best source

of nutrition. Mothers should be encouraged to breastfeed their babies. In some cases mothers are not able to produce enough milk (for example during the colostrum phase) or some women just don't want to breastfeed their infants. In these situations, preterm infants can be fed with anonymous human milk. Some mothers are reluctant when it comes to anonymous milk donation. For example in the Muslim community, some women fear the idea of "milk brother", meaning that infants are being fed from the same breast.

## METHODS

In order to answer these questions:

Can I donate my own milk? And my baby, can he receive milk from an anonymous donor? Even though we are both Muslims?

i) We made a literature review on the religious views of human milk bank.

ii) We interviewed different Muslims referents.

iii) We based our discussion on biological and genetic data.

## RESULTS

Mrs. YA delivered at 26 week of amenorrhea. Her premature baby weighed no more than 500 g. At day 4, she was able to collect 200 ml/day of milk and 500 ml/day at day 7 and up to 1.5 liters. In total 1.79 liters of milk were collected and unused by her baby. The Milk bank medical staff asked Mrs. YA if she wanted to donate her "extra" milk. She refused to do so, because of the "milk brother" idea. After discussion, Mrs. YA, agreed to give her 1.79 liters of milk to the milk bank. She accepted it also because she was unable to store it at home.

## CONCLUSIONS

The pooling of these results: religious, cultural, biological, epigenetic elements allow us to conclude that anonymous human milk can be given to preterm infants. A Muslim woman can donate her own milk without fearing the "milk brother" concept. And also it must not stop human milk bank creation in Muslim countries, as long as it meets a public health need.

## ABS 4

### CORE OUTCOMES IN NEONATOLOGY: PRELIMINARY RESULTS

J. Webbe<sup>1</sup>, N. Modi<sup>1</sup>, C. Gale<sup>1</sup>, on behalf of the COIN Steering Group

<sup>1</sup>Section of Neonatal Medicine, Chelsea and Westminster Campus, Imperial College London, London, UK

INTRODUCTION

In high resource settings one in ten newborn babies require admission to a neonatal unit. Research evaluating neonatal care involves recording and reporting many different outcomes and outcome measures. Such variation limits the usefulness of research as studies cannot be compared or combined. To address these limitations, we are developing a core outcomes set for neonatal medicine.

METHODS

A steering group including parents and former patients, healthcare professionals, and researchers has been formed to guide the development of the core outcome set. We reviewed neonatal trials systematically to identify previously reported outcomes. Additionally we identified outcomes of importance to parents, former patients, and healthcare professionals through a systematic review of qualitative studies. Outcomes were then collated and entered into an international, multi-perspective eDelphi survey. All key stakeholders were invited to participate. The Delphi method will encourage individual and group stakeholder

consensus to identify a core outcome set by asking stakeholders to rank outcomes in a series of surveys. Stakeholders ranked by importance 104 outcomes in 20 different domains (for example the outcome of “Breastfeeding” in the “Gastrointestinal” domain). Outcomes were ranked from 1 to 9 (with 1 being least important and 9 most important). An image of the Delphi survey is attached (Fig. 1). We present the results from the first round of the Delphi process.

RESULTS

430 people registered to participate in the Delphi process. This included the following: Parents/neonatal patients = 256; Nurses/allied healthcare professionals = 55; Doctors = 84 and Neonatal researchers = 35. Participants contributed experience of neonatal care from 25 countries across six continents. The highest ranked outcomes were (with mean score): Survival (8.53); Necrotising enterocolitis (7.97); Sepsis (7.92); Brain injury on imaging (7.89) and Retinopathy of Prematurity (7.52). Lowest ranked outcomes included: Appearance of scars (4.57); Self identifying as premature (4.66); Frequency of defecation (4.78);

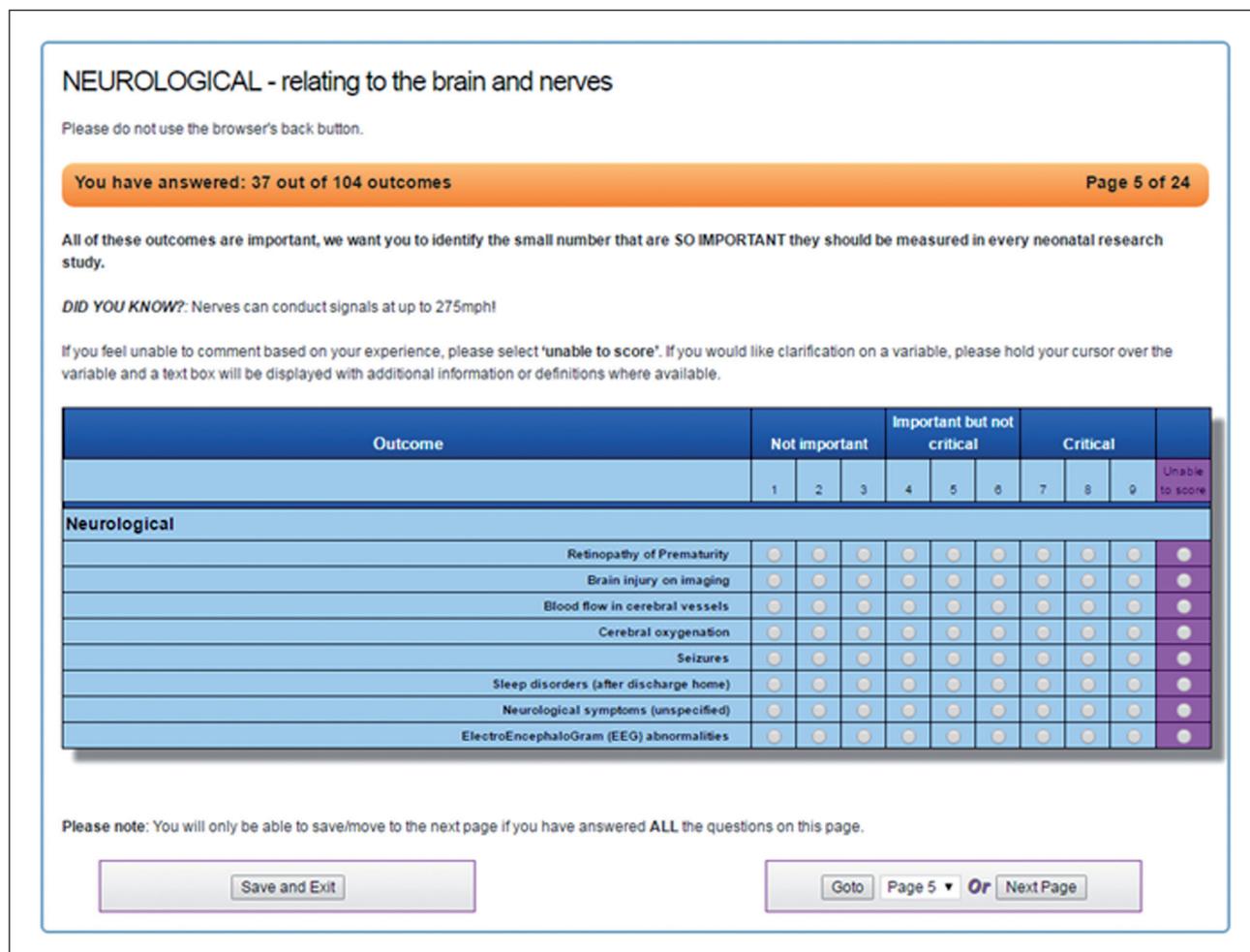


Figure 1 (ABS 4). An image of the Delphi survey.

Excessive secretions (4.98) and Ability to undertake sport (5.01). In general there was little divergence between different stakeholder groups. These results will be used in the two later Delphi rounds to identify a core outcomes set for neonatology.

#### CONCLUSIONS

This work presents the preliminary results from the Delphi to identify a core outcomes set for neonatology. All stakeholder groups initially identified as most important outcomes like survival and necrotising enterocolitis. Further Delphi rounds will help to establish consensus among all groups and identify the core outcomes set.

#### ABS 5

### A PILOT STUDY ASSESSING THE EFFECTIVENESS OF A FAMILY-CENTERED CARE INTERVENTION IN PRETERM INFANTS IN CHINA

R. Zhang<sup>1</sup>, R. Huang<sup>1</sup>, X. Gao<sup>1</sup>, X. Peng<sup>1</sup>, L. Zhu<sup>2</sup>, R. Ramanathan<sup>3</sup>, J. Latour<sup>2,4</sup>

<sup>1</sup>Neonatal Dept., Hunan Children's Hospital, Changsha, China

<sup>2</sup>Nursing Dep., Hunan Children's Hospital, Changsha, China

<sup>3</sup>Neonatal Dept., Paediatric Dept. LAC+USC Medical Center and Children's Hospital Los Angeles, Los Angeles, USA

<sup>4</sup>School of Nursing and Midwifery, Faculty of Health and Human Sciences, Plymouth University, Plymouth, UK

#### INTRODUCTION

Most Neonatal Intensive Care Units (NICU) in China have strict or limited visiting hours for parents. Consequently, parents have limited involvement in the care of their infant. Only in exceptional cases such as difficult decision-making or end-of-life care the parents are allowed to visit the NICU. Although there is a growing interest to implement family-centered care (FCC) in Chinese NICUs, the reality is that this is often related to longer visiting times. The aim of our pilot study was to demonstrate the effectiveness of a FCC intervention in a Chinese NICU.

#### METHODS

This pilot study used a randomised controlled trial design and was conducted at a 60-bed NICU in China. Parents (n = 120) of 66 infants born < 37 weeks GA were recruited. The FCC group included 62 parents of 31 infants in the final analysis; the control group included 48 parents of 30 infants. The FCC intervention encompassed a designated transition room for infants and parents, an

educational programme for parents, and integration of parents in the care of their infant. The primary outcome measures were infants' clinical outcomes; weight gain, NICU length-of-stay, and readmission one month after discharged. The secondary outcomes measures were parent reported outcomes; stress and anxiety, satisfaction, breastfeeding, and clinical knowledge.

#### RESULTS

All included preterm infants birth weight were > 1,000 g with gestational age between 28-36<sup>+6</sup> weeks. Infants in FCC group (n = 31) had increased weight gain (888 g versus 542 g; p = 0.013); NICU length-of-stay in days decreased but not significant (43 versus 46; p = 0.937); and decreases readmission rate was also observed in the FCC group compared to the control group (6.5% vs 50%; p < 0.001). No significant differences were observed between the incidences of NEC and BPD. The incidence of ROP, hospitalized infection and code blue incident rate decreased significantly in the FCC group (p < 0.05). Total mean parental stress and anxiety scores decreased in the FCC group (42 versus 59; p ≤ 0.007); mean satisfaction rates in FCC group were higher compared to control group (96 vs 90; p < 0.001); and parents in the FCC group had better educational knowledge and care skills (p < 0.05).

#### CONCLUSIONS

Involving parents in the care of their infant can improve clinical outcomes of infants. FCC also contributes to parent's clinical education, decreases stress levels and increases satisfaction. Our study suggests that working together with parents in feasible in Chinese NICUs.

#### ABS 6

### TO DETERMINE HOW MANY MOTHERS OF PRETERM BABIES, WHO WERE DELIVERED BETWEEN 24 AND 34 WEEKS GESTATION AND WERE ADMITTED TO NEONATAL UNIT AT ST. MARY' S HOSPITAL, DID NOT RECEIVE ANTENATAL STEROIDS

A. Arunoday, A. Manou, I. Sadasivam

NICU, St. Mary's Hospital, Manchester, UK

#### INTRODUCTION

Maternal antenatal steroids (ANS) administration to mothers who are likely to deliver at preterm gestation has significant benefits for the baby. Single course of ANS are associated with a significant reduction

in rates of Respiratory Distress Syndrome, neonatal death and intraventricular haemorrhage (2006 *Cochrane* review of 21 studies). It is recommended that all women who deliver between 24 and 34 weeks gestation inclusive should be given at least one dose of antenatal corticosteroids (RCOG/NICE/BAPM).

#### METHODS

Retrospective data collection on a pre designed data sheet from maternal notes and badger summary between gestations of 24 and 34 weeks gestation inclusive. Audit period was from January 2016-June 2016, (6 months).

#### RESULTS

Nearly third of patient with no ANS as per BADGER (Nationwide admission summary documentation software for Neonatal admissions) were due to wrong documentation with difference in compliance recorded by maternity in their audit and that recorded by us on NNAP. A rising trend was seen with no ANS administration in near term babies. This was 8% at 32 weeks gestation, rising to 27% at 34 weeks. No specific documented medical

reason for non-administration of ANS was nearly in half (46%) of case. Results are shown in **Fig. 1**.

#### CONCLUSIONS

Improving documentation and awareness by educating junior doctors and staffs helped by local induction, internal study day and campaigns. Better liaison between obstetric and neonatal team by improving “yellow sheet” completion by midwives. Retrospective reviews by core “BADGER team” to ensure correct documentation so that national audit correlates more closely with practice. Clear documentation of cause for no administration of ANS by obstetric team.

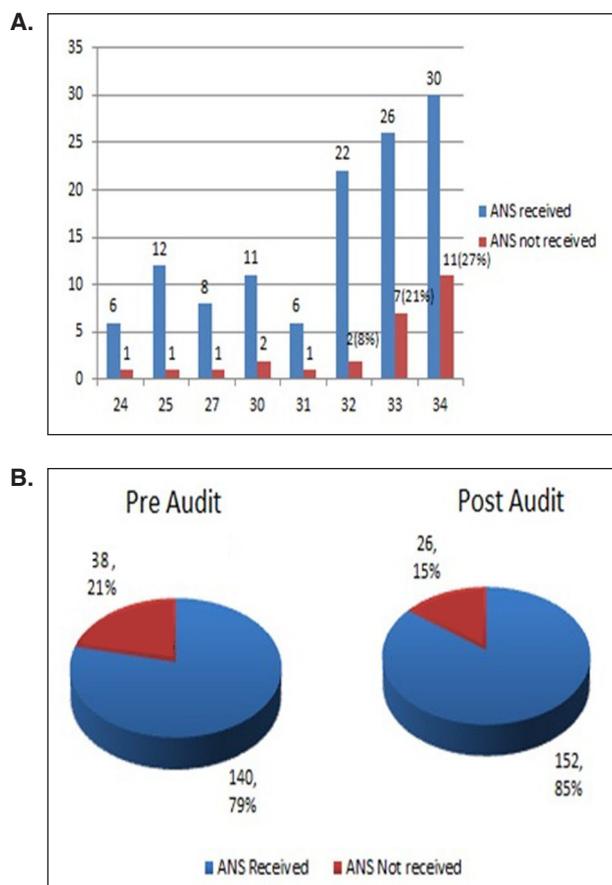
#### ABS 7

#### SATISFACTION LEVEL OF PARENTS OF NICU SERVICES PROVIDED AND CONNECTION WITH THEIR EDUCATIONAL ATTAINMENT

E. Papamichael<sup>1</sup>, E. Polycarpou<sup>1</sup>, M. Talias<sup>2</sup>

<sup>1</sup>Neonatal Intensive Care Unit, Archbishop Makarios III Hospital, Nicosia, Cyprus

<sup>2</sup>Open University of Cyprus, Healthcare Management, Nicosia, Cyprus



**Figure 1 (ABS 6).** **A.** Maternal antenatal steroids (ANS) administered or not per week of gestation. **B.** Difference caused by documentation error in BADGER.

#### INTRODUCTION

Progress in medical science has led to increased survival of premature babies and improved their long-term outcomes. The role of parents is also important. This has led to the more hands-on participation of parents in the care of their child. The therapeutic intervention is focused on family for interactive relationship between health professionals and families in care and treatment. Patient satisfaction is a quality measure of care and that sparked the need for measurement of parental satisfaction. The aim of the study is to assess the degree of parental satisfaction and factors affecting it to improve practices for building a family-centered environment that provides the best care (**Fig. 1**).

#### METHODS

The study took place in the NICU of Archbishop Makarios III Hospital. The study was a one-year perspective and involved 240 families from March 2013 to March 2014. The satisfaction questionnaire (EMPATHIC-N) was used and consisted of a total of 57 statements that identified five key factors: information on the neonate/neonates receiving care (12), care and therapeutic intervention (17), parental involvement (8), organization (8) and professional behaviour of staff in the workplace (12). Investigational and confirmatory factorial analyzes as well as structural models of equations

were applied to examine the relationships between the five satisfaction factors. Meanwhile, mediation and regulatory variables of interactions between parental satisfaction factors were examined.

#### RESULTS

Parents are quite satisfied with the care provided (average satisfaction for each question in the questionnaire from 4.04-4.9, upper limit of 5). The exploratory factorial analysis model detected five satisfaction factors, which were confirmed by the confirmatory factor analysis model. The factors of intervention, organization and professionalism are strongly related to each other, defining a more general second order factor linked to the organizational structure of MENN. Professionalism illustrates the organization, which in turn affects the other dimensions of parental satisfaction. The professionalism of medical staff predicts with statistical significance parental involvement and all other variables. Additionally, mothers with higher level of education require more extensive information to be satisfied.

#### CONCLUSIONS

The above findings show the high rate of satisfaction of NICU parents. In difficult times where drastic

cuts in health are promoted and supply of health professionals is constantly challenged, the NICU seems to record high rates of satisfaction of parents and this is due to NICU organization and the professionalism of the doctors and nurses. Moreover, modern families require accurate and timely information and this increases their satisfaction.

#### ABS 8

#### TWO YEAR NEURODEVELOPMENTAL FOLLOW UP DATA: MEETING METRICS VS DELIVERING QUALITY ASSESSMENTS

M. Parmar, F. Ceroni, S. Narayanan, N. Merchant

*Neonatal Department, West Hertfordshire NHS Trust, Watford General Hospital, London, UK*

#### INTRODUCTION

Neurodevelopmental outcome assessment is a critical aspect of care for high-risk infants and provides basis for benchmarking, early intervention, and endpoints for research studies. Validated tools

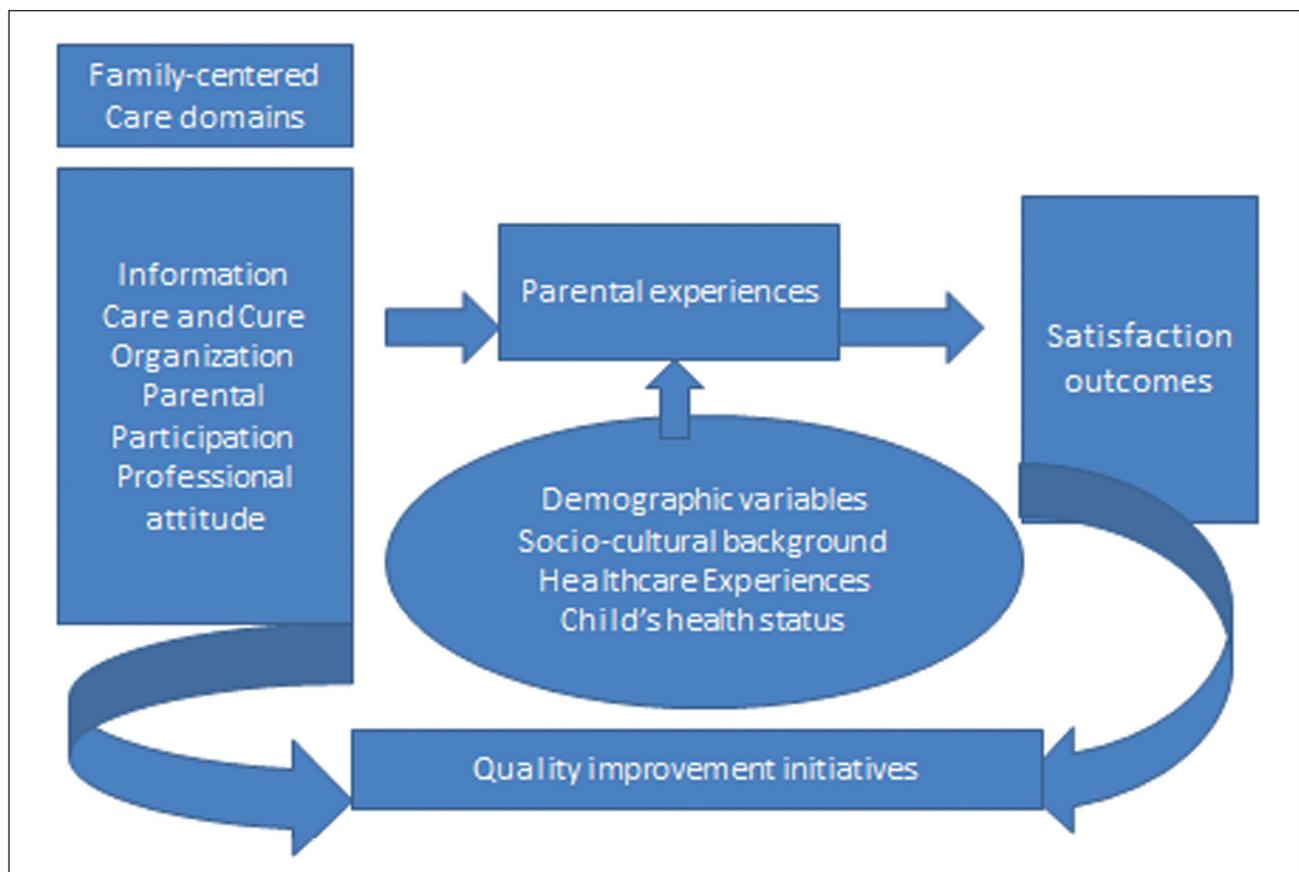


Figure 1 (ABS 7). Parent satisfaction model for intensive care quality performance.

are recommended to assess neurodevelopment; however, use of such tools is patchy and user dependent. National Neonatal Audit Project (NNAP), UK data shows that impairment free survival at 2 years for less than 30 weeks is 15.7-37.1% but 2-year data is available for only 40%. We designed a quality improvement project based on NNAP data to transform 2-year assessment targets and correlate developmental scores with risk factors.

#### METHODS

2013 NNAP data showed 69% compliance to 2-year appointments with no formal developmental assessments. Using QI methodology, specialist clinic was set up to improve compliance and neurodevelopmental assessments. Team included a neonatologist, physiotherapist and administrator. Eligible infants < 30 weeks were prioritized. Appointments were given on discharge, with reminders and alerts set up for 18-30 months range. Real time data monitoring allowed progress tracking. Data was collated from electronic patient records. Bayley Scales of Infant and Toddler Development III (BSID) was used for the assessment. Moderate delay was defined as composite score between 70-84 and severe delay < 70 in any of the 3 domains. Parental feedback was obtained using Likert Scale. Data analyzed using Microsoft® Excel® 2016.

#### RESULT

Of the cohort of 108 neonates born < 30 weeks who were followed up between 2013-2017, assessments improved from 69% in 2013 to 100% in 2017 (**Tab. 1**). 2016 saw a slight dip as 2 babies were seen outside the 18-30 months target. BSID assessments increased from 0 in 2013 to 94% in 2017. Average age at BSID assessments was 25.5 months. Mean (SD) composite scores for cognitive domain was 89.5 (14.4), motor 83.7 (14.6) and language 86.6 (22.6). 19% of children had moderate delay and 31% had severe delay. There appears to be a significant correlation with birth weight ( $p = 0.03$ ) and oxygen days ( $p = 0.01$ ) with cognitive domain but not the other domains. Parents were given a feedback questionnaire at the end of each appointment which asked about pre-clinic communication, staff attitude, parent understanding and communication of BSID outcomes; parents rated the service as “very good” (5.5/6 on Likert scale).

#### CONCLUSIONS

Dedicated administration, timely reminders and active DNA management improved the clinic attendances with excellent parental feedback. Correlation with outcomes will allow for improved

**Table 1 (ABS 8).** Follow-up of the children 2013-2017.

Level 2 - Neonatal Unit			
	Eligible babies	2 year assessment form completed	%
2013	16	11	69%
2014	25	20	80%
2015	29	29	100%
2016	19	17	89%
2017 (till date)	20	20	100%

support in the neonatal period and facilitate planning for comprehensive follow up resources. We also intend to further explore the reasons behind high percentage of infants with severe delay and to extend the service to all at risk infants.

#### ABS 9

#### EVALUATION OF PARENTAL INFORMED CONSENT PROCEDURE IN NEONATAL INTENSIVE CARE UNIT

E. van 't Verlaat<sup>1</sup>, E. de Kort<sup>2</sup>, I. Reiss<sup>1</sup>, M. van Weissenbruch<sup>3</sup>, S. Simons<sup>1</sup>

<sup>1</sup>Department Pediatrics, Division of Neonatology, Erasmus-MC Sophia Children's Hospital, Rotterdam, the Netherlands

<sup>2</sup>Department of Neonatology, Maxima Medisch Centrum Veldhoven, Veldhoven, the Netherlands

<sup>3</sup>Department of Neonatology, VU Medical Center Amsterdam, Amsterdam, the Netherlands

#### INTRODUCTION

Parents should be well informed, understand the information and feel competent to decide or decline voluntary participation of their child in a clinical trial. The Informed Consent procedure has to include information, understanding, competence and voluntariness. We aimed to evaluate parent's experiences about the informed consent procedure by asking their feedback about a propofol dose-finding study at the Neonatal intensive care unit (Neoprop2 study) (468-700).

#### METHODS

An evaluation informed consent questionnaire was developed according the concepts of the informed consent process from the literature. All parents of participating newborns in the Neoprop2 study were asked to complete the questionnaire (5-point Likert scale). Evaluation forms have been sent to all parents.

## RESULTS

The response rate was 52% (42/81 parents). The results showed that 86% of these parents understood the oral and written Patients Information Form. The function and the side effects of propofol were clearly for about 62% parents. Ninety-eight percent of parents knew that the participation in the study was voluntary and the same proportion knew that the obtained data was confidential. Most parents (64%) had enough time to make their decision to participate. Despite their critical ill child, most parents (64%) responded that they could decide well to participate in the study, 12% could not and 17% doubted about it. Parents felt morally obligated to participate in 42% of the cases, 17% doubted about this issue and 41% did not feel obligated. Almost all parents (95%) dared to refuse to participate. The same percentage would like to participate in a next trial if they were asked to.

## CONCLUSIONS

These results provide better inside into the parental perception of informed consent for participation of newborns in clinical trials. We should learn to better explain information about medication, give the parents enough time to make a decision and take the patients competency to participate into account. Moral obligation to participate is relatively high and voluntariness needs to be explicitly addressed.

## ABS 10

### POSTPARTUM DEPRESSION, BONDING AND COPING STRATEGIES IN MOTHERS OF NEWBORNS ADMITTED TO THE NEONATAL UNIT

R. Porta<sup>1</sup>, G. Lasheras<sup>2</sup>, E. Capdevila<sup>1</sup>, B. Farré-Sender<sup>2</sup>, J.M. Farré<sup>2</sup>

<sup>1</sup>Paediatric Department, Hospital Universitari Dexeus, Barcelona, Spain

<sup>2</sup>Psychiatry and Psychology Department, Hospital Universitari Dexeus, Barcelona, Spain

## INTRODUCTION

One of the most stressful events for the mothers is the admission of their offspring to the neonatal unit (NU). In such cases, sociodemographic, obstetrical and neonatal factors and mother stress coping strategies (SCS) are related to postpartum depression (PPD) and the mother-infant bonding. The objectives of the present study were: 1) To determine the presence of PPD and mother-infant

bonding disorders in mothers whose infants were admitted to the NU in the first days after birth (study group), compared to mothers whose infants were not admitted (control group). 2) To identify the risk factors related to PPD and bonding disorders.

## METHODS

In a prospective study, mothers whose infants had been admitted to the NU after birth for a period longer than 72 hours were recruited. Those who accepted completed on line, at 6 weeks after delivery, 3 validated questionnaires: the Edinburg Postnatal Depression Scale (EPDS) for PPD detection, the Parental Bonding Questionnaire (PBQ) to evaluate the bonding disorders, and the Coping Strategies Questionnaire to evaluate the SCS. A comparison group of mothers whose babies were not admitted to the NU was included in the study. Sociodemographic, psychological, obstetric and neonatal variables were studied as risk factors through a multiple lineal regression analysis. The severity of the neonatal condition on admission was evaluated using the CRIB II (Clinical Risk Index for Babies).

## RESULTS

During the period of study (27 months), 334 eligible mothers were informed about the study. 268 accepted to participate, of whose 125 (46.64%) completed the questionnaire. In the comparison group, 561 of 850 mothers accepted to participate and finally 276 completed the questionnaire (49.19%)

## CONCLUSIONS

The prevalence of suspected PPD was 21.6% in the study group and 15.9% in the control group. Bonding disorders were detected less often in the mothers of the study group (2.4% vs 6.5%). But the results of the EPDS and the PBQ were not significantly different between both groups. Coping styles with cognitive restructuration and low ability to solve problems, social isolation and severity of the neonatal condition on admission are the best predictors of a possible PPD. The prevalence of PPD in mothers of neonates admitted to NU after birth was not superior to that in the general population, according to results of an online screening method. The mother-infant bonding was not affected. These findings could be related to the developmental and family focused care performed in the NU. Practices like kangaroo care and parental empowerment can have a positive impact on mother psychological wellbeing. Some SCS can explain a higher rate of PPD in the first 6 weeks. By identifying them, we suggest that the PPD could be prevented in mothers of sick babies.

## ABS 11

**PARENTS' EXPERIENCES OF ACTIVE PARTICIPATION DURING THE WARD ROUND IN A NEONATAL INTENSIVE CARE UNIT**

L. Börjesson, T. Stendahl

*Neonatal Intensive Care Unit, Karolinska University Hospital, Stockholm, Sweden*

## INTRODUCTION

Family-centered care is a central concept in Swedish neonatal care and is characterized by a teamwork effort between the parents and the health care professionals. In a neonatal intensive care unit (NICU) in Stockholm, a general invitation to parents was introduced in 2014 to participate actively in the medical round. It became a daily routine for the parents to join the health care team at the workstation near the child's intensive care bed and actively participate in the discussions during the round. The purpose of the study was to examine the parents' experience of active participation during the round at a NICU.

## METHODS

A descriptive qualitative research approach was used in the study. A total of 11 semi-structured interviews were held with parents after one to three weeks of care at the current NICU. The interviews were analyzed using a manifest content analysis and the results were divided into three categories and nine subcategories (**Tab. 1**).

## RESULTS

The findings were divided into three categories: the importance of communication, participation and the need to adapt. The daily communication

**Table 1 (ABS 11).** Categories and subcategories of the analysis.

Categories	Subcategories
The importance of communication	To get information about the child's care The importance of the information To ask questions To understand the medical terminology
Participation	To be invited to the round To feel as a part of the care team To be more involved in the case of the child
The need to adapt	Waiting for the round Finding time for skin-to-skin care

with the staff and the information that was given during the round was important for the parents. When they felt well informed they described they felt calmer, safer and their worries decreased. The parents described a positive feeling of being invited and to be included in the round gave the parents a sense of being an important part of the care team. The parents described that the round was the start of the day for them. They felt that a great part of the morning consisted in waiting for the round and they adapted accordingly. This led to making it more difficult for parents to find time for skin-to-skin care in the morning.

## CONCLUSIONS

The parents' active involvement during the round led to the confident and informed parents who became more involved in their child's care. However, improvements are needed regarding strategies from the nursing staff to assist parents also during morning time to spend valuable time giving skin-to-skin care instead of waiting for the round.

## ABS 12

**REDUCING THE WASTAGE OF PAEDIATRIC RED CELLS**C. Roehr<sup>1</sup>, J. Staves<sup>2</sup>, S. Hemmatpour<sup>2</sup>, N. Mohanraj<sup>1</sup>, S. Pavord<sup>2</sup><sup>1</sup>*Newborn Services, Oxford University Hospitals NHS Foundation Trust, Oxford, UK*<sup>2</sup>*Department of Haematology, Oxford University Hospitals NHS Foundation Trust, Oxford, UK*

## INTRODUCTION

Red cell transfusion is common in tertiary special care baby units (SCBU) with over 90% of babies receiving red cells. The transfusion laboratory issues and stores paediatric red cell units (paedipacks) for immediate and prospective transfusions. At our institution (tertiary care hospital), concerns over multi-donor exposure had led to the standard operational procedure (SOP) of issuing 6 paedipacks per patient, with packs stored, until expiry, for on demand transfusion. The laboratory checked with SCBU on a daily basis if units may still be required or if they could be returned to stock. Wastage of unused paedipacks was commonplace. As a quality improvement project, we wanted to know whether a change of the SOP for the issue, storage and order process would result in reduced wastage, without increasing donor exposure.

## METHODS

A retrospective audit of transfusion practice, including adherence to the SOP and paedipack wastage, was performed August-October 2015 (period A). Following detailed data analysis and safety evaluation of multiple donor exposure, a consensus for stepwise change of SOP was agreed June 2016-March 2017 (period B). Changes included acceptance of potential multi-donor exposure and reduction in blood issue. Re-evaluation of practice after a 9-month period, included wastage and donor exposure.

## RESULTS

Period A: 157 paedipacks were received by 53 patients (97% patients transfused, mean 2.96 packs/patient). Average monthly wastage of paedipacks 48 units donor exposure 1.21 per patient (pp).

Period B: 478 paedipacks were received by 172 patients (mean 2.78 packs/patient). Average monthly wastage of paedipacks 7; donor exposure 1.12 pp.

## CONCLUSIONS

Change in SOP for issue, storage and ordering of paedipacks resulted in 80% less wastage, which also resulted in significant time saved for staff in both departments. The neonatal consultant team were initially concerned about the risk of increased donor exposure. We demonstrated no change in this, in fact a persistent slight reduction, possibly due to increased awareness. The changes to the way the laboratory issued paedipacks may appear small, but the results regarding wastage are impressive and also corresponded to a significant reduction in costs.

## ABS 13

### ACCURATE DETECTION OF CEREBROSPINAL FLUID FROM THE TIP OF INJEQ IQ-NEEDLE™ IN PEDIATRIC LUMBAR PUNCTURE – PRELIMINARY RESULTS OF A CLINICAL STUDY

S. Halonen<sup>1</sup>, J. Kari<sup>1</sup>, O. Tammela<sup>2</sup>, K. Kronström<sup>1</sup>, V. Eskola<sup>2</sup>

<sup>1</sup>Injeq Ltd, Tampere, Finland

<sup>2</sup>Department of Pediatrics, Tampere University Hospital, Tampere, Finland

## INTRODUCTION

A lumbar puncture (LP) for cerebrospinal fluid (CSF) sample is essential for diagnosing infections, such as meningitis, inflammatory conditions and metabolic disorders. The procedure is challenging, especially in neonates, and high numbers of the

punctures fail or are traumatic. The incidence of traumatic punctures can double when multiple attempts are required. Injeq IQ-Needle™ (IQ-Needle) is developed to provide immediate alert when the needle tip enters CSF. Thus, repeated stylet removals are not necessary. The detection method is based on spectral analysis of electrical properties of tissues. Earlier study in adults showed successful results and now the method is tested in pediatric LPs.

## METHODS

IQ-Needle consists of a 22G-40 spinal needle and a customized stylet, which enables bioimpedance measurement during the LP (**Fig. 1**). The needle is connected to the analyzer with tissue classification algorithm. When the needle tip is in contact with the CSF, analyzer alerts the physician with a sound. The IQ-Needle was investigated in patients younger than 19 months whose care required diagnostic LP (R16075, Tampere University Hospital Ethical committee). Informed consent was obtained prior the procedure from the parent of the patient. In this first phase of the study (ten patients) the classifier was fine-tuned. The LP procedure was conventional but performed with the IQ-Needle. Physician was instructed to guide the needle with normal haptic perception, not with the device information.

## RESULTS

Device CSF alerts were verified by checking CSF leakage and the device performance assessed by the physician. In this first phase with ten patients, CSF sample for laboratory analysis was obtained from seven patients. In two cases the sample was highly bloody and not sent to laboratory. One case was excluded because the recorded measurement data and investigator's report were contradictory.

The device correctly detected CSF in the seven cases. In the other blood contaminated case, device detected CSF but not in the other. Blood changes bioimpedance of CSF and this most likely explains the case without CSF detection. The initial classifier was tuned to more sensitive in order to detect even bloody CSF contacts. The study continues using the tuned classifier with 30 patients and statistical analyses will be performed on the future results and data.

## CONCLUSIONS

IQ-Needle shows promising results in pediatric lumbar punctures and it has a high potential in enhancing the pediatric lumbar puncture procedure. When the CSF contact is immediately detected, unrecognized subarachnoid space enters are prevented. Thus, unnecessary needle movements,



**Figure 1 (ABS 13).** Injeq IQ-Needle™ consists of a 22G-40 spinal needle and a customized stylet, which enables bioimpedance measurement during the LP.

bleeding and tissue damage can be avoided. This can make the procedure easier, prevent complications and reduce patient discomfort.

#### DECLARATION OF INTEREST

SMH, JJAK and KEK are employees of Injeq Ltd. KEK is stakeholder of Injeq Ltd. OT and VE have nothing to declare.

#### ABS 14

#### SUPPORTING THE PEER SUPPORTER

G. Thomson<sup>1</sup>, M.-C. Balaam<sup>2</sup>

<sup>1</sup>Maternal and Infant Nutrition and Nurture Unit (MAINN), School of Community Health and Midwifery, University of Central Lancashire, Preston, UK

<sup>2</sup>Research in Childbirth and Health (ReaCH), School of Community Health and Midwifery University of Central Lancashire, Preston, UK

#### INTRODUCTION

Peer (parent-to-parent) support (PS) is a widely used, cost-effective intervention for parents of premature/sick infants. PS is associated with salutary outcomes for parents, peers and professionals. However, some research suggests peers can be negatively impacted through diminished self-efficacy and contagion stress, leading to high attrition rates. While the need for appropriate training and support for peer supporters is highlighted, there is no clear guidance available. This international study aimed to identify feasible and acceptable psychosocial components to underpin PS training and support in a neonatal context; funded through a British Academy/Leverhulme small grants award.

#### METHODS

Two versions of an online survey (one for managers/coordinators; one for peer supporters) were developed through a literature review and feedback from neonatal/PS experts. Open and closed questions explored the psychosocial underpinnings of the PS model including how peers are selected; opportunities for peers to debrief/receive support; the length, content and provider of PS training; on-going mentoring, supervision and development opportunities. Survey distribution involved dissemination via existing EU networks, social media (FaceBook, twitter, blogs), online searches and snowball methods. ~20 interviews with different PS services who identify “promising” approaches will be undertaken. Ethics approval was obtained from the authors’ institution.

#### RESULTS

Data collection is ongoing – 86 survey responses received to date (May, 2017) from 39 PS services in 13 countries. While almost all services screened ‘potential’ peers using varying methods to assess suitability, ~70% had experienced difficulties, e.g. peers unable to undertake role due to unresolved issues. Length of initial training varied (~1-80 hours) and addressed similar issues (e.g. communication, empathy, role awareness). 90% of peers were satisfied with the training, although input from other specialist areas and skills in identifying/responding to mental health issues were requested. Supervision (77%) and named mentors (92%) were provided for peers, however, issues concerning frequency, format and roles were raised. Peers were able to debrief/share their own experiences (90%) and receive emotional support (100%), with more formalised, regular opportunities to resolve negative emotions highlighted.

#### CONCLUSIONS

Findings highlight marked and varied differences in PS service provision. The majority of PS services have procedures to recruit and assess peers, however, difficulties in peer suitability suggest further work is required. Whilst various recommendations to develop PS were offered, a key area to optimise peer recruitment, retention and effectiveness concern more accessible and specialist mental health provision. Findings will inform the design and commissioning of PS services.

#### ABS 15

#### ONLINE PARENT SATISFACTION SURVEY IS REPRESENTATIVE DESPITE LOW RESPONSE

J. de Boer, M. van Dijk

Erasmus MC-Sophia, Rotterdam, the Netherlands

## INTRODUCTION

We standardly evaluate parents' satisfaction with care after discharge of their infant from our neonatal ICU. Because processing paper questionnaires is time-consuming, we switched to an online version of the EMPATIC-N parent satisfaction questionnaire [1] in 2015. Then, however, the response rate dropped from around 60% to 30%, raising concerns about the representativeness of the sample. We therefore compared parents' online evaluations with those of a telephone survey.

## METHODS

From February 2016 to March 2017, a quarter of eligible parents was randomly selected to participate in a telephone survey, 4 weeks after discharge, instead of completing the online form. The EMPATIC-N questionnaire covers statements about: information provision, care and treatment, parent participation, the NICU environment,

professional attitude, and transfer to another unit/hospital. Scores range from 1 (strongly disagree) to 6 (strongly agree). Mean scores below 5.0 were considered 'aspects that need improvement'. Tree text comments were later grouped under the survey topics. Parents' overall NICU experience is rated from 1 (very negative) to 10 (very positive). T-tests were applied to test between-group differences.

## RESULTS

Response rates were 87% for the telephone survey (104/120) versus 31% for the online form (105/337). Mean scores per theme are presented in **Tab. 1**. Eight mean scores were significantly different between the two groups, but only on three items one group scored below 5 ( $\approx$  needs improvement) while the other group scored 5 or higher ( $\approx$  no need for improvement). In addition, the telephone survey revealed that the meaning of some items was unclear, e.g. "contradictory information", or "feeling obliged to care for own infant". Parents' mean overall rating of the NICU experience was 8.4 (SD = 0.97) for the telephone survey and 8.5 (SD = 0.97) for online version ( $p = 0.72$ ).

**Table 1 (ABS 15).** Scores per theme for the two groups.

Themes, and items scoring < 5	Mean (SD) telephone survey n = 104	Mean (SD) online survey n = 105
<b>Information provision (23 items)</b>	5.3 (0.53)	5.1 (0.73)
• Information about medication	5.0 (1.26)	4.8 (1.32)
• Contradictory information from physicians <sup>a</sup>	5.1 (1.59)	4.7 (1.65)
• Contradictory information from nurses	4.7 (1.66)	4.5 (1.79)
• Contradictory information from nurse practitioners	4.9 (1.58)	4.7 (1.62)
• Infant's future expectations (told by physicians)	<b>4.5 (1.58)</b>	<b>5.1 (1.10)<sup>p</sup></b>
• Infant's future expectations (told by nurse practitioners)	4.8 (1.43)	4.9 (1.33)
<b>Care &amp; treatment (24 items)</b>	5.5 (0.50)	5.3 (0.76)
• Every day it was clear who was medically responsible	4.3 (1.67)	4.4 (1.58)
• Emotionally well supported by the psycho-social team	<b>5.2 (1.38)</b>	<b>4.6 (1.81)<sup>p</sup></b>
<b>Parent participation (8 items)</b>	5.2 (0.74)	4.8 (0.91)
• Parents actively involved in decision making	5.1 (1.35)	4.8 (1.40)
• Feeling obliged to care for own infant	<b>5.1 (1.57)</b>	<b>4.6 (1.78)<sup>p</sup></b>
• Parent wrote own report when infant was transferred	3.0 (2.43)	2.3 (1.83) <sup>p</sup>
<b>The NICU environment (6 items)</b>	5.6 (0.53)	5.5 (0.69)
• Sounds muted as much as possible	4.9 (1.42)	4.8 (1.65)
<b>Professional attitude (9 items)</b>	5.6 (0.50)	5.4 (0.67)
• Unnecessary talking close to the infant	4.8 (1.63)	4.5 (1.76)
<b>Transfer to other unit/hospital (9 items)</b>	4.8 (0.98)	4.7 (0.88)
• Parents well prepared for transfer to other unit/hospital	4.7 (1.75)	4.7 (1.40) <sup>p</sup>
• Parents had final talk with nurse	4.0 (2.09)	4.0 (1.78) <sup>p</sup>
• Parents had final talk with physician or nurse practitioner	4.7 (1.91)	4.4 (1.79)
• Sufficient information about the ward the infant is going to	4.2 (1.86)	4.6 (1.57) <sup>p</sup>
• Website about transfer to other hospital was informative	4.0 (2.16)	4.4 (1.81)
• Parents is offered to visit the new ward/hospital in advance	3.5 (2.41)	3.2 (2.15) <sup>p</sup>

<sup>a</sup>High scores  $\approx$  good results; <sup>b</sup>t-tests,  $p < 0.05$ ; bold = significantly different and one group < 5, other group  $\geq 5$ .

## CONCLUSIONS

EMPATIC-N scores from a random sample of telephone surveys largely agree with scores from online surveys. Parents' comments on shortcomings may help us to improve care. In both groups, the amount of such helpful comments was largely similar. Wording of some items needs critical review. Overall results show that the online questionnaire is representative in spite of the low response rate.

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## ABS 16

### INCIDENCE OF HYPOTHERMIA ASSOCIATED WITH BIRTH AND INTRAHOSPITAL TRANSPORT OF NEWBORN INFANTS REQUIRING ADMISSION TO A NICU – A QUANTITATIVE OBSERVATIONAL STUDY

V. Hansson, M. Hedin, A. Örténstrand, M. Viberg

Karolinska University Hospital, NICU, Stockholm, Sweden

## INTRODUCTION

Infants requiring care at neonatal intensive care units (NICU) are at greater risk to develop hypothermia

during both birth and following intra-hospital transport. Implementing and applying adequate measures to prevent hypothermia have been shown in previous studies to improve the infant's long and short-term health. Previous study at one NICU at Karolinska University hospital, have shown that 37% of the newborn infants requiring admission at the NICU developed hypothermia prior to transport and 41% developed hypothermia after the transport. Various transport methods were used as in an incubator (40%), an open-incubator (13%), an infant bed (10%), in the arms of a parent but not skin to skin (18%), and skin to skin transport with a parent (18%). Only one infant was transported skin to skin with a parent in the kangaroo-position. The study has resulted in new procedures and guidelines aimed at reducing cases of hypothermia. Further research and evaluation of current procedures is suggested in order to ensure safe patient care. The purpose of this study was to examine body temperature associated with birth and intrahospital transport of infants requiring care at a NICU at Karolinska University hospital, after the introduction of the new procedures.

## METHODS

A quantitative prospective observational study was used with a consecutive selection during the period from August to December of year 2016. All infants requiring admission to NICU were included

**Table 1 (ABS 16).** Relationship between hypothermia before and after transport and different background factors.

Background factor	Before transport n = 41			After transport n = 40		
	Hypothermia	Non-hypothermia	p	Hypothermia	Non-hypothermia	p
All neonates, n (%)	12 (29.3)	29 (70.7)		8 (20.0)	32 (80.0)	
Gender			0.02			1.0
Boy, n (%)	2 (10.5)	17 (89.5)		4 (21.1)	15 (78.9)	
Girl, n (%)	10 (45.5)	12 (54.5)		4 (19.0)	17 (81.0)	
Delivery room			0.06			1.0
Delivery ward, n (%)	1 (7.7)	12 (92.3)		2 (15.4)	11 (84.6)	
Operation ward, n (%)	11 (39.3)	17 (60.7)		6 (22.2)	21 (77.8)	
Apgar at 5 min age			0.4			0.04
< 7, n (%)	1 (12.5)	7 (87.5)		4 (50.0)	4 (50.0)	
7-10, n (%)	11 (33.3)	22 (66.7)		4 (12.5)	28 (87.5)	
Gestational age			0.10			0.05
< 29 weeks, n (%)	2 (18.2)	9 (81.8)		0	11 (100)	
29-32 weeks, n (%)	5 (55.6)	4 (44.4)		4 (44.4)	5 (55.6)	
33-36 weeks, n (%)	1 (9.1)	10 (90.9)		1 (9.1)	10 (90.9)	
> 36 weeks, n (%)	4 (40.0)	6 (60.0)		3 (33.3)	6 (66.7)	
Birth weight			0.25			0.44
< 1,000 g, n (%)	0	5 (100)		0	5 (100)	
1,000-1,500 g, n (%)	5 (41.7)	7 (58.3)		2 (16.7)	10 (83.3)	
1,501-2,500 g, n (%)	2 (18.2)	9 (81.8)		2 (18.2)	9 (81.8)	
> 2,500 g, n (%)	5 (38.5)	8 (61.5)		4 (33.3)	8 (66.7)	

and all infants in need of a hypothermia treatment were excluded. The data collection was performed at Karolinska University hospital in Stockholm by means of a transport journal. Data was analyzed with descriptive statistics and Chi-2 test.

#### RESULTS

A total of 41 infants were included in the study (**Tab. 1**). The presence of hypothermia prior to the transport was 29% (n = 12), while after the transport 20% (n = 8). Of the infants born after gestational week 32, were 52% (n = 12) transported with a parent, including 83% (n = 10) skin to skin in the kangaroo position. The study found a significant relationship between hypothermia and the following: gender, gestational week, delivery ward type (birth/operation) and low Apgar, see attached table.

#### CONCLUSIONS

The study found that the presence of hypothermia has decreased, while skin to skin transports has increased after new procedures and guidelines as compared with previous study in the same hospital. Further improvement of procedures and research is required in the area in order to achieve an adequate body temperature at all newborn infants.

#### ABS 17

### CLINICAL DECISION SUPPORT SYSTEMS FOR NEONATAL CARE – AN UPDATED COCHRANE SYSTEMATIC REVIEW

K.Tan<sup>1</sup>, P. Dear<sup>2</sup>, S. Newell<sup>2</sup>

<sup>1</sup>Department of Paediatrics, Monash University, Melbourne, Australia

<sup>2</sup>Department of Paediatrics, University of Leeds, Leeds, UK

#### INTRODUCTION

Clinical decision support systems (CDSS) are computer-based systems used to integrate clinical and patient information to provide support at the point of care. They can aid in the diagnostic process, generate alerts and reminders, review treatment plans, use in information retrieval, and for image recognition. When this *Cochrane* review was first published ten years ago, there were limited high level studies (i.e. randomised control trials) of CDSS in neonatal care. This update of the review aims to investigate whether CDSS has an effect on the mortality and morbidity of newborn infants and on the performance of physicians managing them.

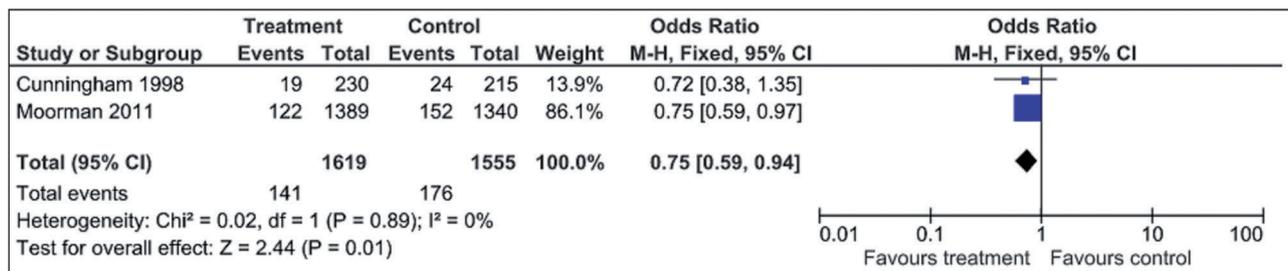
#### METHODS

The standard search method of the *Cochrane* Neonatal Review Group was used. Searches

were made of the *Cochrane* Central Register of Controlled Trials (CENTRAL, The *Cochrane* Library), MEDLINE (from 1966 to July 2016), EMBASE (1980 to July 2016), CINAHL (1982 to July 2016) and AMED (1985 to July 2016). Randomised or quasi-randomised controlled trials which compared the effects of CDSS versus no CDSS in the care of newborn infants. Trials which compared CDSS against other CDSS were also considered. The eligible interventions were CDSS for computerised physician order entry (CPOE), computerised physiological monitoring, diagnostic systems and prognostic systems.

#### RESULTS

Two studies were found for CPOE (52 infants and 27 staff), two studies for computer aided physiological monitoring (3,174 infants), one study for the management of hyperbilirubinemia (15 doctors) and a single study for incubator humidification management (136 infants). Computer-aided prescribing: one study [1] examined the effects of CPOE on parenteral nutrition ordering. No significant effects on short-term outcomes (weight gain) were found while longer-term outcomes were not reported. The second study [2] investigated the effects of a database program in aiding the calculation of neonatal drug dosages. This study found that the time taken for calculation was significantly reduced with also a significant reduction in the number of prescription errors when computer-aided prescribing was utilised. Computer-aided physiological monitoring: one study [3] was found which examined the effects of computerised cot side physiological trend monitoring and display. There were no significant effects on mortality, volume of colloid infused, frequency of blood gases sampling (samples per day) or severe intraventricular haemorrhage (Papile Grade IV). Long-term neurodevelopmental outcome was not reported. A second study [4] which utilised heart variability index (HRC) for the early detection of sepsis did not find a significant effect on their primary outcome measure of days alive and off ventilator 120 days after enrolment. However, the prespecified secondary outcome of mortality was significantly lower in the HRC arm. In the meta-analysis, the combined odds ratio (95% CI) was 0.75 (0.59 to 0.94) (**Fig. 1**). One study [5] investigated the effect of computerised aid on the management of hypothetical cases of jaundice and found that the rate of therapeutic errors was significantly lower in the computer-aided arm. Finally, a single centre study [6] investigated incubator humidification



**Figure 1 (ABS 17).** Computer-aided physiological monitoring (see the text).

using CDSS, did not find any significant difference in the time to regain birth weight when computerised plan for humidification was utilised.

### CONCLUSIONS

In the decade after this systematic review was first published there is emerging evidence that computer aided physiological monitoring may lower mortality rates. Further evaluation of CDSS using randomised controlled trials is warranted and should continue.

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### ABS 18

#### THERMOREGULATION AND PHYSIOLOGICAL STABILIZATION BY SKIN-TO-SKIN CONTACT AT BIRTH IN PRETERM INFANTS

A. Linnér, B. Sundberg, B. Westrup, B. Skiold

*Newborn Medicine, Karolinska University Hospital, Stockholm, Sweden*

### INTRODUCTION

Skin-to-skin contact (SSC) is a place of care for low birth-weight and/or preterm infants, originally used

in contexts of limited medical resources. Currently, SSC is more widely used as it has benefits in multiple settings. However, there is limited evidence concerning SSC during the initial stabilization of preterm infants immediately after birth. Our aim was to compare stabilization of preterm infants provided with SSC immediately at birth with conventional care. The primary outcome was body temperature and the secondary outcomes were hypoglycemia and need for respiratory support.

### METHODS

The study was set at the Karolinska University Hospital Neonatal Unit at Danderyd Hospital where 54 infants with a gestational age of 28-34 weeks were randomized to SSC or conventional care. SSC meant that the infant was dried, immediately placed on parent's chest, covered, provided with ECG electrodes, saturation probe; CPAP and peripheral line if needed. Mostly fathers were SSC providers since mothers could not be monitored in our NICU immediately after birth. In conventional care, the infant was provided with monitoring and equipment on a Resuscitaire® then transported and cared for in an incubator or heated bed. The SSC intervention was the place of care during the initial hour after birth, while both groups otherwise received identical medical care.

### RESULTS

The mean body temperature after one hour was lower in the SSC group compared to the control group: 36.29°C (standard deviation ± 0.5) versus 36.66°C (± 0.4) (p = 0.02), i.e. a mean difference of 0.37°C. Admission temperature was also lower; 36.14°C (± 0.6) versus 36.50°C (± 0.5) (p = 0.03), i.e. a mean difference of 0.36°C (p = 0.03). There were no significant differences between groups for median temperatures or secondary outcomes, but a tendency for lower blood glucose in the SSC group.

### CONCLUSIONS

SSC with father during initial stabilization was associated with lower body temperatures than after conventional care but was similar with regards to

hypoglycemia and need for respiratory support. SSC is a safe alternative to conventional care provided that monitoring is performed.

## ABS 19

### CONSERVATIVE TREATMENT OF IATROGENIC PERFORATIONS CAUSED BY GASTRIC TUBES IN EXTREMELY LOW BIRTH WEIGHT INFANTS – EXPERIENCE OF A SINGLE CENTER

M. Thanhaeuser, A. Repa, A. Berger, N. Haiden

*Division of Neonatology, Pediatric Intensive Care Medicine and Neonopediatrics, Medical University of Vienna, Vienna, Austria*

#### INTRODUCTION

Gastric or esophageal perforations are rare, but life-threatening events in preterm infants. Incidence is 0.4-0.5% with a mortality of 21-30%. Management of perforations ranges from surgical to conservative treatment with a trend to the latter especially in esophageal perforations.

#### METHODS

This was a retrospective analysis in extremely low birth weight infants (ELBW: birth weight < 1,000 g) with perforations of the upper gastrointestinal tract caused by polyurethane gastric tubes. The study was conducted in a single tertiary neonatal intensive care unit between 2012 and 2016. The aim of our study was to describe incidence, management, morbidity and mortality. Data were retrieved from medical charts.

#### RESULTS

During the 4-year study period a total of 471 extremely low birth weight infants ELBW were born and analyzed. Incidence of perforations attributed to a gastric tube was 1.5% (n = 7/471), median birth weight was 563 g (range: 475-755 g), median gestational age 23<sup>+3</sup> (range: 23<sup>+0</sup>-24<sup>+5</sup>). Perforation occurred on day of life 3 (range: 2-14 day of life). 43% (n = 3/7) infants had a perforated esophagus, 57% a gastric perforation (n = 4/7). Enteral feedings were stopped for a median of 6 days (range: 4-13 days) and infants received antibiotic therapy for 16 days (range: 8-22 days). In one infant, a gastrorrhaphy was performed within an exploratory laparotomy six days after perforation occurred. Two infants died due to sequelae of prematurity (28.6%) – independent of the gastrointestinal perforation.

#### CONCLUSIONS

Conservative treatment of esophageal or gastric perforations in ELBW infants was the first line

management at our center. Except for one infant who had a gastrorrhaphy, all infants showed spontaneous remission without major complications. As affected infants were exclusively extremely premature with a gestational age < 25 weeks, it might be prudent to use only softer silicone tubes in these infants.

## ABS 20

### INCREASED BREAST MILK USE REDUCED SEVERITY OF NECROTIZING ENTEROCOLITIS IN A QUALITY IMPROVEMENT PROJECT IN A CHINESE NICU

Q. Zhou<sup>1</sup>, SK. Lee<sup>2</sup>, XJ. Hu<sup>1</sup>, SJ. Lee<sup>1</sup>, SY. Jiang<sup>1</sup>, Y. Cao<sup>1</sup>

<sup>1</sup>Neonatology, Children's Hospital of Fudan University, Shanghai, China

<sup>2</sup>Pediatrics, University of Toronto, Toronto, Canada

#### INTRODUCTION

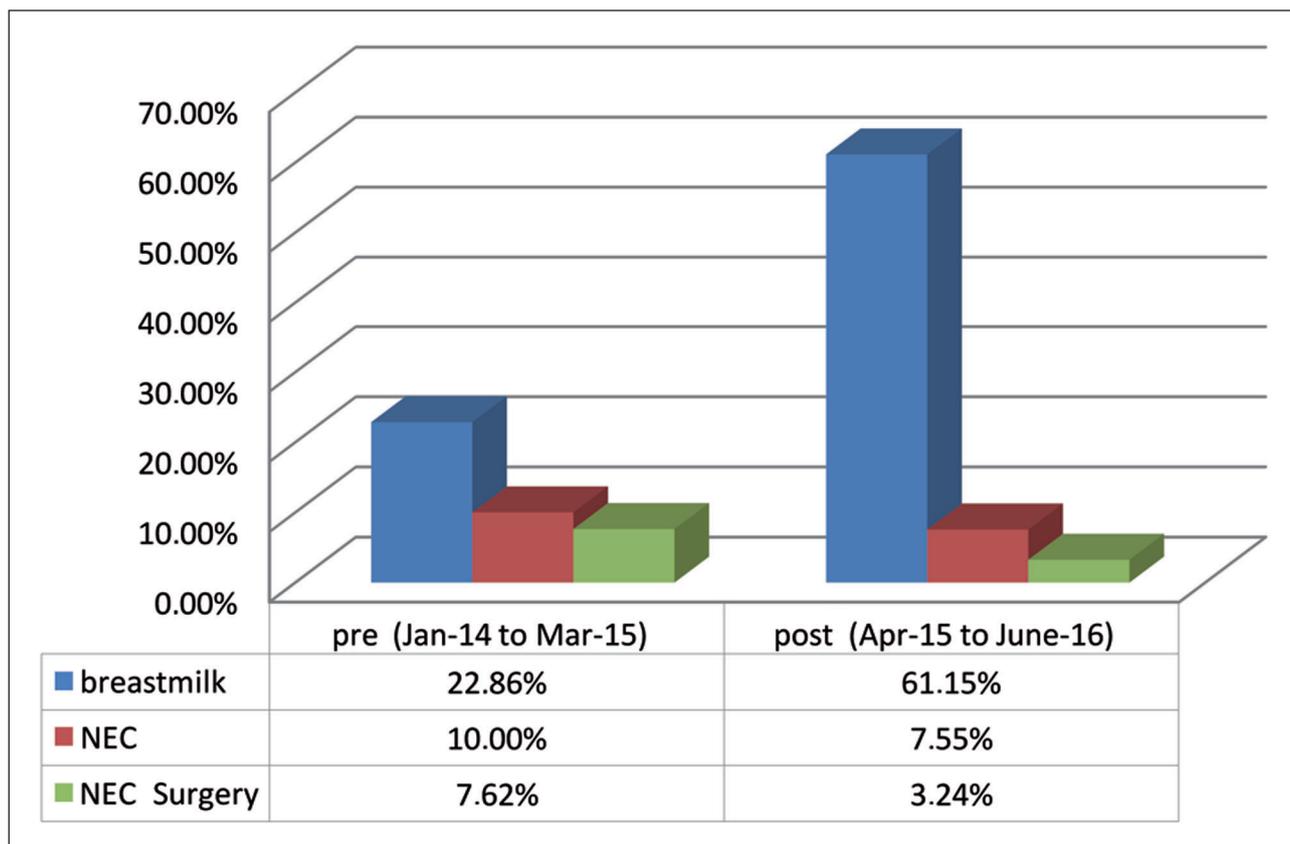
Few data are available on breast milk feeding in Chinese Neonatal Intensive Care Units (NICUs). The aims of this study were to evaluate the efficacy of a multidisciplinary intervention in promoting breast milk feeding and reducing necrotizing enterocolitis in very low birth weight (VLBW) infants in a Chinese NICU.

#### METHODS

A pre-post non-randomized interventional cohort study was conducted in the NICU of Fudan University Children's Hospital in Shanghai. Multiple interventions (including setting up the breast milk feeding team, educating medical staff and parents, establishing a breast pumping room in NICU and distributing related teaching materials) were implemented gradually from April 2015 to April 2016. The primary outcome of breast milk feeding rate was compared between baseline (January 2014 to March 2015) and intervention periods (April 2015 to June 2016). Secondary outcomes measures included necrotizing enterocolitis (NEC) rate, incidence of NEC needing surgery, mortality rate and time to full enteral feeds.

#### RESULTS

A total of 488 VLBW infants were enrolled. When the baseline period was compared with the intervention period, any breast milk feeding rate improved (34.76% vs 80.58%; p < 0.01), high proportion (50% or greater) of breast milk enteral feeding rate increased (22.86% vs 61.15%; p < 0.01), and NEC needing surgery decreased (7.62% vs 3.24%; p = 0.03; adjusted odds ratio [OR] 0.32)



**Figure 1 (ABS 20).** Trends of breast milk consumption and NEC from pre-intervention to post-intervention.

significantly (**Fig. 1**). There was no significant difference in the mortality rate (0.5% vs 1.49%;  $p = 0.40$ ; adjusted OR = 2.10) and NEC rate (10.00% vs 7.55%;  $p = 0.34$ ; adjusted OR = 0.59), but time to full enteral feeds increased ( $20.18 \pm 1.67$  vs  $24.15 \pm 1.65$  days;  $p < 0.01$ ; adjusted OR = 1.09).

#### CONCLUSIONS

Our quality improvement initiative increased the consumption of breast milk and reduced the severity of NEC in VLBW infants. Continued efforts are needed to better promote breast milk feeding in Chinese NICU.

#### ABS 21

##### SCARRED FOR LIFE?

M. Kristiansen<sup>1</sup>, C.-A. Olsson Mägi<sup>2</sup>

*PO Sjukan Nyfödda Barn, Karolinska University Hospital, Solna, Stockholm, Sweden*

#### INTRODUCTION

Prevalence of pressure ulcers in the neonatal population is unclear. Many neonates need respiratory support which can be a risk for pressure

ulcers. Pressure ulcers may lead to suffering related to care and illness. Aim: Mapping of the prevalence of pressure ulcers located in the face of neonatal patients admitted to the neonatal ward with previous need or current need of respiratory support.

#### METHODS

55 submitted neonates were included. Gestational age between 23-41 weeks. Quantitative cross sectional study with descriptive analysis using a consecutive sample. Data was collected from patient record. Pressure ulcers were measured on face from respiratory support. Pressure ulcers were classified according to an established classification instrument.

#### RESULTS

55 patient records were audited. 39 pressure ulcers were detected in 18 patients. Stages 1-2 associated with CPAP treatment were most common (92%). Care plans for wound care were detected in 28% of patients with pressure ulcers. Other documented interventions were detected in 33% of the patients with pressure ulcers. A care plan with risk diagnosis was detected in 7% of all 55 patients.

#### CONCLUSIONS

Pressure ulcers are more common in the neonatal population compared to the adult population.

Documentation and adherence to the nursing process is low. This can lead to suffering related to illness and care for the premature patient.

## ABS 22

### HOW CAN NEONATAL NURSES ENHANCE PARENT-INFANT BOND BY EMPOWERING PARENTS

M.J. Ravn<sup>1</sup>, J.B. Wigdel<sup>2</sup>

<sup>1</sup>The Neonatal Intensive Care Unit, Akershus University Hospital, Lørenskog, Norway

<sup>2</sup>Lovisenberg Deaconal University College, Oslo, Norway

#### INTRODUCTION

Newborn care has increased focus on the principles of family-based care. At this point not all NICUs offer this. There will, in most cases, occur an unnatural separation between the parents and the newborn child. This can lead to anxiety, stress, fear and parents may feel powerless and insecure in their role as parents. To help parents regain sense of security, control and self-confidence in parenting is an important task in neonatal care. In order to meet the parents' challenges, the neonatal nurse can focus on empowerment. Thesis: How can neonatal nurses enhance the parent – child bond and ensure the parents' presence in the NICU, focusing on empowering the parents.

#### METHODS

Literature searches were conducted February 22<sup>nd</sup>-March 25<sup>th</sup> 2017 in CINAHL, PubMed and Medline. The articles had to be of newer date, and had to have relevance to Norwegian NICUs. Norwegian parents have economic support from the government allowing them to take time off work to stay with their sick infant. All NICUs in Norway are built to house parents. Many articles encountered were from countries without such economic support and physical environment. We included two older articles because they explore parents' experience of parenting in the NICU. We recognize that parenting in the NICUs has changed for the last years. But the parents' perceptions of how it is to parent in the NICU may not have changed as much. Nine articles were included.

#### RESULTS

Nurses identified environmental, technological, parental emotions and staff attitudes as barriers to parenting in the NICU. Nurses did not consider

poor communication, lack of parental orientation, nursing practices or unit policies as barriers. Nurses need to analyze their practices, unit policies and procedures, to reduce the factors limiting parenting in NICU. Physical closeness with the infant is needed for parents to feel emotionally close and express parental behavior. Early intervention offers a preventive and salutogenic model to integrate parents. Maternal self-esteem is affected by maternal and infant factors and by feedback from NICU staff. Support by family and staff is more valuable, than support from a significant other. Parents suggested how they could be empowered by physical contact, individualized care and involvement in decision-making processes.

#### CONCLUSIONS

Parents are empowered by information and to be included as a part of the child's caregiving team. Emphatic communicating is more important than the amount of information given. Early interventions including "mother infant transaction program" and "creating opportunities for parent empowerment", enhance parent-infant bonding, and ensure parental presence in the NICU. High economic and personnel expenditures are prohibitive.

## ABS 23

### SKIN-TO-SKIN CONTACT IN EXTREMELY PRETERM NEWBORNS

H. Pavlyshyn, I. Sarapuk, O. Klishch

*Pediatrics Department, I. Horbachevsky Ternopil State Medical University, Ternopil, Ukraine*

#### INTRODUCTION

Skin-to-skin contact (SSC) is a cornerstone of neuro-development and family-oriented care for preterm infants. It support infant's physiological stability, warmth and sleeping; it reduces pain and stress, and promotes breastfeeding and lactation. But still, some researches do not show the positive results of this newly applied care. Therefore the purpose of the present study was to investigate the effectiveness of skin-to-skin contact depending on its peculiarities such as regularity, duration and period of first contact in preterm babies.

#### METHODS

The study involved 26 premature infants with gestational age  $27.85 \pm 1.33$  weeks who were treated in NICU and Neonatal Department. All

infants included in the study had SSC with their parents. According to the first SSC newborns were divided in two groups – group 1 (SSC begins in the first week of life) included 15 (57.7%) infants, group 2 (SSC begins after the first week of life) – 11 (42.3%). According to the regularity of SSC there was group A (SSC was regularly performed) which included 16 (61.5%) infants, and group B (SSC was irregular) – 10 (38.5%). According to the duration of SSC there was group I (SSC was more than 3 hours per day) – 10 infants (38.5%) and group II (SSC was less than 3 hours per day) – 16 (61.5%).

## RESULTS

The infants of group 1 had lower incidence of BPD comparing with group 2 (20% vs 72.7%,  $p < 0.05$ ). Cases of cholestasis in group 1 didn't occur, in group 2 – 36% ( $p < 0.05$ ). Weight gain per 1 day was higher in group 1 ( $23.13 \pm 4.29$  g vs  $19.51 \pm 3.96$  g;  $p < 0.05$ ). The incidence of nosocomial infection was lower in group A comparing to group B (37.5% and 90.0%,  $p < 0.05$ ). The impact of SSC regularity on weight gain per 1 day was substantial, but not significant ( $22.8 \pm 4.17$  g vs  $19.64 \pm 4.4$  g;  $p = 0.075$ ). The incidence of nosocomial infection was lower in group I comparing with group II (37.0% and 75.0%,  $p < 0.05$ ). The percentage of infants who were breastfed at the moment of discharge was higher in group I compared to group II (70.0% vs 25.0%,  $p < 0.05$ ). The impact of SSC duration on weight gain per 1 day was substantial, but not significant ( $23.46 \pm 4.61$  g vs  $20.44 \pm 4.09$  g;  $p = 0.093$ ).

## CONCLUSIONS

Early, regular and prolonged SSC has a positive impact on the preterm baby's health. Early SSC prevents the development of BPD, cholestasis and promotes weight gain. Regular and long contact prevents nosocomial infections and promotes breastfeeding. Skin-to-skin care should be encouraged in all clinics and should be started as soon as possible depending on baby's condition, be regular and long-lasting according to parents' opportunities.

## ABS 24

### DEVELOPMENT AND IMPLEMENTATION OF AN INTEGRATED FAMILY DELIVERED NEONATAL CARE MODEL INCLUDING A PARENT SUPPORT MOBILE APP

J. Banerjee, A. Aloysius, K. Platonos, A. Deierl

Imperial College Healthcare NHS Trust, London, UK

## INTRODUCTION

Family integrated care (FIC) is a model of neonatal care of increasing interest in the UK. Introduced in a low resource setting in Estonia, inadequate staff provision led to development of a care model parents involved as primary carers with support and training from nursing and medical staff. Results demonstrated better outcomes in infection rates, co-morbidities, breastfeeding, weight gain and parental mental health compared to traditional care models. These results have recently been replicated in a larger multicentre cluster RCT in developed countries. Our services implemented a FIC care model as a quality improvement (QI) program.

## METHODS

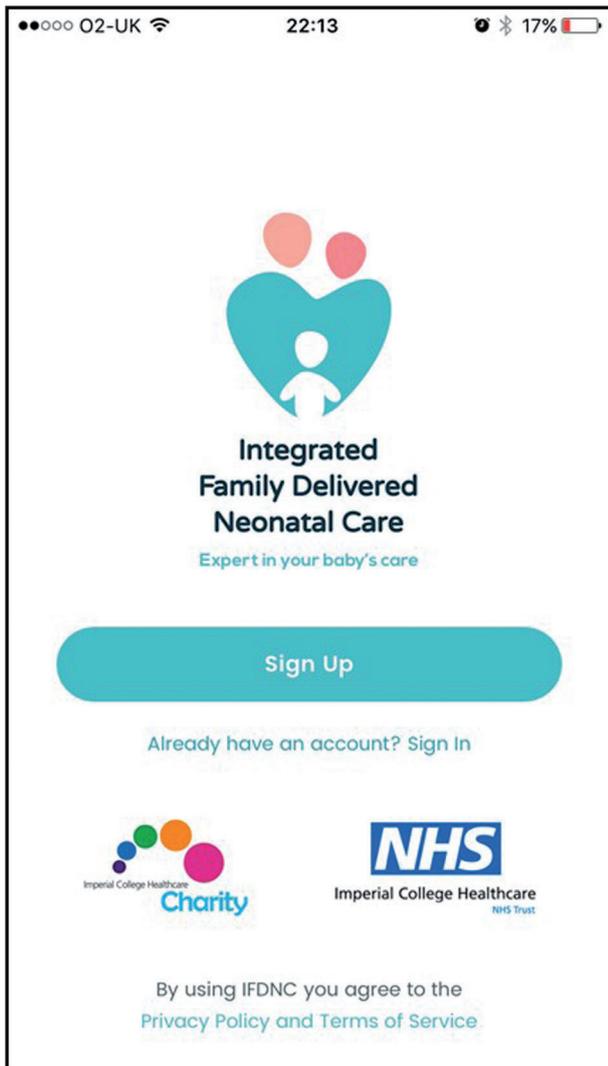
Imperial College Healthcare NHS Trust Neonatal Service has a funded QI project called Integrated Family Delivered Care (IFDC). We have developed a mobile App for parents with expertise from our multidisciplinary team (MDT) (**Fig. 1**) consisting of diary to chart skin-to-skin time, expression, feeding, growth and special memories; a developmental timeline and a comprehensive curriculum to support parent education on the neonatal unit environment, routine cares, monitoring, medical conditions, ventilation, nutrition, medication etc. as well as chapters on developmental care, coping, making milk, journey to suck feeding and discharge home. Additionally to this a competency assessment booklet was developed.

## RESULTS

The App supported by project nurses and a multidisciplinary competency based education programme enables families to be their Baby's main caregiver. Since the launch in April 2017, more than 300 parents, carers and professionals across the UK and worldwide have downloaded the App and are actively using it for their benefit. At our neonatal units several families have already embraced the App and have found it very useful, informative and helpful in their journey; the App enables them to understand neonatal care better hence reducing their stress and anxiety.

## CONCLUSIONS

The app is free to download internationally and expected to be beneficial to parents having a baby admitted to Neonatal Unit and of interest to other Neonatal Units interested in this model of neonatal care.



**Figure 1 (ABS 24).** Imperial College Healthcare NHS Trust Neonatal Service has a funded QI project called Integrated Family Delivered Care (IFDC): a mobile App for parents was developed.

## ABS 25

### EMPLOYING A NUTRITION NURSE IN NEONATAL INTENSIVE CARE UNIT IMPROVED NUTRITION AND GROWTH OUTCOMES IN PRETERM NEONATES

O. Aydemir, A. Calik Saglik, Z. Sekili, N. Tekin

*Department of Neonatology, Eskisehir Osmangazi University Hospital, Eskisehir, Turkey*

#### INTRODUCTION

Nutrition nurses are clinical nurse specialists with knowledge and experience in nutrition support and responsible for the care of patients on enteral and parenteral nutrition and education of the nursing

colleagues in intensive care units. Nutritional support has a critical role in intensive care of preterm neonates. We aimed to investigate the nutrition and growth outcomes after employment of a nutrition nurse in our level III neonatal intensive care unit (NICU).

#### METHODS

We conducted a retrospective cohort study including preterm neonates < 34 weeks and < 2,000 g who are admitted to our NICU in the first day of life. Infants born between September 2013 and August 2014 (before employment of a nutrition nurse) were defined as group A, and infants born between March 2015 and February 2016 (after employment of a nutrition nurse) as group B. Six months in between were excluded because it was the transition period for implementation of new practices by the nutrition nurse. Infants with major congenital anomalies, congenital gastrointestinal obstruction and those who died before discharge were excluded. Primary outcome was presence of postnatal growth retardation in term equivalent age (body weight < 10<sup>th</sup> percentile at 40 weeks postmenstrual age). Secondary outcomes were time to reach full enteral feedings, regain birth weight, feeding with breast milk during NICU stay and beyond, presence of osteopenia of prematurity, necrotizing enterocolitis, parenteral nutrition associated liver disease, and retinopathy of prematurity.

#### RESULTS

Infants in group A (n = 38) and group B (n = 40) were similar with regard to gestational age, birth weight, gender and perinatal characteristics. Time to reach full enteral feedings was shorter in group B (27.3 ± 18.1 vs 18.7 ± 11.3, p = 0.034). First feds were more commonly started with breast milk (29% vs 75%, p < 0.001), breast feeding were more common at discharge (79% vs 95%, p = 0.045) and longer in duration (6.1 ± 7.3 vs 8.4 ± 6.3 months, p = 0.008) in group B. Infants in group B have lower rate of osteopenia of prematurity (13.1% vs 0, p = 0.024). Other secondary outcomes were similar between two groups. The primary outcome postnatal growth retardation was lower (31% vs 57.9%, p = 0.007) among infants in group B at term equivalent age (**Tab. 1**).

#### CONCLUSIONS

While other members of the NICU team deal with acute care of the infant, nutrition nurse focuses on individualized nutritional care and ensures that this is provided to each infant consistently. Additionally nutrition nurse spends special effort to encourage and support the mother to provide breast milk and

**Table 1 (ABS 25).** Clinical characteristics, nutrition and growth outcomes of infants before and after employment of a nutrition nurse in neonatal intensive care unit.

	Grup A (n = 38)	Grup B (n = 40)	P
Gestational age (week) <sup>a</sup>	30.66 ± 2.11	30.68 ± 2,14	0.887
Birth weight (g) <sup>a</sup>	1,393.2 ± 331.3	1,478.7 ± 415.8	0.278
5 minute APGAR <sup>b</sup>	8 (5-10)	9 (5-10)	0.349
Gender (F/M)	22/16	18/22	0.255
Cesarean section (%)	95	92	0.687
Preeclampsia (%)	26	17.5	0.346
Maternal diabetes (%)	10.5	12.5	0.785
SGA (%)	15.8	5	0.149
Respiratory distress syndrome (%)	50	42.5	0.507
Necrotising enterocolitis (%)	5.3	2.5	0.610
Sepsis (%)	57.9	42.5	0.174
Bronchopulmonary dysplasia (%)	23.7	17.5	0.461
Retinopathy of prematurity (%)	2.6	7.5	0.616
PN associated liver disease (%)	15.7	7.5	0.252
Osteopenia of prematurity (%)	13.1	0	<b>0.024</b>
Postmenstrual age at discharge (week) <sup>a</sup>	36.8 ± 2.1	36.1 ± 1.8	0.831
Hospital stay (day) <sup>a</sup>	42.9 ± 22.8	41.2 ± 27.7	0.542
Time to reach full enteral feedings (day) <sup>a</sup>	27.3 ± 18.1	18.7 ± 11.3	<b>0.034</b>
First feds started with breast milk (%)	29	75	<b>&lt; 0.001</b>
Breastfeeding at discharge (%)	79	95	<b>0.045</b>
Breast feeding duration (month) <sup>a</sup>	6.1 ± 7.3	8.4 ± 6.3	<b>0.008</b>
Postnatal growth retardation at term (%)	57.9	31	<b>0.007</b>
Severe postnatal growth retardation at term (%)	41.2	21.9	<b>0.092</b>

<sup>a</sup>mean ± SD, <sup>b</sup>median (minimum-maximum).

SGA: birth weight < 10<sup>th</sup> percentile; PN: parenteral nutrition, postnatal growth retardation: body weight < 10<sup>th</sup> percentile; severe postnatal growth retardation: body weight < 3<sup>rd</sup> percentile.

continue breastfeeding. Employing a nutrition nurse in NICU shortened the time to reach full enteral feds, increased breast feeding and decreased postnatal growth retardation in preterm neonates.

## ABS 26

### THE EFFECT OF BATHING AT TWO DIFFERENT TIMES ON BODY TEMPERATURE AND SKIN MOISTURE LEVEL IN NEWBORNS

D. Gözen<sup>1</sup>, S. Yalınzoğlu Çaka<sup>2</sup>, S. Ateş Beşirik<sup>3</sup>, Y. Perk<sup>4</sup>

<sup>1</sup>Pediatric Nursing Department, Istanbul University, Florence Nightingale Faculty of Nursing, Istanbul, Turkey

<sup>2</sup>Pediatric Nursing Department, Sakarya University Faculty of Health Science, Sakarya, Turkey

<sup>3</sup>Pediatric Nursing Department, Karamanoğlu Mehmet Bey University, Faculty of Health Science, Konya, Turkey

<sup>4</sup>Neonatology Unit, Pediatric Department, Istanbul University Cerrahpaşa Medical Faculty Hospital, Istanbul, Turkey

## INTRODUCTION

The structure of stratum corneum is the most important factor in preserving the skin integrity of newborns. Bathing provides the hydration of stratum corneum. Hydration of stratum corneum is effective on sustaining the skin integrity, barrier function of skin and body temperature. The time of the first bath is important for providing thermoregulation in the postpartum period, preventing the hypothermia, and preserving the skin moisture which is important in sustaining the barrier function of skin. This was designed as randomized controlled experimental study for the purpose of examining the effect of newborn's postpartum first bath time on body temperature and skin moisture.

## METHODS

The population of the study consisted of newborns that were born in the 38<sup>th</sup> GW in the Medical Faculty Neonatology Unit between January 2016 and June 2016 and met the inclusion criteria. In the study, a total of 73 infants who constituted the sample were divided into two groups according to bathing times

in a randomized controlled way. While the first group involved 39 infants bathed 24 hours after their birth, the second group involved 34 infants bathed 48 hours after their birth. Newborns in both groups were compared in terms of body temperature and skin moisture (measuring area: forehead, abdomen, forearm, upper leg) level before the bath and at the first and tenth minutes after the bath.

## RESULTS

When comparing gestational weeks, Apgar scores, weight, height, head circumference, gender distributions, and delivery methods of newborns; there was no statistically significant difference between groups ( $p > 0.05$ ). There was no statistically significant difference according to comparing the temperature of room and bath water ( $p > 0.05$ ). It was determined that there was no significant difference between the post-bathing body temperatures of the infants ( $Z = -1.419$ ;  $p = 0.156$ ) in terms of the times of bathing; whereas, the body temperatures of infants bathed 48 hours after birth were significantly higher at the 10<sup>th</sup> minute after birth than infants bathed 24 hours ( $Z = -2.654$ ;  $p = 0.008$ ). It was determined that there was no significant difference between the groups in terms of moisture values obtained from the skin moisture measurement areas according to the times of bathing ( $p > 0.05$ ).

## CONCLUSIONS

Consequently, it was considered that postponing the time of the first bath in newborns to postpartum 48 hours was effective on preserving the body temperature of infants.

## ABS 27

### MOTHER-INFANT CLOSENESS SUPPORTS THE BREASTFEEDING OF PRETERM INFANTS AT DISCHARGE

S. Raiskila<sup>1,2</sup>, A. Axelin<sup>2</sup>, L. Toome<sup>3,4</sup>, S. Caballero<sup>5</sup>, B. Tandberg<sup>6,7</sup>, R. Montiroso<sup>8</sup>, E. Normann<sup>9</sup>, B. Hallberg<sup>10</sup>, B. Westrup<sup>10</sup>, U. Ewald<sup>9</sup>, L. Lehtonen<sup>1,2</sup>

<sup>1</sup>Turku University Hospital, Turku, Finland

<sup>2</sup>University of Turku, Turku, Finland

<sup>3</sup>Tallinn Children's Hospital, Tallinn, Estonia

<sup>4</sup>Tartu University, Tartu, Estonia

<sup>5</sup>Hospital Gregorio Marañón, Madrid, Spain

<sup>6</sup>Department of Pediatric and Adolescent Medicine, Drammen Hospital, Vestre Viken Hospital Trust, Drammen, Norway

<sup>7</sup>University of Bergen, Bergen, Norway

<sup>8</sup>0-3 Centre for the at-Risk Infant, Scientific Institute, IRCCS Eugenio Medea, Bosisio Parini, Lecco, Italy

<sup>9</sup>Pediatrics, Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

<sup>10</sup>Huddinge Hospital, Karolinska Institutet, Stockholm, Sweden

## INTRODUCTION

The benefits of breastfeeding and breast milk include unique nutritional components, protection from infections and long-term metabolic diseases and improved cognitive development. In addition, breastfeeding supports development of sensitive mother-infant interaction. It is obvious that preterm birth impairs the beginning of breastfeeding. It is also more difficult to initiate lactation after preterm birth. It is important to identify practices supporting breast milk provision and breastfeeding among preterm infants. We studied how mother-infant closeness during the first two weeks of life associates with maternal breast milk provision and breastfeeding at discharge among preterm infants.

## METHODS

The parents of 328 preterm infants were recruited in 11 NICUs in Finland, Estonia, Sweden, Norway, Italy and Spain. They filled in daily closeness diaries about how much time they spent in the NICU, in skin-to-skin contact (SSC) and holding their babies in the first two weeks of their hospitalisation. The mothers answered questions about breast milk provision, breastfeeding, and the feeding type at discharge from hospital. The associations between mother-infant closeness and feeding were analyzed by using multivariate analysis adjusted by infant's sex, gestational age, and birth weight.

## RESULTS

The discharge questionnaire was filled in by the mothers of 287/328 (88%) preterm infants. A total of 89.9% of the infants received any breast milk at discharge; 10.1% were fed by formula only. A total of 52.3% of the infants received breast milk only. A total of 68.9% were breastfed at least partially, and 21.3% were exclusively breastfed. 13.9% were discharged with feeding tube, usually together with breastfeeding. 21.3% were bottle-fed only. In multivariate analysis, the mother's presence in the NICU during the first weeks after birth associated with any breast milk provision at discharge vs. formula (OR 1.1,  $p = 0.002$ ), any vs. no breastfeeding (OR 1.1,  $p = 0.003$ ), and exclusive breastfeeding (OR 1.1,  $p = 0.002$ ). Mother-infant SSC associated with any breastfeeding at discharge (OR 1.6,  $p < 0.001$ ). The amount of holding did not associate statistically significantly with the type of milk or feeding. Results are presented in **Tab. 1**.

**Table 1 (ABS 27).** The duration of early mother-infant closeness presented as median hours per day (min, max) and maternal breast milk provision and breastfeeding status at discharge.

	Breast milk	Breast milk and formula	Formula	Exclusive breastfeeding	Partial breastfeeding	Bottle-feeding only
<b>Presence</b>	21.3 (11.2, 24)	9.4 (0.6, 24)	18.7 (0.6, 24)	20.4 (2.3, 24)	15.7 (0.6, 24)	9.3 (0.3, 24)
<b>SSC</b>	2.5 (1.2, 5.0)	1.0 (0, 10)	1.4 (0, 13.7)	1.4 (0, 13.7)	1.4 (0, 13.7)	0.8 (0, 7.4)
<b>Holding</b>	3.7 (1.6, 4.5)	0.8 (0, 7.6)	1.1 (0.2, 8.9)	2.3 (0, 8.83)	1.1 (0, 8.8)	1.1 (0, 8.8)

SSC: skin-to-skin contact

## CONCLUSIONS

Mother's presence and SSC at the beginning of hospital stay associated with better success in breast milk provision and breastfeeding at discharge among preterm infants. Early support for mother's presence and SSC in neonatal units provides preterm infants more often the benefits of breast milk and breastfeeding.

## ABS 28

### THE FIRST MINUTES WHEN MY EXTREMELY PRETERM INFANT WAS BORN

C. Israelsson, F. Thorolfson

*Neonatal Intensive Care Karolinska Hospital Solna, Stockholm, Sweden*

## INTRODUCTION

Children that are born preterm or are sick when they are born usually need urgent care by professionals. The acute situation is also the fathers first meeting with its child. It is reasonable to assume that the first meeting between the child and its parents is important for the connection between them later on. The extensive medical equipment and the invasive procedures can easily overshadow the experience of having a newborn. Communication is therefore an important part of nursing care to make the fathers feel involved. The pediatric nurses duties include supporting the fathers in the first meeting with their newborn baby so that they can be involved in the health and care of the child. Purpose: The purpose of this study was to investigate fathers' experiences of the pediatric nurses support in connection to the emergency care after birth.

## METHOD

A qualitative design was used. A total of eight fathers of children that was intubated directly on the children table after birth were enrolled in these interviews. They were all interviewed face-to-face or over the telephone. These interviews were later analyzed using a content analysis.

## RESULTS

During data analysis two categories was identified: to be involved from the start and communication. To be involved from the start describes the most father felt both important and involved in the finishing room and was generally pleased with the support from the nursing staff. There were different views of if the bond between father and child was affected by the presence of the staff in the room. Communication describes to be a key aspect in terms of support, which could be uttered both verbally and nonverbally.

## CONCLUSIONS

For the fathers to get the best experience, it is important to receive information before and during the procedure. The fathers stress, anxiety and fear can be alleviated with the help of good communication, which can facilitate the start of the bonding process and the fatherhood.

## ABS 29

### DEVELOPMENT AND EVALUATION OF eLEARNING EDUCATION TO SUPPORT BREASTFEEDING IN NICU

W. Higman, L. Wallace, A. Turner, S. Law, K. Blake

*UHCW NHS Trust, Coventry, UK*

## INTRODUCTION

The evidence that breast milk feeding reduces mortality and short and long-term morbidity among premature and small babies is well established [1] but breastfeeding rates in neonatal units in the UK remain low [2]. The aim of this study was to develop and evaluate an eLearning module that addresses the learning needs of clinicians to support breast milk feeding on Neonatal Intensive Care Units. The module focussed on the knowledge areas of anatomy and physiology of lactation (A&P) and breast milk expression (BME).

## METHODS

Mixed methodology was used to evaluate the eLearning module and inform its iterative development. This consisted of quasi-experimental pre-test/post-test studies using The Neonatal Unit Clinical Assessment Tool (NUCAT), an on-line objective knowledge test with self ratings of confidence to test the effects of the eLearning module on knowledge, confidence in knowledge and confidence in practice. Semi-structured interviews explored clinicians' experiences of undertaking the eLearning module.

## RESULTS

Between October to December 2014, 101 neonatal clinicians, including neonatal nurses, doctors, Advanced Neonatal Nurse Practitioners and nursery nurses undertook the initial NUCAT assessment, 90 completed the training and post intervention NUCAT, 60 repeated NUCAT at 6-8 weeks. Knowledge and confidence was significantly increased immediately following the intervention and at 6-8 weeks in all groups. Interviews showed the feasibility and applicability of the module. Baseline knowledge was greater in the area of BME than in A&P. Neonatal nurses had greater baseline knowledge of BME than doctors or nursery nurses. Doctors/ANNPs were more knowledgeable about A&P. Following the training intervention Doctors/ANNPs showed the greatest improvement in knowledge scores and nursery nurses the least.

## CONCLUSIONS

On-line assessment and training provide a potentially effective multidisciplinary training method to improve breastfeeding knowledge and confidence. Nursery nurses may have differing learning needs and require further support and training.

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## ABS 30

### THE ROLE OF PAEDIATRIC PHYSIO/OCCUPATIONAL THERAPISTS IN PARENTAL EMPOWERMENT AT THE NICU

M.J.C. Eijssermans, M.J. Jongmans, C.H. Verhage, F. Jenken, J. van der Net, M.J. Benders, A. van den Hoogen

*Department of Neonatology, Child Development and Exercise Center, Wilhelmina Children's Hospital, University Medical Center Utrecht, Utrecht, The Netherlands*

## INTRODUCTION

For parents admission of their infant to a Neonatal Intensive Care Unit (NICU) can be associated with feelings of inadequacy to fulfill the desirable parental role. To empower parents and give them tools to provide more insight in the behaviour of their preterm infant, paediatric physio/occupational therapists regularly meet parents and their infant during NICU admission. Subsequently these therapists support parents in understanding the behavioural communication of their infant. We hypothesised that when parents understand the behaviour of their infant their self confidence in their parental role increases. In this study we aim to evaluate, if understanding the infant's behaviour empowers parents.

## METHODS

Semi-structured interviews with parents of infants born < 27 weeks of gestation and admitted at the NICU were conducted. Parents who were unable to speak the Dutch language and parents with infants with irreversible prognoses of imminent death were excluded. Interviews were audio recorded and transcribed verbatim. Thematic analyses were explored. This method emphasizes organization and rich description of the data set and moves on to identifying implicit and explicit ideas within the data. Written informed consent was obtained from all participating parents.

## RESULTS

Eight semi-structured interviews with 10 parents of 8 infants were conducted. Two main themes emerged from this analysis: "Understanding body language" and "communication". Understanding the body language of their infants, gives parents tools how to support their infants optimal. Parents indicate that if they are positively empowered in "reading" understanding the behaviour and knowing have learned how to console their infants, their self-confidence increases. When understanding the behavioural communication of their infants, parents can play an active role to minimize their baby's stress in the developmentally-unexpected challenged environment of the NICU. When the communication with health professionals to parents

is safe and open they are empowered in their parental role, which stimulates them in a complete partnership in caring for their infants during NICU stay.

#### CONCLUSIONS

Supporting and teaching parents to understand the behaviour of their preterm infant by paediatric physio-occupational therapists seems beneficial in increasing the self-confidence of parents. Communication to parents needs to be safe and open to empower them in their parental role to a complete partnership in caring for their infants during NICU stay.

#### ABS 31

### NEUROPROTECTIVE DEVELOPMENTAL CARE: STATE OF KNOWLEDGE AND IMPLICATIONS FOR PRACTICE

A. Lavallée<sup>1,2</sup>, G. De Clifford-Faugère<sup>1,2</sup>, A.N. Fernandez Oviedo<sup>1</sup>, C. Garcia<sup>1</sup>, M. Héon<sup>1,2,3,4</sup>, M. Aita<sup>1,2,4</sup>

<sup>1</sup>Nursing Faculty, Université de Montréal, Montreal, Canada

<sup>2</sup>CHU Sainte-Justine Research Center, Montreal, Canada

<sup>3</sup>Écoles des Sciences Infirmières, Université de Sherbrooke, Sherbrooke, Canada

<sup>4</sup>Quebec Network on Nursing Intervention Research, Montreal, Canada

#### INTRODUCTION

Neuroplasticity, which is the brain's capacity to modify its strength and number of synaptic connections, peaks during the third trimester of gestation. During this period, the fetus's brain's size quadruples and the myelination of the central nervous pathway occurs. In case of a preterm birth, the infant hospitalized in the neonatal intensive care unit (NICU) is particularly vulnerable because of its immature and rapidly developing neurologic system. Therefore, neuroprotective developmental care (NDC) is particularly important during the NICU hospitalization to optimize short and long-term neurodevelopmental outcomes in infants born preterm. NDC is defined as a group of interventions supporting normal neurodevelopment in preterm infants. According to Kenner and McGrath, these interventions are classified in six categories such as: protected sleep, pain and stress management, infant handling and positioning, optimize feeding with breast milk, family-centered care and the healing environment which includes the control of environmental light and noise. The latest systematic

review regarding the effectiveness of some of these interventions on neurodevelopment of preterm infants has been updated in 2006. The aim is to summarize findings of a thorough literature review on the latest empirical findings regarding the effectiveness of these six NDC interventions on preterm infant's neurodevelopment.

#### METHODS

A thorough literature review in the following databases (CINAHL, Embase, PsycInfo, PubMed and Google Scholar) was conducted according to the six NDC categories of interventions. Studies were selected for the review if they evaluated the effectiveness of these interventions on preterm infant's short or long-term neurodevelopment. Studies have also been considered if they measured other outcomes associated with neurodevelopment such as sleep, physiological stability or stress response.

#### RESULTS

A large variety of interventions have been evaluated during the preterm infants' NICU hospitalisation on neurodevelopment and other abovementioned variables. Each of the six categories include different interventions such as clustering of care (protected sleep), skin to skin contact (pain and stress management), prone positioning (infant handling and positioning), oral stimulation (optimize feeding with breast milk), parental participation in care (family-centered care) and cycled lighting (healing environment).

#### CONCLUSIONS

To date, various NDC interventions have been evaluated in randomised controlled trials or quasi-experimental trials and can be integrated in clinical practice. Research is rapidly evolving and is still a priority in the neonatal research field regarding preterm infant's neurodevelopment. More empirical data linked to the effectiveness of these interventions is necessary to optimize neonatal nursing and other healthcare professional's clinical care. An update of the *Cochrane* systematic review published in 2006 should be done to integrate the latest empirical findings.

#### ABS 32

### PROSPECTIVE SURVEILLANCE OF RISK FACTORS FOR INTRACRANIAL HEMORRHAGE IN PRETERM INFANTS DECREASES THE RATE OF INTRACRANIAL HEMORRHAGE AND IMPROVES NEURODEVELOPMENTAL OUTCOME AT THE AGE OF 24 MONTHS

L. Schiefele<sup>1</sup>, F. Reister<sup>2</sup>, J. Essers<sup>1</sup>, B. Mayer<sup>3</sup>, M. Schmid<sup>4</sup>, H. Hummler<sup>1,5</sup>

<sup>1</sup>Division of Neonatology, Department of Pediatrics, Children's Hospital University of Ulm, Ulm, Germany

<sup>2</sup>Obstetrics and Gynaecology, University of Ulm, Ulm, Germany

<sup>3</sup>Institute for Biometry and Clinical Epidemiology, University of Ulm, Ulm, Germany

<sup>4</sup>Neonatology, University of Zürich, Zürich, Switzerland

<sup>5</sup>Sidra Medical and Research Center, Doha, Qatar

## INTRODUCTION

Intracranial hemorrhage (ICH) occurs in around 15-25% of premature infants with a gestational age < 30 weeks and a birth weight < 1,500 g. ICH increases the risk of neurodevelopmental impairment. We hypothesized that ICH is not an unavoidable disaster and thus we tried to lower its occurrence using an interdisciplinary approach involving physicians and nurses to implement a bundle of interventions.

## METHODS

An interdisciplinary group of physicians and nurses at the Perinatal Center, University of Ulm, Germany, developed a prospective program to monitor risk factors and a bundle of interventions including an unified clinical approach to labor and delivery, neonatal stabilization immediately after birth, and to NICU care during the first week of life for preterm infants with gestational age (GA) < 30 weeks and birth weight < 1,500 g. Adherence to these interventions was monitored regularly using standardized chart review. Data of the following 5 year period (August 2010 to July 2015) was compared to a historical control group before the intervention (January 2008 to July 2010). Furthermore, neurodevelopmental outcome at the age of 24 months was compared between the first 3 years after the intervention (August 2010 to July 2013) compared to the historical control group (January 2008 to July 2010; Bayley-II-Scales, cerebral palsy [CP], blindness and deafness). Impairment was defined as either a Bayley – Score (PDI or MDI) < 70, deafness, blindness or GMFCS ≥ 1.

## RESULTS

Before/after implementing the bundle of interventions 197/387 preterm infants with a median (IQR) GA of 26.6 (24.4-28.7 SSW)/26.4 weeks (24.3-28.7) were born. The overall rate of ICH was reduced from 52/197 (26.4%) to 56/387 (14.5%) ( $p < 0.001$ ). The rate of ICH III + IV according to Papile et al. [1] was reduced from 20/197 (10.2%) to 24/387 (6.2%) after implementation ( $p = 0.087$ ). At the corrected age of 24 months the rate of impaired children was

significantly lower in the group of infants after implementation of the intervention (41/128 [32.0%] versus 36/173 [20.8%],  $p = 0.027$ ). Notably the rate of children with CP was significantly lower in the group after implementation (18/128 [14.1%] before versus 6/173 [3.5%] after,  $p = 0.001$ ).

## CONCLUSIONS

Prospective monitoring of risk factors in premature neonates may help to reduce the rate of ICH and improve neurodevelopmental outcome considerably. Involvement of highly motivated stakeholders from obstetrics and neonatology and continuous efforts are required to maintain success.

## REFERENCE

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## ABS 33

### THE IMPLEMENTATION OF THE CLOSE COLLABORATION WITH PARENTS TRAINING PROGRAM IN 5 NEONATAL UNITS – A QUALITATIVE STUDY

M. Toivonen<sup>1</sup>, L. Lehtonen<sup>2,3</sup>, S. Ahlqvist-Björkroth<sup>4</sup>, A. Axelin<sup>1</sup>

<sup>1</sup>Department of Nursing Science, University of Turku, Turku, Finland

<sup>2</sup>Faculty of Medicine, University of Turku, Turku, Finland

<sup>3</sup>Department of Pediatrics, Turku University Hospital, Hospital District of Southwest Finland, Turku, Finland

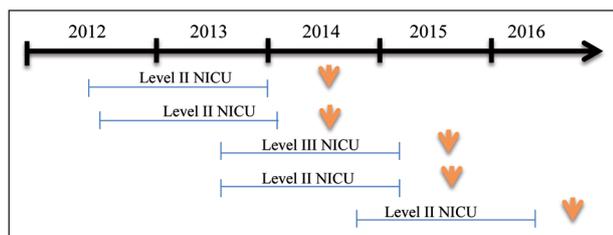
<sup>4</sup>Department of Psychology and Speech-Language Pathology, University of Turku, Turku, Finland

## INTRODUCTION

Family-centered care (FCC) is delivered in daily staff-parent interactions in a neonatal intensive care unit (NICU). Staff attitudes and care practices can be developed with systematic training of the staff such as the Close Collaboration with Parents™ Training Program to promote FCC. However, implementation of FCC is challenging and requires attitude change in each staff member. There is a need to identify what can be changed and what are the barriers and facilitators of a change in FCC. The aim of this study was to describe staff's perceptions after the Close Collaboration with Parents™ Training Program regarding the changes in FCC and the implementation process.

## METHODS

The Close Collaboration with Parents™ Training Program was carried out in five NICUs in Finland



**Figure 1 (ABS 33).** Timespan of the implementation of the Close Collaboration with Parents Training Program in five NICUs.

The blue lines indicate the 18-month training in each unit. The arrows indicate the time points of the interviews.

(4 level II and 1 level III NICUs) (Fig. 1). This descriptive qualitative study was conducted six months after the 18-month training in each unit. The training aimed to facilitate NICU staff to work in collaboration with parents in infant daily care. The data were collected with 10 group interviews and two individual interviews. The unit managers (2-3 doctors and/or head nurses per unit, total n = 12) and the nurses (2-6 per unit, total n = 20) were asked to reflect the possible changes in infant care in the neonatal unit facilitated by the training and to describe the implementation process. Data were analyzed using thematic content analysis.

## RESULTS

The unit managers and the nurses reported as the most salient change that the staff acquired more receptive attitude towards parents. Parents were considered as equal partners in infant care and their presence was appreciated more. The unit managers and the nurses had observed that parents' presence calmed the infants and increased parents' own confidence in care taking. The role of nurses changed from a caregiver to a facilitator who supported parents in their infant care. The successful implementation of the training required a unit-wide commitment and a recognized need for a change by the unit managers. Other major changes simultaneously in the unit and the lack of support from leadership complicated the implementation. Successful implementation was supported by the multimodal learning methods of the training program including mentoring and long enough duration of the training.

## CONCLUSIONS

This study showed that a unit-wide, systematic and structured training program (the Close Collaboration with Parents™) facilitated significant improvements in FCC in five neonatal intensive care units. Critical elements in implementation were support from leadership and the use of mentoring in learning.

## ABS 34

### A USER CENTRED DESIGN APPROACH TO EVALUATE A VALIDATED INFANT PAIN MEASURE E-LEARNING MODULE

B. Stevens<sup>1</sup>, S. Gibbins<sup>2</sup>, M. Campbell-Yeo<sup>3</sup>, C. McNair<sup>1</sup>, J. Yamada<sup>4</sup>, K. Dionne<sup>1</sup>, S. Dinsdale<sup>1</sup>, C. Johnston<sup>5</sup>, A. Taddio<sup>1</sup>

<sup>1</sup>The Hospital for Sick Children, Toronto, ON, Canada

<sup>2</sup>Trillium Health Partners, Mississauga and Toronto, ON, Canada

<sup>3</sup>IWK Health Centre, Halifax, NS, Canada

<sup>4</sup>Ryerson University, Toronto, ON, Canada

<sup>5</sup>McGill University, Montreal, QC, Canada

## INTRODUCTION

The validated Premature Infant Pain Profile (PIPP) was recently revised (PIPP-R) to enhance reliability, feasibility and clinical utility. An interactive online e-learning module was developed for health care professionals using educational knowledge translation (KT) strategies. The e-learning module describes the PIPP-R, defines each pain indicator, and includes interactive directions for scoring PIPP-R pain assessments, quizzes and case studies. The aim was to evaluate and refine the PIPP-R e-learning module using a user-centered design (UCD) approach including 3 phases of usability testing.

## METHODS

The 3-phase usability study is being conducted in two Level 3 Neonatal Intensive Care Units (NICUs) in Canada. In Phase 1 (completed), 4 content and KT experts reviewed the PIPP-R module for content and face validity using audio-recorded "think-aloud" sessions. In Phase 2 (completed), 22 NICU nurses viewed the module and evaluated its acceptability and feasibility using an 11-item online survey. In Phase 3 (in progress), 100 NICU nurses, trained using the module in the clinical setting, will a) complete a 14-item online survey on the module's acceptability, feasibility, and perceived clinical utility, and b) have their independent real-time pain scores compared with an expert rater at 1-week and 3-months post-training to further assess clinical utility and sustained knowledge.

## RESULTS

Content analysis from Phase 1 revealed that the e-learning module was well designed in terms of navigation and comprehensive for content. Results from the 22 nurses in Phase 2 indicated that: a) 95% reported that the module was feasible and the time

to complete the module was acceptable b) 98% perceived the module as engaging, easy to use, and that the content was appropriate; and c) 100% considered the content was comprehensive, would facilitate practice change in the way they assessed infant pain and they would recommend the module to other health care professionals. Results from Phases 1, 2, and 3 on perceived clinical utility will be presented at the conference.

#### CONCLUSIONS

The PIPP-R module was well received as a feasible and acceptable KT educational strategy to improve knowledge and use of the PIPP-R measure. Based on user feedback in Phases 1 and 2, two additional case studies were added to the module in Phase 3. Results from Phase 3 will provide insight to the perceptions of the e-learning module's clinical utility and practice change associated with its use in the clinical setting.

#### ABS 35

### EVALUATION OF PROLONGED PAIN IN PRETERM INFANTS WITH PNEUMOTHORAX USING HRV ANALYSIS AND EDIN SCORES

M. Buyuktiryaki, N. Uras, N. Okur, M.Y. Oncel, G. Kadioglu Simsek, S. Isik, S.S. Oguz

*Zekai Tahir Burak Maternity Teaching Hospital, Division of Neonatology, Ankara, Turkey*

#### INTRODUCTION

The neonatal pain and discomfort scale (*Échelle douleur inconfort nouveau-né* – EDIN) and the heart rate variability (HRV) have been used for the evaluation of prolonged pain. To assess the availability of the newborn infant parasympathetic evaluation (NIPE) index for the evaluation of prolonged pain in preterm infants with chest tube placement due to pneumothorax.

#### METHODS

A prospective observational study that assessed prolonged pain in the preterm infants with a gestational age between 33 and 35 weeks undergoing installation of chest tubes. Prolonged pain was assessed using the EDIN and NIPE indexes.

#### RESULTS

There was a significant correlation between the EDIN scale and the NIPE index ( $r = -0.590$ ,  $p = 0.003$ ). Prolonged pain is significantly higher in severity in the first 6 hours following chest tube installation (NIPE index: 60 [50-86] vs 68 [45-89],

$p < 0.002$ ; EDIN score: 8 [7-11] vs 6 [4-8],  $p < 0.001$ ).

#### CONCLUSIONS

NIPE monitoring, which is based on HRV analysis that has previously been shown to be effective, is a non-invasive, easy-to-use, instantaneous and continuous pain assessment method in the evaluation of prolonged pain.

#### ABS 36

### NAME BANDS IN PRETERM INFANTS – WHAT IS THE NATION DOING?

A. Doerr, A. Glover, F. Emery

*Neonatal Unit, Southmead Hospital, Bristol, UK*

#### INTRODUCTION

Neonatal patients frequently require procedures, investigations and interventions. Name bands are the gold standard method of patient identification especially for a population who cannot speak for themselves. However, extremely preterm babies have fragile skin and are relatively immobile meaning that name bands directly applied to the limbs may cause breaches in skin integrity. Following a near miss incident within a tertiary NICU, we assessed the national practice of labelling babies born at extremely low weight (< 1,000 g) or 25 completed weeks gestation. Aim: To assess the use of infant name bands in extremely low birth weight (< 1,000 g) babies in UK tertiary neonatal units

#### METHODS

We identified all tertiary neonatal units within the UK and surveyed them by telephone. Two authors undertook the phone calls to reduce caller variation. 41 units kindly responded to our questions. Information was gained from a clinical staff member (commonly the nurse in charge) as this response was felt to accurately reflect the practice occurring within these units. The questions asked were;

- Do you treat patients under 1,000 g/25 weeks gestation? If not; “Thank you for your time.”
- If so: Do you use name bands on those patients in practice?
- If so: All of those patients without exception? What name bands do you use? (Please specify brand) Have you experienced any complications?
- If not: How do you identify that patient group? Qualitative data were recorded using Excel®.

## RESULTS

41 tertiary NICUs responded. 22 do not use name bands on infants < 1,000 g, 19 units would consider using them. Of the 19 who considered using labels, 8 considered prematurity and skin integrity. 11 (27%) stated they use labels irrespective of other factors but on further questioning, only 1 (2.4%) unit in the UK used name bands routinely in these babies. Units who do not directly label the babies fix labels to equipment near the baby. Of the units who use name bands in this population, 10 use labels printed from computer generated demographics and 8 use namelets (handwritten information, paired to the mothers band). The final unit used a Velcro attaching band. The single unit using bands on babies < 25 weeks uses protective cushioning. Only 1 unit stated a problems with using the bands and that was that the bands often fall off. We assume they are applied loosely to avoid skin injury.

## CONCLUSIONS

Whilst essential that babies can be identified for many reasons including safe administration of drugs and blood products, this need must be balanced with physical risks the actual labels pose on fragile skin. Whilst we understand national hospital policies on patient labelling, it may be, in the case of extremely low birthweight babies that this is not the most appropriate course of action when considering the risks verses benefits.

## ABS 37

### DELIVERING EVIDENCE-BASED INFORMATION AT THE POINT OF CARE

A. Dunlop<sup>1</sup>, L. Osborne<sup>2</sup>, P. Satodia<sup>2</sup>

<sup>1</sup>Clinical Sciences Library, University Hospital Coventry and Warwickshire NHS Trust, Coventry, UK

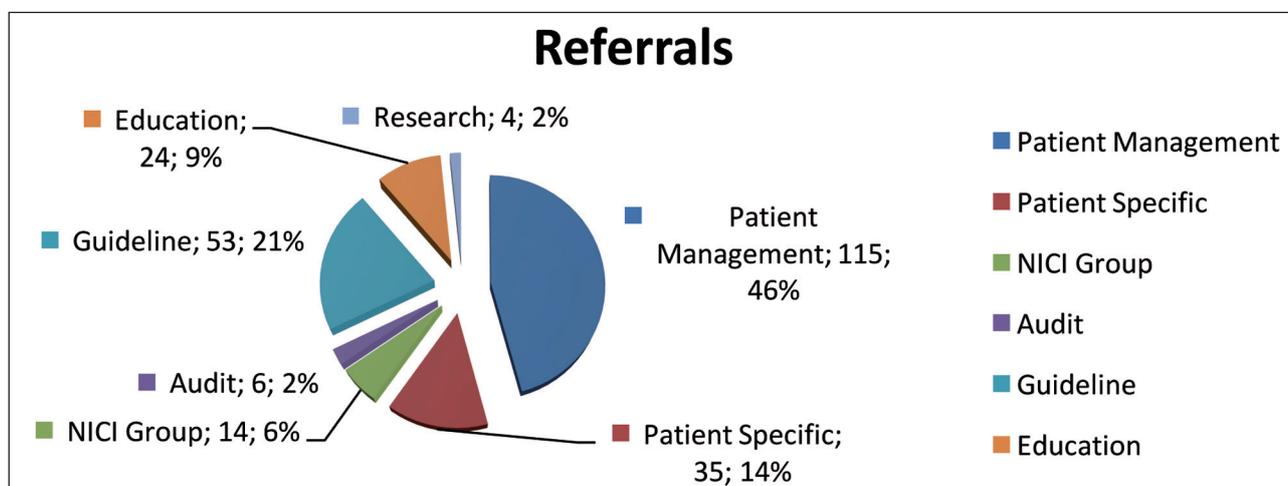
<sup>2</sup>Neonatal unit, University Hospital Coventry and Warwickshire NHS Trust, Coventry, UK

## INTRODUCTION

The role of information professionals in clinical teams to provide evidence at the point of care has developed rapidly. Our hospital library developed a unique service, clinical evidence based information service (CEBIS), to deliver evidence at the point of care. This has been recognised at a national level 1. The tertiary Neonatal Intensive Care Unit was a pilot team, involving a CEBIS specialist in weekly multidisciplinary team grand ward rounds. Each week CEBIS provides evidence to inform clinical practice, supporting clinical staff in delivering evidence in practice presentations, facilitating clinical discussions to enhance evidence-based practice, education, service development etc. Our objective was to review the impact of an information specialist during teaching grand round in the tertiary NICU.

## METHODS

CEBIS referrals are submitted via the ICT system, individual patient record, in person or by phone/email to the CEBIS specialist by clinicians. Each referral is automatically assigned a unique computer generated ID. Following completion, all records for this referral are stored on the ICT system providing seamless access to evidence summaries, full text papers and discussion forums used by clinicians involved with each referral. All referrals from development of CEBIS in 2013 to 2017 were reviewed. The aim was to evaluate the impact and value of a dedicated CEBIS specialist within the NICU team.



**Figure 1 (ABS 37).** During the study period, a total of 251 evidence referrals were made by NICU. Of these the most common purpose (46%) was patient management.

## RESULTS

During this period, a total of 251 evidence referrals were made by NICU. Of these the most common purpose (46%) was patient management (**Fig. 1**) with a further 14% being entered through the electronic individual patient record. The purposes of referrals were set during the pilot of CEBIS development working with clinicians to find the purposes most likely to be used. The full breakdown of referrals by purpose, are shown in the pie chart below. The CEBIS specialist was invited to join the neonatal infection control improvement group (NICI); a multidisciplinary task group formed to implement best practice in order to lower infection rates on the ward, and has provided evidence for each topic discussed. After each referral, an anonymous survey is completed by clinicians. The CEBIS team use this feedback to improve and evaluate the services involvement in clinical teams.

## CONCLUSIONS

Having a dedicated information professional in attendance at weekly grand rounds has resulted in better use of evidence at the point of care. The NICU team regularly uses CEBIS to question current practice, inform parents of likely outcomes for their infants or in some cases choices of treatment options, educate multidisciplinary staff, update clinical guidelines, stimulate clinical discussion, develop new services and confirm best practice.

### ABS 38

#### COST-EFFECTIVENESS OF TRANSCUTANEOUS BILIRUBIN (TCB) MONITORING IN A GROWING HEALTH ECONOMY

L. Mohammed, B.N. Ofoegbu

*Neonatal Intensive Care Unit, Corniche Hospital, Abu Dhabi, UAE*

## INTRODUCTION

The Corniche Hospital, Abu Dhabi is host to the largest neonatal service in the UAE. The hospital has around 7,000 births/year with nearly 1,000 admissions/year to the NICU. Jaundice is one of the commonest postnatal problems. Severe jaundice is associated with significant morbidity and possible mortality. There are validated transcutaneous measurement systems that facilitate the assessment of jaundice. The transcutaneous bilirubin (TcB) meter was introduced to the postnatal wards in June 2015. A retrospective study was done with the aim of assessing the cost benefits of this tool to our facility.

## METHODS

The number of serum bilirubin (SBR) tests done 2 months before (from April to June 2015) and 2 months after (July to August 2015) the introduction of the TcB machine were evaluated. The review included babies located on the postnatal wards who are more than 35 weeks of gestational age with a birth weight of more than 2 kg and babies who attended the jaundice clinics up to the age of 14 days. The study excluded babies with pathological jaundice (< 24 hours of age) and those who were admitted to NICU. Babies were identified during the two epochs using CERNER®, the computer based health information system. Information related to demographics was obtained. Costs of SBR were obtained from the financial team who referred to established insurance claim pathways.

## RESULTS

During the study period and average of nearly 600 babies were born monthly in our Hospital. In the two months prior to the introduction of the TcB meter, the cost of doing the SBR tests was an average of just over \$ 4,600 per month. This cost does not include the cost of consumables and nursing time. In the two months after the introduction of TcB meter, the cost of doing these tests reduced to just over \$ 2,000 (**Tab. 1**). In addition there was a reduced waiting time for parents on the postnatal wards and jaundice clinics. It was also gratifying that an instant result was obtained making the journey less stressful for parents.

## CONCLUSIONS

The introduction of TcB meter has reduced the cost spent on measuring SBR. This impact is apparent despite the increased numbers of live births in the epoch following the introduction of TcB meter. The calculated savings will be more, if the cost of consumables and nursing time is added to the cost of the test. In current world economic climate, these cost savings can be diverted to other areas of the health economy that are in need of funding.

**Table 1 (ABS 38).** Costs in dollars of serum bilirubin prior to and immediately after introduction of transcutaneous bilirubin (TcB) meter.

2015	Number of live births	Number of SBR's	Cost in dollars (\$)
April	549	319	4,050
May	587	402	5,100
June	Transcutaneous bilirubinometer introduced		
July	617	184	2,330
August	598	182	2,300

SBR: serum bilirubin.

**ABS 39****IMPROVING THE QUALITY OF DISCHARGE IN BABIES WITH DOWN SYNDROME**

C.M. Moore, S.M. Eldaw, M. McCormack, J.J. Fitzsimons

*Department of Paediatrics, Our Lady of Lourdes Hospital, Drogheda, Co Louth, Ireland*

**INTRODUCTION**

The Republic of Ireland has the highest of Down syndrome in Europe. The Down Syndrome Medical Interest Group in UK and Ireland have guidelines suggesting safe standards of care for children and adolescents with Down Syndrome, including what needs to be organised upon discharge. Anecdotal reports suggested that not all discharges met with these standards. We planned to create a checklist to improve compliance with these guidelines in a regional neonatal centre, and first audited historical compliance to identify areas for improvement.

**METHODS**

The retrospective review identified cases of babies with Down syndrome from the Maternity Information System, in order to retrieve and review medical records. Anonymised data was analysed using a proforma. The checklist was designed based on the above mentioned standards and multidisciplinary feedback was employed.

**RESULTS**

Over a three-year period, twenty babies were clinically diagnosed with Down syndrome. Babies were identified using the Maternity Information System. All clinical diagnoses were postnatal. Every baby had karyotype confirmation of their diagnosis of Down syndrome, as well as referral to Early Intervention Multidisciplinary Services and Physiotherapy, Thyroid Stimulating Hormone checked on Newborn Bloodspot Screening card and Newborn Hearing Screening. 90% (n = 18) babies had cardiology referral before discharge. 35% (n = 7) of babies were plotted on appropriate centile charts and only 25% of babies had ophthalmology referral completed. Six-month pilot implementation of the checklist demonstrated 100% compliance (n = 3) with the standards.

**CONCLUSIONS**

The quality of medical discharge of babies with Down syndrome can be improved with the use of a standardised checklist.

**ABS 40****CLOSE COLLABORATION WITH PARENTS™ INTERVENTION PREVENTS PROLONGED MATERNAL POSTPARTUM DEPRESSIVE SYMPTOMS**

S. Ahlqvist-Björkroth<sup>1</sup>, A. Axelin<sup>2</sup>, R. Korja<sup>1,3</sup>, M. Huhtala<sup>4</sup>, L. Lehtonen<sup>5</sup>

*<sup>1</sup>Department of Psychology and Language Pathology, University of Turku, Turku, Finland*

*<sup>2</sup>Department of Nursing Science, University of Turku, Turku, Finland*

*<sup>3</sup>Department of Clinical Medicine, University of Turku, Turku, Finland*

*<sup>4</sup>Department of Oncology and Radiotherapy, Turku University Hospital, Turku, Finland*

*<sup>5</sup>Department of Pediatrics, University of Turku and Turku University Hospital, Turku, Finland*

**INTRODUCTION**

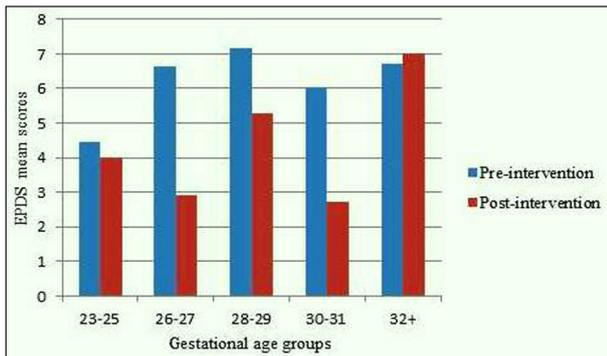
Maternal depression is common during early postpartum weeks (6-48%) after a preterm birth. Although decreasing during the first year, depression remains common (17-20%) up to two years after a preterm delivery. Because maternal depression has adverse effects on the mother-child relationship and child development, it is important to provide preventive interventions for all mothers of preterm infants. We have shown earlier that a unit-wide intervention, the Close Collaboration with Parents™, decreased mothers' depressive symptoms when the infant was 6 months old. This study evaluated the effects of the intervention on maternal depressive symptoms when the child was 2 years old.

**METHODS**

The Close Collaboration with Parents™ intervention was implemented by training the whole staff in a level III NICU in Finland between February 2009 and May 2012. The training aimed to increase staff skills to support parenting during NICU care. The pre-intervention cohort consisted of 146 mothers of infants cared for in the same NICU in 2001-2006 and the post-intervention cohort consisted of 48 mothers of infants cared for in 2011-2015. Included mothers 1) had an infant with birth weight of 1,500 g who was alive at discharge without major congenital anomalies or syndromes and 2) spoke Finnish or Swedish. Maternal depressive symptoms were measured using the Edinburgh Postnatal Depression Scale (EPDS) at 2 years of child's corrected age.

**RESULTS**

The EPDS scores of the mothers in the post-intervention cohort were significantly lower than the



**Figure 1 (ABS 40).** Mean scores of the mothers' EPDS scores by gestational age groups in pre-intervention and post-intervention cohorts.

EPDS scores of the mothers in the pre-intervention cohort ( $M = 4.09$ ,  $SD = 4.06$  and  $M = 6.30$ ,  $SD = 4.76$ , respectively). In the univariate analysis, the estimate of the differences was 2.21,  $p = 0.005$  and in the adjusted multivariate analysis the estimate of the difference was 2.07,  $p = 0.009$ . The proportion of mothers who scored above the clinical cutoff ( $> 12$ ) of the EPDS decreased from 9.6% to 6.2% after the intervention,  $p = 0.02$ . The differences in the mothers' EPDS mean scores are presented by gestational age groups in the **Fig. 1**.

#### CONCLUSIONS

This study showed that the Close Collaboration with Parents™ intervention consistently decreased prolonged depressive symptoms among mothers of very low birth weight infants. We conclude that providing the staff better skills to support parenting during hospitalization prevents maternal depression. Maternal postnatal depression also seems to be a good and feasible marker to monitor the quality of family centered care in a NICU.

#### ABS 41

#### NOISE IN THE NICU. INTRODUCING A NOISE REDUCTION POLICY TO SOUTHMEAD NEONATAL INTENSIVE CARE UNIT: PRIMARY RESULTS FROM A 3 MONTH SERVICE IMPROVEMENT PROJECT

J. Hawksley, E. Helliwell, F. Emery

*Southmead Neonatal Intensive Care Unit, North Bristol NHS Trust, Bristol, UK*

#### INTRODUCTION

Neonates on NICU are exposed to higher sound levels than developing foetuses. Loss of the uterine environment exposes them to higher noise levels

at earlier gestations. Loud and prolonged noise exposure has negative physiological responses including apnoeas, blood pressure fluctuations and extended ventilation time. It also negatively impacts staff and parents. 4-6% of preterm infants in the UK suffer hearing loss. Whilst acknowledging multiple contributing factors, we know louder and prolonged noise contributes. This is hugely important, as a potentially controllable factor. The American Academy of Paediatrics (AAP) advises to monitor sound in NICU and that a "noise level of 45dB is of concern".

#### METHODS

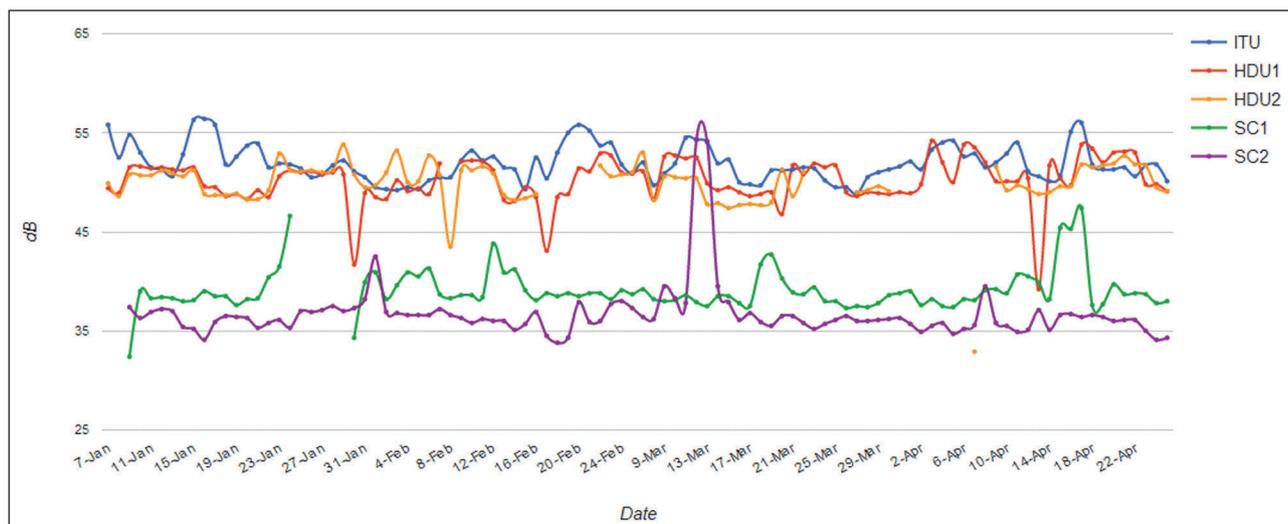
Southmead NICU monitored noise levels in intensive, high dependency and special care to assess its level and the variability infants were exposed to each day. Data from each room's 'SoundEar3' meter was downloaded over a 1 month period. To demonstrate the neonate's exposure to sound a dosimeter recorded noise levels within incubators, comparing to the noise level in the room. Sound levels for daily activities were assessed, including ward rounds, opening and closing incubator doors and insulating the incubator with covers. A multi-faceted intervention project: "Promote Quietness" began in March 2017: "Marc(ssshh)". This included parent information leaflets, staff education and a noise poster. Monitoring has continued for the following months to assess the effects of these interventions.

#### RESULTS

Data demonstrated noise level variation between rooms on NICU (**Fig. 1**). ITU recorded levels of 63.54 dB compared to 62.96 dB in special care. Interestingly, levels remained over 50 dB during 4-days of HDU closure, demonstrating background noise above AAP recommendations. Following the interventions, maximum sound levels in ITU fell from 90.39 dB in January, to 90.25 dB in April. Average sound levels reduced by 0.98 dB January to April. Decibels are a logarithmic scale, demonstrating a positive effect for the neonate. The Atom Incu incubator demonstrated a 17.9 dB reduction in noise from ambient room sound level. Conversation over the incubator produced levels up to 73.4 dB which reduced by 4.2 dB when applying a single blanket. Waste bins within the department were changed after an average level of 58.6 dB was recorded. Actively trying to close incubator doors quietly demonstrated a reduction in 11.4 dB.

#### CONCLUSIONS

"Promoting Quietness" resulted in noise reduction in NICU. Different incubators offered varying



**Figure 1 (ABS 41).** Minimum sound levels recorded in Southmead NICU during introduction of multifaceted noise intervention project.

protection from sound and could be selected based on CGA. Adding a thick cover reduced noise levels in incubators, and will be mandatory. Background noise surpasses recommended limits. Positively, exposure is reduced within incubators and is influenced by small alterations in daily practice. Parents' voices are encouraged for their positive influence.

## ABS 42

### IS BREAST MILK ODOR APPROPRIATE TO MANAGE PAIN IN PRETERM NEONATES?

G. De Clifford-Faugère<sup>1,2</sup>, A. Lavallée<sup>1,2</sup>, M. Aita<sup>1,2,3</sup>

<sup>1</sup>Université de Montréal, Faculty of Nursing, Montreal, Canada

<sup>2</sup>Research Center CHU Sainte-Justine, Montreal, Canada

<sup>3</sup>Quebec Network of Nursing Intervention Research (RRISIQ), Montreal, Canada

#### INTRODUCTION

It is recognized that preterm neonates can feel pain, which can be expressed through specific signs. Even if the number of heel pricks has declined over the last decade, it still remains high at almost one a day. Repeated and untreated pain has consequences for the preterm neonates such as a hypersensitivity to pain, as well as important repercussions on their motor and intellectual development. The use of pharmacological and non-pharmacological interventions is very limited in this population. Hence, it is pertinent to investigate the effect of a new intervention on the pain response of preterm

neonates: the breast milk odor. A specific objective of this pilot study was to estimate the effect of breast milk odor on preterm neonates' pain response during a heel prick.

#### METHODS

For this pilot study, only the experimental group was considered. Preterm neonates were familiarized to their mother's breast milk odor during nine hours preceding the painful procedure and during the heel prick in addition to standard care. For familiarization, a total of 3 mL of breast milk was put on a sterile gauze near the infant's nose and was changed every 3 hours. During the pilot study, the distance of the gauze to the neonates' nose was changed according to 3 groups: 3 to 10 cm (n = 4, group 1), 1 to 1.5 cm (n = 4, group 2) and 1 mm (n = 4 preterm, group 3). Pain response was assessed by the revised premature infant pain profile (PIPP-R), which is reliable and valid tool for preterm neonates. The PIPP-R score could vary from 0 (no pain) to 21 (intense pain).

#### RESULTS

Differences in pain response was observed across the 3 groups: the closer the gauze with breast milk was to the neonate's nose, the lower was the PIPP-R score. At the needle insertion, the average PIPP-R score was 11.67 for G1, 10.25 for G2, 8.75 for G3. There was no difference between groups one minute after the needle insertion. However, 30 sec after the end of the heel prick, a difference of 3 points in the PIPP-R score was observed between G1 and G3. The time to return to baseline (RTB) was also measured: 4 min and 30 sec for G1, 1 min and 21 sec for G2, and 50 sec for G3. This finding also suggests

that the closer the gauze to the neonates' nose was, the faster is their time to RTB. Noteworthy, these findings emerge only from descriptive statistical analysis and other covariables (i.e. gestational age, number of previous heel prick...) could have influenced the findings of this pilot study.

#### CONCLUSIONS

Breast milk odor seems to diminish preterm neonates' pain response to heel prick. The distance to where the compress is placed from the neonates' nose appears to play a role in their pain response score and their time to RTB. This pilot study's findings lead to the conduct of a full-scale randomized clinical trial with the purpose of evaluating the effectiveness of this intervention, thus guiding the neonatal clinical practice and research in pain management of preterm neonates.

#### ABS 43

### REDUCING UNNECESSARY BLOOD SAMPLING IN NEONATAL UNIT – A QUALITY IMPROVEMENT INITIATIVE

H. McDermott, A. Smith, P. Nath

*Neonatal Intensive Care Unit, University Hospitals of Coventry and Warwickshire, Coventry, UK*

#### INTRODUCTION

Neonates are at risk of anaemia due to suboptimal erythropoiesis of prematurity, exacerbated by

iatrogenic blood loss via testing for monitoring and investigations. With a small circulating volume, they can quickly become deplete and up to 80% of preterm babies weighing less than 1,500 g at birth are transfused at least once during admission, being exposed to associated, albeit small, inherent risks. This study reports on the first stage of a quality improvement project evaluating the physical and financial costs of blood sampling in a neonatal intensive care unit (NICU) and feasible ways of minimising blood loss through testing, in order to reduce harm while maintaining safe monitoring.

#### METHODS

We conducted a prospective study on all babies in the NICU and special care baby unit (SCBU) with data collected over a 2 week period in May 2017. Those already on the unit and those admitted in the first week were eligible for inclusion, to ensure at least 7 days of data per patient was gathered. We produced a standardised data sheet to be filled in by the person taking each sample to collect epidemiological and blood test data. The notes and electronic clinical systems were also reviewed retrospectively to ensure a full data set was collected. In addition, we contacted the laboratory for information regarding the cost of each individual test. The data was collated and analysed in Microsoft® Excel®.

#### RESULTS

In total, 726 blood tests were taken on 27 neonates; 395 gases and 331 laboratory tests. Overall, 30 'routine' sets of blood tests were performed. Only 2 NICU patients had arterial lines, with all other

**Table 1 (ABS 43).** Results on all babies in the neonatal intensive care unit (NICU) and special care baby unit (SCBU) with data collected over a 2 week period.

	NICU (n = 14)	SCBU (n = 13)	Total (n = 27)
Gestation at birth in weeks (median)	27	32	30
Gestation at data collection in weeks (median)	31	33	32
Birthweight in grams (median)	1,088	1,640	1,345
Weight at data collection in grams (median)	1,500	1,960	1,640
Median age in days (range)	30 (0-89)	9.5 (0-90)	23 (0-90)
<b>Blood tests over 2-week period</b>			
Gases (mean) per patient	18	2	14
Laboratory tests (mean) per patient	17	5	12
Blood sampling events (mean) per patient	21	3	16
Skin breaks (mean) per patient	15	3	14
Percentage of successful tests (not clotted or insufficient)	98%	98%	98%
Percentage of tests where change made (range)	24% (9-57%)	17% (0-24%)	21% (0-57%)
Packed red cell transfusions	7 (50%)	1 (8%)	8 (30%)
Mean haemoglobin at transfusion in g/L (range)	103 (95-112)	85	100 (85-112)

NICU: neonatal intensive care unit; SCBU: special care baby unit.

bloods requiring at least one skin break to acquire. No babies had delayed cord clamping recorded and no umbilical samples were used. 8 babies were transfused, with no adverse events. Only 21% (0-57%) of gases or blood tests were acted upon to make or monitor a change. The correlation of the gas machine values to the number of individual laboratory values for haemoglobin (36 tests), bilirubin (19), sodium (38) and creatinine (27) showed a close positive correlation of 0.95-0.99, potassium (39) showed 0.88. Bland Altman analysis showed that gas machine values can be reliably used instead of the lab results, as 92-96% of gas values for these markers were within +2 SD of the lab results. Results are presented in **Tab. 1**.

#### CONCLUSIONS

More efforts should be made to consider use of cord blood testing, use of near-patient gas machine values and standardising frequency of routine blood tests given lack of actions. Benefits of this include fewer transfusions, better developmental care, increased time-efficiency for staff and lower financial cost to the department. We intend to continue with an extended quality improvement project looking at the impact of reduced blood testing.

#### ABS 44

##### ALARM VISIBILITY AND INFUSION CONTINUITY: ENVIRONMENTAL CHANGE AND TECHNOLOGY ASSISTANCE

M. Bastanie, H. Blom, L. Mahieu, M. Meeus, S. Laroche, D. VanLaere, M. Voeten, V. Demeulemeester, R. Vermeulen, A. Mulder

*Neonatal Intensive Care Unit, Antwerp University Hospital, Antwerp, Belgium*

#### INTRODUCTION

Infusion continuity, especially of vasoactive medications is a key element of neonatal intensive care. The management of IV pump alarms is crucial to infusion continuity, and has been linked to alarm fatigue. With the move towards higher patient to staff ratios and single patient room occupation, alarm management has become an increasing important topic. In the Antwerp University Hospital Neonatal Intensive Care Unit (NICU) two years ago the decision was made to introduce central infusion monitoring and to change the environment of the NICU in three zones to reduce infusion interruptions. Quantitative and qualitative data were gathered in order to assess the impact of these changes.

#### METHODS

In order to assess the impact of the environmental change and the introduction of central monitoring of infusions on infusion continuity, the following quantitative parameters were selected for pre and post implementation assessment:

- Measurement of volume of Near End of Infusion (NEOI) alerts.
- End of infusion (EOI) alerts.
- Reaction Time (RT): Measurement from first time occlusion alarm to infusion restart.

Second stage analysis mapped the above NEOI, EOI and RT to vasoactive infusions where infusion continuity is vital. Data were drawn from the event logs and drug libraries of syringe drivers in continuous use in the NICU over a period of 1,244 days (622 days of data each for the pre- and post-change periods). Third stage analysis integrated quantitative data with qualitative data gathered from questionnaires on the application of central monitoring of infusions and environmental change to assay their impact on infusion continuity, alert fatigue and patient safety.

#### RESULTS

Initial analysis showed the following changes between pre and post central monitoring implementation with environmental changes. There was a 46.4% average reduction in NEOI alerts, a 66.1% average reduction in EOI alerts and a 31% average reduction in reaction time. A noticeable trend was that the reaction time to infusion occlusion dropped in the first month following the introduction of central infusion monitoring and environmental change, and significantly continued to decrease as usage time increased. Increasing familiarity with the changes and the integration of the new technology into the work pattern of the unit were probably the cause of this continued improvement.

#### CONCLUSIONS

There are multiple variables in any study of alarm fatigue and infusion continuity. The ability to quantitatively track alert numbers and reaction times, allied to qualitative data and care trends in time contributes to a greater understanding of the issues of infusion delivery in NICU and have the potential to aid in planning for improvement in the quality of care.

#### ABS 45

##### NOT A MONITORING PROBE LESION

A. Olariu, S. Nallagonda, J. Egyepong

Neonatal Intensive Care Unit, Luton & Dunstable University Hospital, Luton, UK

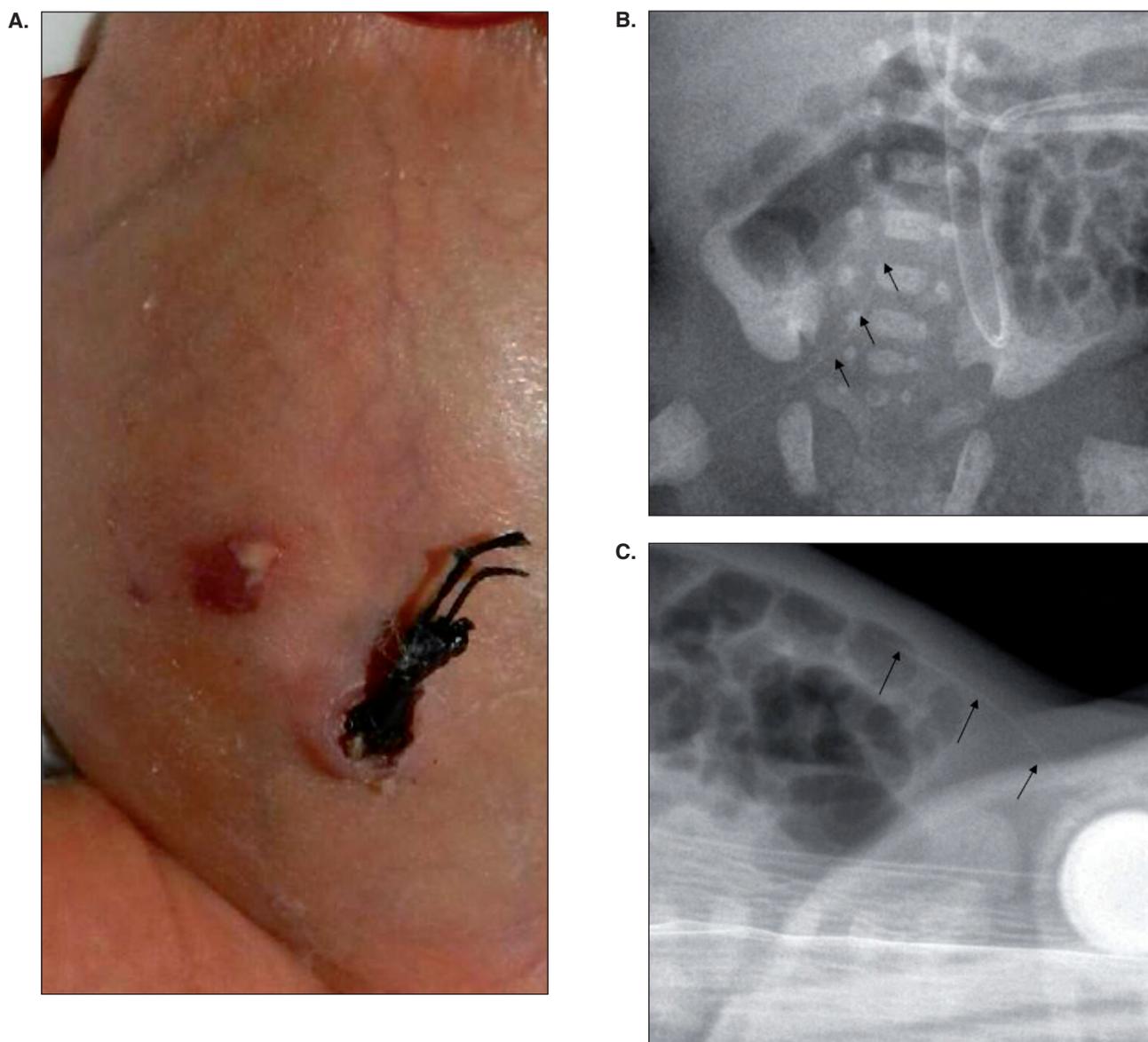
## INTRODUCTION

Percutaneously Inserted Central Catheters (PICC) are extensively used in preterm babies. A number of complications can occur with their use, extravasation being the most common, resulting from non-centrally placed tips. Anterior abdominal wall (AAW) extravasation injuries is a very rare complication from lower limb inserted catheters. This is the only reported case of a right (Rt) saphenous inserted PICC with an unusual course, with the tip position in a right epigastric vein in the AAW, initially thought to be due to a burn from a monitoring probe. In any suspicious lesion involving the AAW, in the presence of a lower limb PICC, the tip position should be reviewed with a lateral radiograph. We report a rare case of PN extravasation ulcerative, burn-like injury, where the tip of a PICC introduced into the Rt saphenous vein appeared on AP x-ray to be located to the right of L5-S1 vertebrae just below the ilio-caval junction. However, the lateral x-ray identified the catheter tip to be off-course, in a Rt epigastric vein (which drains the right lower and medial part superficial of the anterior abdominal wall).

## CASE REPORT

A 25 week gestation baby, birth weight of 775 grams, was noted to have a skin lesion on the right side of the anterior abdomen wall (AAW), lateral and slightly superior to the umbilicus on day 7 of life. The central part of the lesion, measuring about 2 mm in diameter, was yellowish-white with an erythematous shiny surrounding of about 1 cm. On palpation of the skin around it, it was felt to be slightly oedematous (**Fig. 1A**). Initial thought was a developing burn secondary to the use of a monitoring probe (temperature, ECG lead or transcutaneous TcPO<sub>2</sub>/O<sub>2</sub> probe). The lesion had developed over a 24 h period. On reviewing the history, it was noted that the PICC line (28 gauge/1F/Vygon, Germany) had been inserted up to 11 cm, in the Rt Long Saphenous vein 24 h prior. The tip was noted to be at the level of first sacral vertebra (S1) on contrast (Omnipaque 140, GE Healthcare, Oslo, Norway) anterior-posterior (AP) radiograph of the right leg and abdomen (**Fig. 1B**). Parenteral Nutrition (PN) containing 11% dextrose and 20% Intralipid® had then been started after the above x-ray confirmation. The differential diagnosis after the above review was

the possibility of extravasation injury from PN from the PICC with the tip in a small vessel in the AAW. This was subsequently confirmed on a lateral plain radiograph of the abdomen (**Fig. 1C**). The TPN was stopped and the PICC was removed. The lesion healed without scarring over the next 72 h. Extremely preterm babies are prone to burns from monitoring probes despite several precautions that are taken during their care on NICUs. This is due to anatomical and physiological prematurity of their skin. Extravasation may be defined as the non-intentional leakage of infused fluid into surrounding tissues, which may lead to tissue injury. The prevalence of extravasation injuries leading to skin necrosis in 31 regional neonatal units in the United Kingdom was 38 per 1,000 babies. PICCs are life-saving in the care of extremely preterm babies and provide access for PN, infusions and for administering concentrated medications. A number of complications can occur with their use, including extravasation injuries resulting from sub-optimally placed tips in various sites, such as pericardial and pleural effusions, peritoneal cavity, lumbar venous plexus leading to paraplegia, and AAW extravasation injury. Therefore, locating PICC tips using x-ray with contrast is paramount. Some advocate the use of lateral x-rays as an adjunct, especially for lower limb PICCs as the tips of these may erroneously be interpreted as being optimally placed in the IVC. There are currently some case reports of these tips rather being located in the Lt ascending lumbar vein and Lt epigastric veins, anterior to the IVC on AP x-rays, all from Lt lower limb catheters. Alabsi et al. [1], in a review of 21 saphenous vein PICCs over a 13 month period, identified 3 cases of initially unrecognised, malpositioned Lt saphenous vein PICC tips on contrast AP x-rays. The tips were later found to be in the Lt ascending lumbar vein/lumbar venous plexus and Lt superficial epigastric vein in the AAW. The only case similar to ours was previously reported by Baker and Imong in 2002 [2]. They described a similar catheter placement on day 1, through the Lt saphenous vein, which resulted in a localised area of abdominal wall cellulitis to the left side of umbilical stump from day 3. In a review of 2,186 PICCs inserted over a 19 year period, Cartwright [3] presented a case with contrast brush beyond a PICC tip in a similar position to ours which was subsequently removed. In our case, although the initial x-ray was done with



**Figure 1 (ABS 45).** **A.** Skin lesion on the right side of the anterior abdominal wall (AAW), lateral and slightly superior to the umbilicus on day 7 of life. The central part of the lesion, measuring about 2 mm in diameter, was yellowish-white with an erythematous shiny surrounding of about 1 cm. On palpation of the skin around it, it was felt to be slightly oedematous. **B.** The PICC line inserted up to 11 cm in the Rt Long Saphenous vein 24 h prior. The tip was noted to be at the level of first sacral vertebra (S1) on contrast anterior-posterior (AP) radiograph of the right leg and abdomen. **C.** Confirmed diagnosis on a lateral plain radiograph of the abdomen.

contrast, this did not show a contrast jet or blush beyond the tip, which would have prevented its use and subsequent extravasation complication. This is the first reported extravasation injury of the AAW secondary to insertion of PICC in the Rt Saphenous vein. Early recognition with prompt removal of the line in this suspected and subsequently confirmed abnormal tip position, led to healing without scarring.

#### CONCLUSIONS

In any suspicious, burn-like lesion involving the anterior abdominal wall, in the presence of a lower

limb PICC, the tip position should be reviewed with a lateral radiograph in order to exclude malposition and extravasation injury. Don't think it's just a burn from a monitoring probe!

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**ABS 46****QUALITY IMPROVEMENT PROJECT: TOWARDS NEONATAL MANAGEMENT OF PREGNANCIES COMPLICATED BY POLYHYDRAMNIOS**

R. Mardare, A. Olariu, M. Noureldein, J. Egyepong

*Neonatal Intensive Care Unit, Luton & Dunstable University Hospital, Luton, UK***INTRODUCTION**

Polyhydramnios complicates 0.4-1.9% of pregnancies and is associated with adverse pregnancy and neonatal outcomes. Oesophageal atresia (OA) is one of the causes with a low prenatal detection rate of 9.2-24%. In our institution, the practice after delivery is brief NICU admission for nasogastric tube (NGT) insertion and chest X-ray (CXR) to rule out OA. Our aim was to formulate an improved care pathway through a retrospective review of polyhydramnios and OA cases, a study on current national practices and evidence-based literature.

**METHODS**

We reviewed neonatal outcomes of 110 pregnancies complicated by polyhydramnios between Jan 2012-Dec 2014 and 11 cases of OA during Jan 2010 - Dec 2015. Cases were identified from patient electronic notes, imaging and other database systems. Database system changes led to differences in using different time periods.

**RESULTS**

The incidence of polyhydramnios was 0.71% in live births (110/15,338), only 4.5% of 110 had OA. All OA babies, except 1, presented at delivery with features requiring immediate NICU admission. 61% of polyhydramnios cases were born by Caesarean section (local rate of 28%). 17.3% needed NICU admission (admission rate during same period was 12%). 1.8% of polyhydramnios babies had other anomalies on prenatal scans – Goldenhar syndrome or Trisomy 18. The meantime to obtaining a CXR was 124 mins, range: 55 mins to 6 hours 53 mins (proxy to separation time and first feed). Over the 6 year period, 11 cases of OA were diagnosed, only 36% had polyhydramnios antenatally. All OA patients were admitted for different reasons: 63% needed immediate intervention at birth, 1 patient had Trisomy 18 antenatally and 2 patients were admitted for prematurity. Only one baby (no polyhydramnios) went to the postnatal ward, had a post feed dusky choking episode, and subsequent NICU admission.

**CONCLUSIONS**

Without routine practice of NGT + CXR immediately after birth, no cases of OA would have been missed. In our new improved pathway, the Fetal Medicine Group will be alerted weekly of polyhydramnios cases and antenatal counselling will be offered when anomalies or amnioreduction are present. The neonatal team will attend all deliveries where polyhydramnios was identified. Admission to NICU will be done only for: antenatally known congenital and chromosomal anomalies, post-amnioreduction, dysmorphism and respiratory distress/requiring respiratory support. These babies will have NGT and CXR as part of their investigations. For isolated polyhydramnios cases, NGT and CXR management will not be followed anymore. Parents will be made aware of the features of OA (frothing/excessive secretions, respiratory distress, choking, dusky episode) and midwives will observe baby's first feed. This improved pathway will avoid unnecessary admissions, investigations, separation of mother and baby, delaying the commencement of feeds. It is therefore cost saving and promotes patient safety as it prevents possible iatrogenic complications – hypoglycaemia, exposure to ionizing radiation.

**ABS 47****SITUATIONAL FAMILY INTERACTION**

N. Betzelos, J. Nilsson, J. Högström, M. Corrias, S. Lilliesköld, M. Norman, K. Bohlin

*Department of Newborn Medicine, Karolinska University Hospital, Stockholm, Sweden***INTRODUCTION**

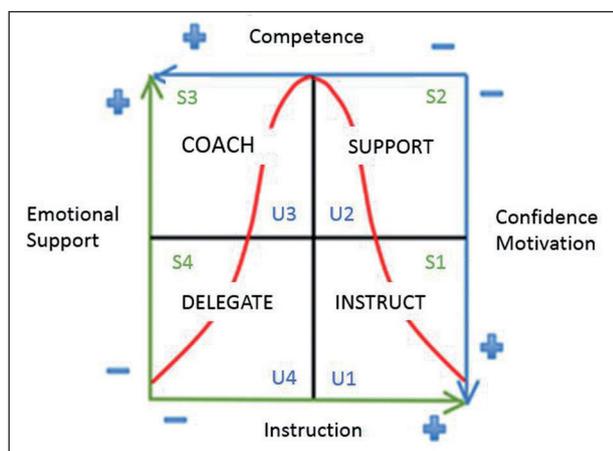
A new program has been implemented at the Neonatal Units at Karolinska University Hospital in Sweden. The program intends to improve professionals' interaction with families according best practice in communication and pedagogics. 450 employees care for approx. 3,000 neonates/year, level 1-3. The units allow parents to stay with their newborn 24/7. Parental involvement is part of the daily work for the health care professionals and can be a great challenge concerning interaction and communication. The aim is to coach the parent to be a confident and independent caregiver. Professionals must change their earlier mindset from being “doers” to become “teachers”.

## METHODS

A new theory was created, “Situational Family Interaction” based on Hershey-Blanchard Situational Leadership. The theory explains that the pedagogic approach depends upon each individual situation. All tasks are different and require different pedagogical style depending on every persons’ level of competence and commitment to the specific task. The professionals learn how to adjust different level of instruction and motivation during a two-day interactive course (Fig. 1). Different scenarios related to common clinical situations and encounters with families are being followed by debriefing sessions. The professionals also practice how to response to different crisis reaction as shock, anger, fear, guilt etc. and how they should adjust themselves in different situations.

## RESULTS

The implication of the program ensures that all health care professionals is given the same tools to use in interaction with families. A common language and approach can help reduce communications barriers with parents as well between the professionals, which then leads to increased patient safety. Emotional support to families in crisis and correct individual pedagogic style can also improve parents functioning and the relationship with their newborn with the longtime effect of a reduced care time. Better communication skills can also increase the professionals’ confidence to face different communication challenges. The different pedagogical styles are also useful for the professionals to use on new employees, in terms of making them independent and confident.



**Figure 1 (ABS 47).** Situational family interaction. U1-U4: different levels of competence and confidence; S1-S4: different pedagogic styles.

## CONCLUSIONS

Evaluations from the program show that the professionals develop their ability in different interaction and communication skills but the big challenge has been, and still are, to maintain the professionals’ competence. Shorter sessions with debriefing and repetition of the theories are set out continuously but further work needs to be done. The result and the effect of the program need to be evaluated and measured.

## ABS 48

### EARLY DISCHARGE OF PREMATURE INFANTS < 36 WEEKS GESTATIONAL AGE WITH NASOGASTRIC TUBE FEEDING, NEW STANDARD OF CARE?

F.S. van Kampen<sup>1</sup>, A.C. de Mol<sup>2</sup>, J.P. Korstanje<sup>2</sup>, F. Maingay-de Groof<sup>3</sup>, L. van Meurs-Asseler<sup>3</sup>, H.G. Stas<sup>4</sup>, R. Willemsen<sup>4</sup>, G.M.S.J. Stoelhorst<sup>2</sup>; on behalf of Nutrisociety

<sup>1</sup>Franciscus Gasthuis and Vlietland, Schiedam, the Netherlands

<sup>2</sup>Albert Schweitzer Hospital, Dordrecht, the Netherlands

<sup>3</sup>Northwest Hospital Group, Alkmaar, the Netherlands

<sup>4</sup>Maastad Hospital, Rotterdam, the Netherlands

## INTRODUCTION

Since 2002 parents of preterm infants are taught to give nasogastric tube feeding (NTF) in the Albert Schweitzer Hospital (ASH) (Dordrecht, the Netherlands), a secondary care hospital with a post-IC neonatal unit. When monitoring of vital parameters is no longer necessary but the infant is still dependent on NTF, earlier discharge from hospital is possible. Homecare is provided by pediatric nurses. Aim of this study was to evaluate duration of NTF at home and compare this to admission time from cessation of monitoring till discharge independent of NTF in infants born in two comparable hospitals who do not offer home-NTF. Possible complications of NTF at home and parental satisfaction with the procedure were evaluated.

## METHODS

Preterm infants < 36 weeks gestational age (GA) discharged with NTF between Feb 2014 and Feb 2016 from the ASH were included in a prospective cohort study. Exclusion criteria: syndromic anomalies, asphyxia with neurological sequelae and (psycho)social problems. Duration of NTF at home was registered by pediatric nurses during weekly visits. Parental satisfaction was evaluated with a

**Table 1 (ABS 48).** Patient characteristics of the study and control groups.

	ASH n = 113	MSH n = 36	NHG n = 66	p-value
Male	56 (50%)	17/36 (47%)	43/66 (65%)	0.09
Gestational age (mean)	32.6 weeks	32.5 weeks	32.8 weeks	0.80
Birthweight (mean)	1,873 grams	1,733 grams	1,934 grams	0.19
Singleton	69 (61%)	23 (64%)	52 (79%)	0.05
BPD	14 (12%)	4 (11%)	3 (5%)	0.22
IVH	10 (9%)	2 (6%)	5 (8%)	0.81
Caucasian	89 (79%)	23 (64%)	53 (80%)	0.13

ASH: Albert Schweitzer Hospital (Dordrecht, the Netherlands); MSH: Maasstad Hospital (Rotterdam, the Netherlands); NHG: Northwest Hospital Group (Alkmaar, the Netherlands).

questionnaire. The control group was formed of infants < 36 weeks GA of the Northwest Hospital Group Alkmaar (NHG, included Feb 2014-May 2015) and the Maasstad Hospital Rotterdam (MSH, included Feb 2014-Dec 2015).

## RESULTS

In the ASH 51% (123/242) of preterm infants were discharged with NTF. 92% (113/123) were included in the study. In the NHG 59% (66/111) of preterm infants remained in hospital after cessation of monitoring till they no longer needed NTF, in the MSH 44% (36/81). Patient characteristics of all groups are shown in the **Tab. 1**. Median duration of NTF at home in the ASH infants was 9 days, compared to a median of 9 and 11 admission days after cessation of monitoring till discharge independent of NTF in the NHG and MSH infants respectively ( $p = 0.37$ ). No complications related to NTF at home were noted. 95% of parents regarded NTF at home as safe and would repeat it in the future if necessary.

## CONCLUSIONS

Earlier discharge home with NTF in preterm infants < 36 weeks GA is safe and results in high parental satisfaction rates. Median duration of NTF at home in the study group is comparable to the admission time after cessation of monitoring till discharge independent of NTF in the control groups. A shorter admission time is beneficial for hospital admission capacity and is likely financially favorable. From our point of view discharge with NTF in clinically stable preterm infants should be standard of care.

## ABS 49

### NIOSIM: NORTHERN IRELAND SIMULATION AND HUMAN FACTOR TRAINING

R. Little, C. Anderson, M. O'Dowd, R. Tubman

Royal Maternity Hospital, Belfast, Northern Ireland

## INTRODUCTION

The risk of dying due to error in hospital is 1 in 300, compared with 1 in 10 million in an air crash [1]. Neonatal trainees must acquire new practical skills and learn how to manage complex emergencies. Simulation training is essential due to patient safety demands and reduced learning opportunities owing to the European Working Time Regulation (EWTR). Multi-disciplinary *in situ* simulation allows trainees to enhance team performance and learn from errors without clinical consequence [2, 3]. Introduction of human factor training should improve trainee confidence and reduce clinical incidents. We developed a simulation program in the regional tertiary Neonatal Intensive Care Unit (NICU). Our aim was to deliver high fidelity simulation scenarios to improve team clinical performance and non-technical skills in common NICU emergencies, as well as incorporating specific learning objectives arising from clinical incidents.

## METHODS

Pre-simulation questionnaires were distributed to all neonatal trainees in the regional NICU at the beginning of their six month job rotation. Monthly *in situ* simulations were planned using high fidelity manikins, providing an opportunity for repetitive practice in a safe learning environment. Debrief with team performance orientated feedback will give staff an opportunity to explore the learning outcomes and provide participant feedback. Certificates of attendance were designed for trainee e-Portfolios and nursing revalidation.

## RESULTS

The pre-simulation staff questionnaires highlighted that limited numbers of trainees felt confident in managing neonatal scenarios: PPHN (20%), Congenital Diaphragmatic Hernia (30%) and

**Table 1 (ABS 49).** Trainee confidence before and after NICU simulation scenarios.

Scenario	Pre-simulation confidence (%)	Post-simulation confidence (%)
CDH	20	80
BPD spells requiring intubation	30	100

BPD Spells (40%) compared with other neonatal scenarios such as Preterm deliveries (70%). 100% of responders requested more multi-disciplinary training simulation. We ran a pilot scenario as part of a PDSA cycle, identifying the degree of fidelity achievable, and the type of scenario that could be completed in the time slots available. We embarked on a monthly simulation programme with our modified scenarios. Following simulation staff confidence increased as outlined in the table below. Feedback highlighted many requests for neonatal simulation earlier in the rotation and involvement of a wider MDT including midwives.

#### CONCLUSIONS

Introducing *in situ* simulation to Northern Ireland's Regional NICU has successfully improved trainee confidence. Trainees report enhanced provider skill, improved communication and effective teamwork. To ensure a culture change of engaging in regular simulation training in a busy tertiary NICU we are seeking support from our local postgraduate training organisation to endorse adequate simulation time in Neonatal Units throughout the region.

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#### ABS 50

#### MILK ANALYSIS USING MILK ANALYZERS IN A STANDARDIZED SETTING (MAMAS) STUDY

G. Fusch<sup>1</sup>, C. Kwan<sup>1</sup>, N. Rochow<sup>1</sup>, M. Belfort<sup>2</sup>, J. Festival<sup>3</sup>, A. Hair<sup>4</sup>, J.-M. Hascoet<sup>5</sup>, T. Kuehn<sup>6</sup>, MIRIS<sup>7</sup>, M. Nelle<sup>8</sup>, D. O'Connor<sup>9</sup>, G. Pelligra<sup>10</sup>, B. Poindexter<sup>11</sup>, B. Urlesberger<sup>12</sup>, A. Wesolowska<sup>13</sup>, C. Fusch<sup>1,14</sup>

<sup>1</sup>Department Pediatrics, McMaster University, Hamilton, Canada

<sup>2</sup>BWH, Boston, USA

<sup>3</sup>NorthernStar Mothers Milk Bank, Calgary, Canada

<sup>4</sup>Texas Children's Hospital, Houston, USA

<sup>5</sup>CHRU, Nancy, France

<sup>6</sup>Klinikum Neukölln, Berlin, Germany

<sup>7</sup>MIRIS, Uppsala, Sweden

<sup>8</sup>Inselspital, Bern, Switzerland

<sup>9</sup>SickKids, Toronto, Canada

<sup>10</sup>Victoria General Hospital, Victoria, Canada

<sup>11</sup>Cincinnati Children's Hospital, Cincinnati, USA

<sup>12</sup>Medical University of Graz, Graz, Austria

<sup>13</sup>Holy Family Hospital, Warsaw, Poland

<sup>14</sup>Department of Pediatrics, Paracelsus Medical University, Nuremberg, Germany

#### INTRODUCTION

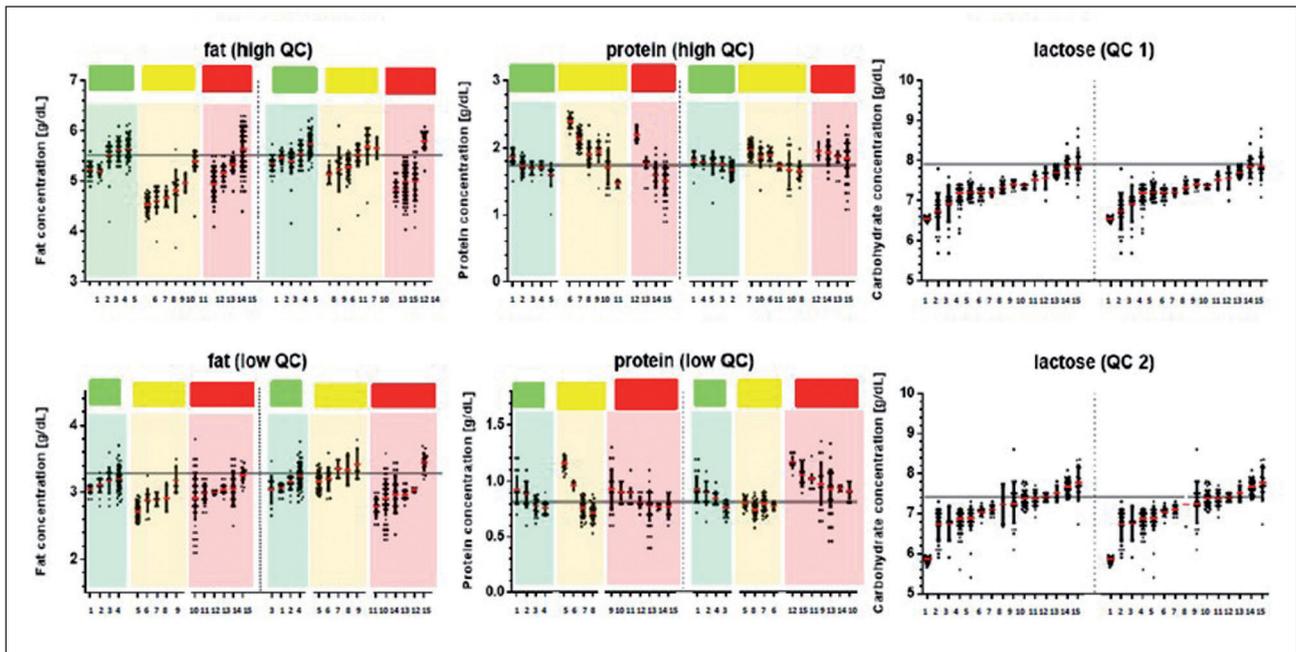
Human milk analyzers (MA) are increasingly used to rapidly measure the macronutrient content in breast milk for target fortification, to reduce the risk of postnatal growth restriction. However, many MA are used without quality assurance, validation or calibration. Hence, we have launched the MAMAS study, a multicenter international quality initiative, to implement standard procedures following good laboratory and clinical practice (GLCP) for MA. Aim of the study is to investigate the quality of measurements between different MA, test whether the accuracy and precision of devices can be improved by establishing individual calibration curves, and assess the long-term stability of measurements, following the GLCP guidelines.

#### METHODS

Breastmilk samples prepared at McMaster University were sent out to 13 participating centers in North America and Europe for measurement purposes, for a total of 15 devices. The study included 3 sets of samples: A) initial assessment of the device's performance consisting of 10 calibration samples with random replicates; B) long term stability and quality control (LQC) consisting of 2 batches of 100 samples to be measured every time before the device is used, over 6 months; C) ring trial consisting of 2 samples to be measured monthly. The devices tested were Unity SpectraStar™ (n = 5) and MIRIS Human Milk Analyzer™ (n = 10).

#### RESULTS

The initial assessment results revealed that fat, protein and carbohydrate measurements vary significantly, independent of the device used. The range of protein variation was > 1g/dL. Using the data of the initial assessment and the inverse regression approach, we generated correction algorithms for each device and applied it to the LQC measurements. We grouped the devices as follow, based on their LQC measurements: accurate and no correction required



**Figure 1 (ABS 50).** Long term quality control measurements from each centre for fat, protein and carbohydrates. For fat and protein, each single graph shows raw data (left) and corrected data (right). Grey horizontal line shows the chemical reference value. In each graph, the devices are grouped as follow: accurate and no correction required (green), correction successful (yellow), and correction unsuccessful (red).

( $n = 5$  for high QC,  $n = 4$  for low QC), correction successful ( $n = 6$  for high QC,  $n = 5$  for low QC), and correction unsuccessful ( $n = 4$  for high QC,  $n = 6$  for low QC) (Fig. 1). Overall, this correction significantly improved the accuracy for fat and protein measurements, as shown by LQC data (Fig. 1). We speculate that a reason the correction was unsuccessful could be due to the presence of pre-analytical sample preparation errors, thus requiring staff training, during the initial assessment and/or the LQC samples measurement. Once validated, the LQC results are quite robust, however daily QC will identify malfunction of the device and long-term shift. The LQC results also show general long term stability of the measurements, although there are differences in stability between devices. GLCP improves the results obtained during ring trials.

#### CONCLUSIONS

This is the first trial to compare MA measurements in a multicenter setting. The observed variations in measurements between centers are clinically significant and would impact the outcomes of clinical trials assessing the adjustment of nutrient intake in human milk fed babies. The accuracy of measurements can be improved by establishing individual correction algorithms. This study shows that GLCP must be introduced to bedside milk analysis to avoid confusing results in breast milk research.

#### ABS 51

### KANGAROO FAMILIES – THE MEANING OF SOUND ENVIRONMENT FOR THE DEVELOPMENT OF PREMATURELY BORN INFANTS

K. Kostilainen<sup>1</sup>, K. Mikkola<sup>2</sup>, E. Partanen<sup>1</sup>, S. Pakarinen<sup>1</sup>, M. Huutilainen<sup>1,3</sup>, V. Fellman<sup>4,5</sup>

<sup>1</sup>Cognitive Brain Research Unit, Department of Psychology and Logopedics, Faculty of Medicine, University of Helsinki, Helsinki, Finland

<sup>2</sup>Jorvi Hospital, Helsinki University Central Hospital, Helsinki, Finland

<sup>3</sup>Swedish Collegium for Advanced Studies, Uppsala, Sweden

<sup>4</sup>Pediatrics, Department of Clinical Sciences, Lund University, Lund, Sweden

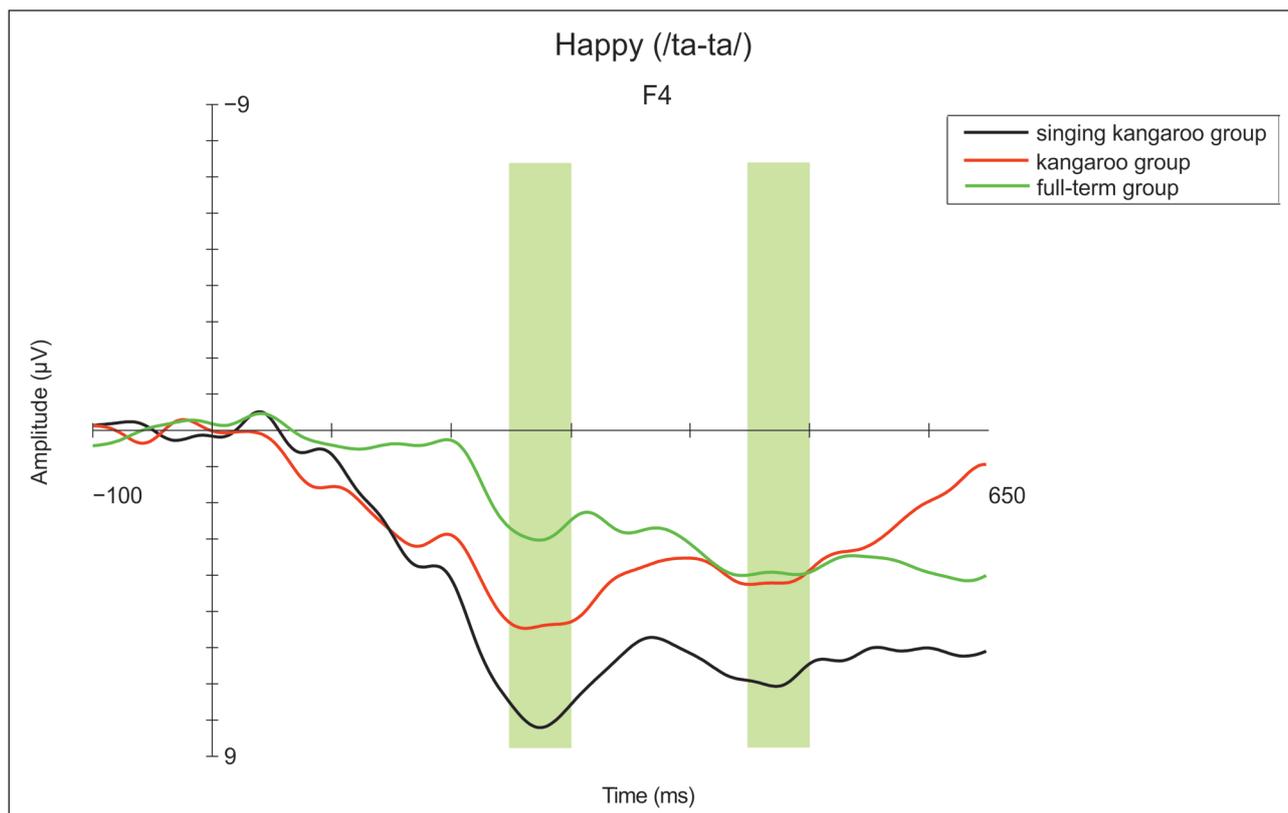
<sup>5</sup>Children's Hospital, University of Helsinki, Helsinki, Finland

#### INTRODUCTION

Language disorders are more common in preterm than in term-born children. Auditory processing starts antenatally and the ability to discriminate changes in speech is required for normal language development. In our ongoing prospective Kangaroo Families study we evaluate the effects of early exposure to music on the development of auditory processing after premature birth.

#### METHODS

Preterm infants born at 26-33 gestational weeks (GW) in Helsinki University Hospital were enrolled



**Figure 1 (ABS 51).** Auditory event related potentials (AERPs) showed statistically significant discriminatory responses to emotional stimuli in all three groups.

into singing ( $n = 22$ ) or control ( $n = 15$ ) groups. Parents were instructed to perform daily kangaroo care between 33-40 GW. During kangaroo care in the singing group parents were instructed to sing or hum. To evaluate the effects of singing on sound processing, auditory event related potentials (AERPs) to linguistic and emotional (happy/sad/angry) stimuli were recorded at 40 GW. In addition, 20 full-term control infants were recorded after birth. Data of postnatal music exposure were collected and at 2.5 years of age preterm infants ( $n = 27$ ) were assessed using Bayley III.

#### RESULTS

In the interim analysis AERPs showed statistically significant discriminatory responses to emotional stimuli in all three groups. The responses of singing kangaroo group infants differed significantly from those of full-term newborns in all linguistic deviants and emotional variants. The preliminary results of Bayley test suggested statistically significant positive effects of music on the expressive language and language comprehension at 2.5 years old. Results are presented in **Fig. 1**.

#### CONCLUSIONS

At term age, all infants were competent to process emotional stimuli. Parental singing during active

auditory cortical maturation of brain development may improve auditory discrimination skills in preterm infants. Additionally, the results show that the versatile use of music (singing, playing and listening) may enhance language development. Thus, parental singing and music may effectively support cognitive development after premature birth.

#### ABS 52

### A SYSTEMATIC REVIEW OF THE EFFECTIVENESS OF INTERVENTIONS DURING NICU HOSPITALIZATION ON THE SHORT-TERM NEURODEVELOPMENT OF PRETERM INFANTS

M. Aita<sup>1</sup>, R. Stremmler<sup>2</sup>, N. Feeley<sup>3</sup>, A. Lavallée<sup>1</sup>, G. De Clifford-Faugère<sup>1</sup>

<sup>1</sup>Faculty of Nursing, Université de Montréal, Montréal, Canada

<sup>2</sup>Lawrence S. Bloomberg Faculty of Nursing, University of Toronto, Toronto, Canada

<sup>3</sup>Ingram School of Nursing, McGill University, Montréal, Canada

#### INTRODUCTION

Preterm infants' neurodevelopment is influenced during the Neonatal Intensive Care Unit (NICU) hospitalization where the experiences they

encounter can have significant consequences for the development and functioning of their brain. The effectiveness of interventions initiated during NICU hospitalization has been evaluated on infants' long-term neurodevelopment after discharge, but none specifically examined their effectiveness on infants' neurodevelopment during their NICU hospitalization. The aim of this systematic review is to evaluate whether interventions (i.e. sensory stimulation, parental involvement...) improve infants' short-term neurodevelopment during NICU hospitalization.

#### METHODS

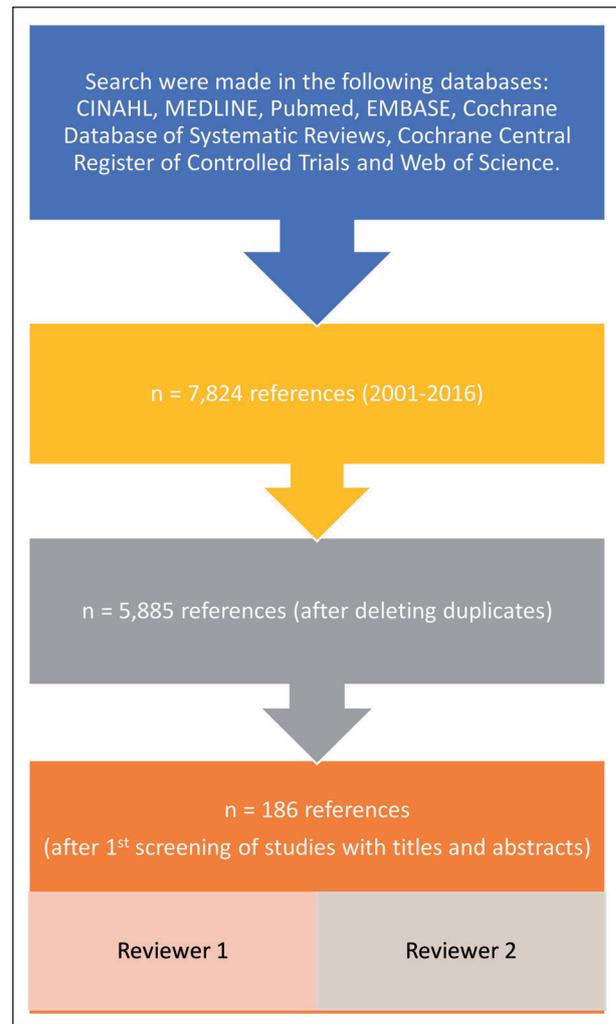
Funded by the Quebec Network on Nursing Intervention Research, this systematic review protocol follows the PRISMA-P6 guidelines and is registered in Prospero (CRD42017047072). Searches were conducted in common databases (**Fig. 1**). Considered studies have an experimental design published in English/French in the past 15 years with infants of 24 to 36<sup>67</sup> GA and having no brain abnormalities or a status inducing neurodevelopment. All interventions instigated during NICU hospitalization, delivered by professionals and/or parents were included. Comparator groups can be a non-exposed group or one exposed to another intervention. Outcomes are infants' neurodevelopment measured during NICU hospitalization (primary) with a standardized tool as well as physiological stability and sleep (secondary).

#### RESULTS

A total of 7,824 references were retrieved from the databases searches. A number of 5,885 references remained after deleting duplicates. To date, the 1<sup>st</sup> step in screening studies was completed by 2 reviewers keeping 186 references (**Fig. 1**). The next steps consist of a 2<sup>nd</sup> screening of studies with the articles and data extraction, all in agreement with 2 reviewers. Then, the *Cochrane* tool will be used for assessing studies' bias. A meta-analysis will be done if data are sufficiently homogeneous. Results will be analyzed using a standardized mean difference. If possible, subgroup analyses will be carried out with infants' GA and interventions' attributes (i.e. dose, type, etc.). Publication bias and selection of variables will be examined using the Funnel plot graphical method and Egger's statistical test. The quality of evidence will be assessed using the GRADE Working Group tool.

#### CONCLUSIONS

Identifying effective interventions promoting preterm infants' neurodevelopment as soon as they are hospitalized in the NICU will guide clinical



**Figure 1 (ABS 52).** Preliminary results following 1<sup>st</sup> step in studies screening by 2 reviewers.

neonatal care and may foster infants' long-term development. Also, results of this systematic review will provide a better understanding of the effectiveness of early interventions on the underlying processes of infants' short-term neurodevelopment in addition to guiding neonatal research.

#### ABS 53

#### THE IMPACT OF LUNG ULTRASOUND IN THE REDUCTION OF RADIATION EXPOSURE IN NICU

C. Barone<sup>1</sup>, L. Balestriere<sup>2</sup>, A. Faiella<sup>2</sup>, G. Montesano<sup>2</sup>, B. Orsini<sup>2</sup>, I. Perrotta<sup>1</sup>, D. Riccardi<sup>1</sup>, V. Roseto<sup>2</sup>, I. Rotta<sup>2</sup>, F. Toro<sup>2</sup>, M. Napolitano<sup>2</sup>

<sup>1</sup>Dipartimento della Donna, del Bambino e di Chirurgia Generale e Specialistica, Università degli Studi della Campania "L. Vanvitelli", Naples, Italy

<sup>2</sup>U.O.C. di Neonatologia e TIN, Ospedale Evangelico Betania, Naples, Italy

## INTRODUCTION

Lung ultrasound (LUS) is a relatively new technique with a well defined semiology. Lung ultrasound findings have been described for typical neonatal respiratory conditions, such as meconium aspiration syndrome, hyaline membrane disease, transient tachypnea of the neonate and pneumothorax. We performed a retrospective analysis of hospital administration data from 2013 to 2016 to investigate the impact of introducing lung ultrasounds in terms of the amount of chest radiographs and radiation exposure. Lung ultrasound was introduced in 2014 as the first-line imaging technique for all babies admitted to the NICU with signs of respiratory distress.

## METHODS

We focused on preterm babies with a gestational age between 24 and 36 weeks, and the number of chest X-rays performed in this population during the period 2013-2016 were retrieved from the hospital administration electronic archives. Mortality, NICU stays, the oxygen dependence and grade III-IV intraventricular haemorrhage in the babies with weight < 1,500 g were also retrieved for the same periods. The data were analysed with the chi-square test with the

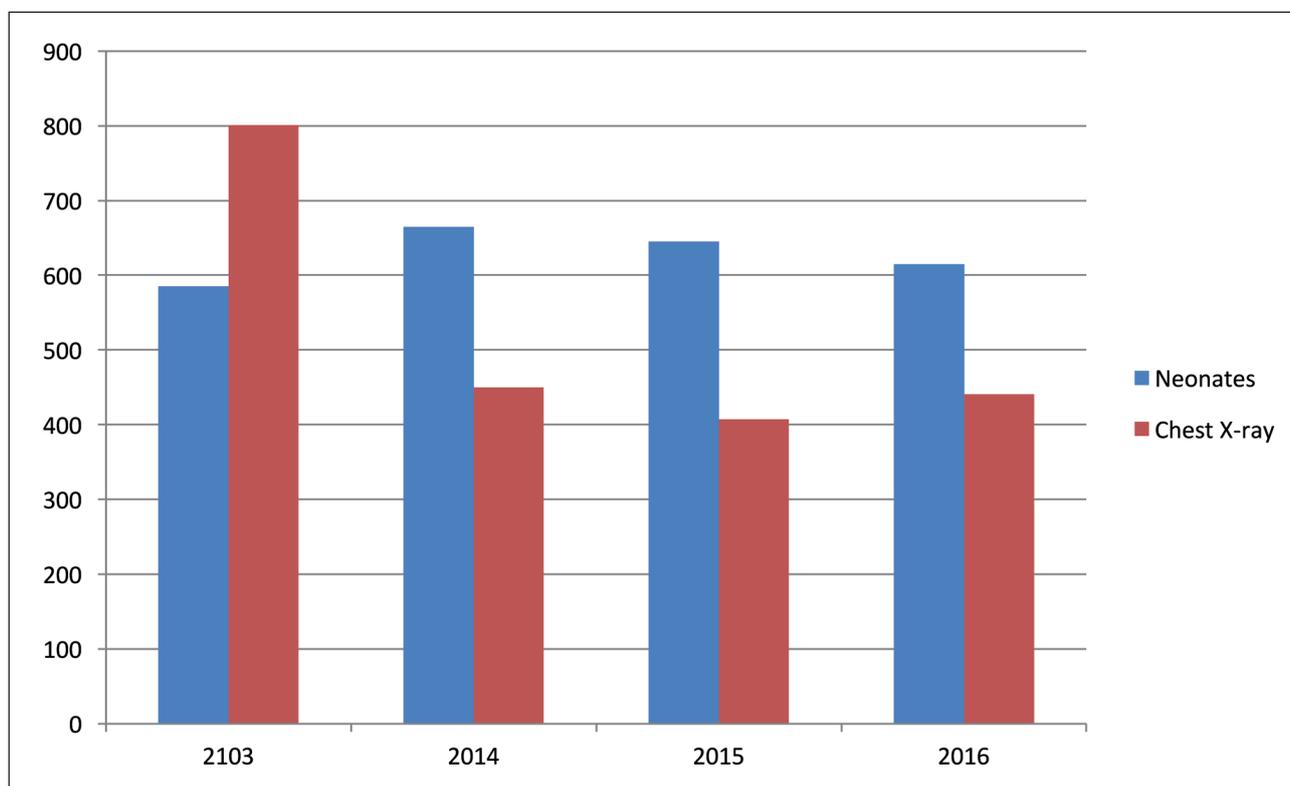
Student t-test, and  $p < 0.05$  was considered to be statistically significant.

## RESULTS

In 2013, we performed 801 chest X-rays on a population of 585 preterm infants admitted to the NICU and in the following years we observed a significantly reduction of chest X-rays (441 chest X-rays on a population of 615 babies in 2016) with a decrease of 51.8% of this exam (**Fig. 1**). The mean number of chest X-rays per neonate decreased from 1.37 in 2013 to 0.71 in 2016 and the mean radiation dose per baby decreased from 41  $\mu\text{Gy}$  to 21  $\mu\text{Gy}$  in the same years. The overall in-hospital mortality in preterm < 1.500 kg decreased between 2013 (15.7%) and 2016 (1.8%), and other major outcomes were not worsened.

## CONCLUSIONS

Our data show the impact of LUS on radiation exposure in NICU. In the last years we observed a progressive decrease in the number of chest x-ray (51.8%). The introduction of LUS as first line imaging technique for all babies with respiratory distress and to detect the position of central lines, would allow a further reduction of radiation exposure. Chest x-ray could be used as second line procedure if there are doubts about findings during LUS.



**Figure 1 (ABS 53).** Comparison between the number of preterm babies with a gestational age 24-36 weeks, and the number of chest X-rays performed in this population from 2013 to 2016.

## ABS 54

## FAST AND METICULOUS: IMPROVING QUALITY OF NEONATAL RESUSCITATION DOCUMENTATION

M. Karam<sup>1</sup>, N. Merchant<sup>1</sup>, A. Sierra<sup>2</sup>, S. Narayanan<sup>1</sup><sup>1</sup>Neonatal Department, West Hertfordshire NHS Trust, Watford General Hospital, London, UK<sup>2</sup>Women's Services, West Hertfordshire NHS Trust, Watford General Hospital, London, UK

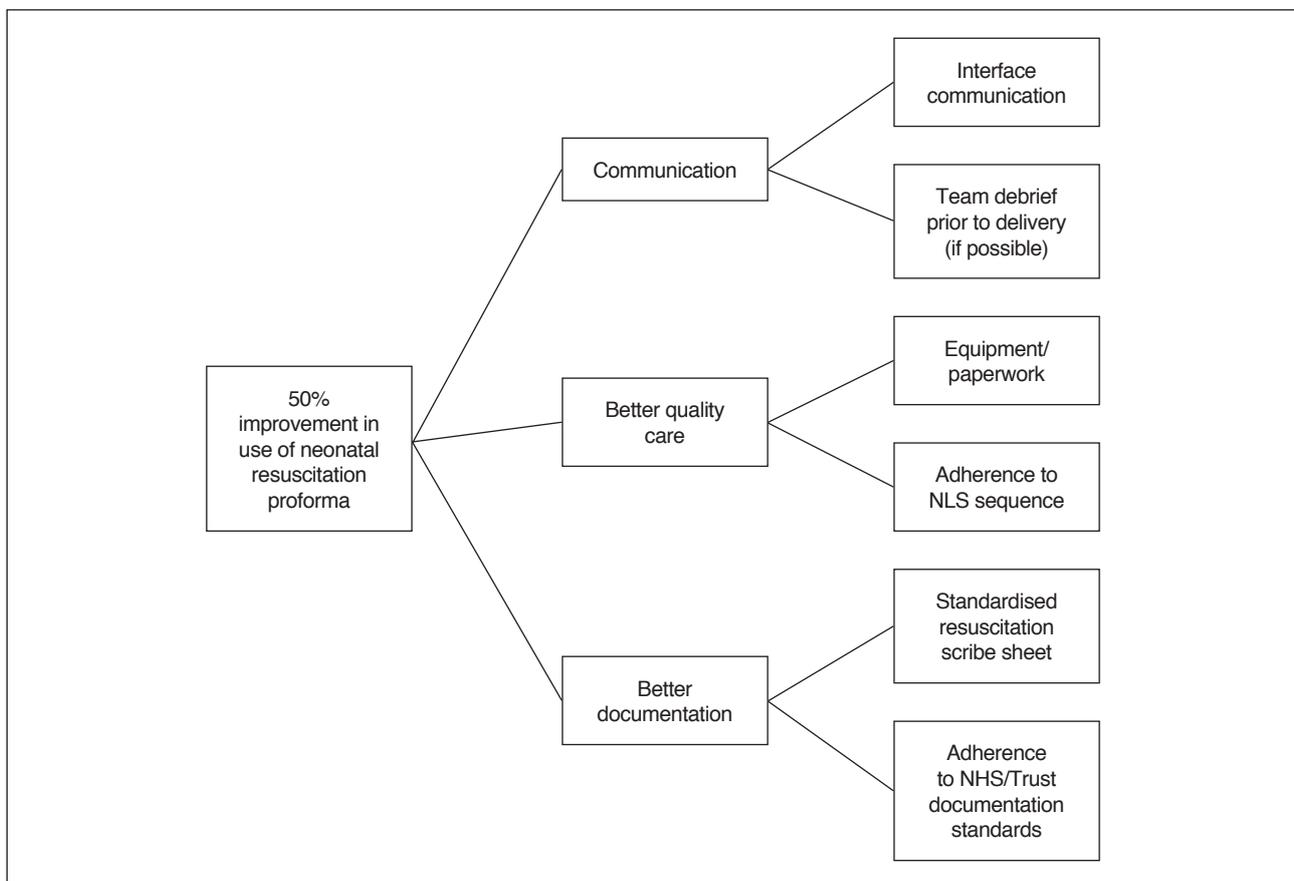
## INTRODUCTION

Neonatal resuscitation is a fast-paced event that involves cohesive team working and effective communication between multiple professionals. Accurate documentation of events is vital for subsequent clinical care and could be of value in auditing team performance and has medico-legal implications. UK Neonatal Life Support (NLS) and International Liaison Committee on Resuscitation (ILCOR) guidelines recommend the importance of accurate contemporaneous documentation

of resuscitation, although no specific guidance is included. The aim of the study was to assess neonatal resuscitation documentation standards and implement improvements using quality improvement methodology.

## METHODS

Review of Root Cause Analysis (RCA) reports of 9 cases of neonatal hypoxic ischemic encephalopathy over 1 year period identified a common theme of absent/poor documentation of neonatal resuscitation. Perinatal team set out to improve quality of documentation targeting a 50% improvement in resuscitation documentation. Using quality improvement methodology (brainstorming sessions, communications matrix and driver diagrams) several interventions (Fig. 1) were used. These interventions were refined in iterative PDSA cycles over 6 months. A retrospective review of 12 randomly selected case notes of babies who required resuscitation at birth was conducted (July-Dec 2016). Results were analysed in Excel® 2016. Feedback was collated from the perinatal team on the use of the resuscitation document.



**Figure 1 (ABS 54).** Interventions used in quality improvement methodology (brainstorming sessions, communications matrix and driver diagrams).

**RESULTS**

After a series of PDSA cycles, the proforma was modified by addition specific prompts, drug doses and identification of team members present at resuscitation. At the end of 6 months we audited our documentation. Of a total 90 crash calls 22 required significant resuscitation. 12 of these were randomly audited. Proforma was used to document resuscitation in 6 of these notes (50%). All 6 proformas had documentation of interventions, heart rate, respiratory effort and saturations. Team roles were identified only in 2 (33%) cases. Clear timing of events was documented in only 2 (33%) cases whereas time resuscitation commenced was documented in 5/6 (83%) cases. Only 1 proforma had documentation of parental communication and only 2 were signed and dated. Perinatal staff expressed satisfaction and acceptance of the record form, noting ease of use.

**CONCLUSIONS**

Through collaborative working and intelligent use of QI methodology we demonstrated 50% improvement in quality of neonatal resuscitation documentation. Further work is needed to improve documentation of team roles, and communication with family. We intend to do this by analysing poor performance, understanding reasons behind incomplete documentation and implementing changes to manage variation by enhanced scenario based simulation training.

**ABS 55****SAFETY CULTURE ASSESSMENT IN A NEONATAL UNIT FOLLOWING A PLAN TO IMPROVE PATIENT SAFETY**

M. Arriaga-Redondo, A. Rodriguez-Sanchez de la Blanca, E. Sanz-Lopez, A. Diaz-Redondo, R. Gregorio-Hernandez, P. Chimenti-Camacho, M. Sanchez-Luna

*Neonatology Division, Gregorio Marañon University Hospital, Madrid, Spain*

**INTRODUCTION**

Due to the complexity and characteristics of their patients, neonatal units are risk areas for the development of adverse events. For this reason, there is a need to evaluate and increase the patient safety culture among healthy workers. To evaluate this safety culture the “Cuestionario sobre la seguridad de los pacientes” is the Spanish version of the “Hospital Survey on Patient Safety” from the

Agency for Health Care Research and Quality. Aim: To compare the safety culture survey in a Neonatal Unit before and after of improving a patient safety program.

**METHODS**

Along 2015, a patient safety improving program was conducted in a Neonatal Unit based on: formative talks, design and implementation of the use of safety checklist and promotion of incidents reports. Neonatologists, nurses and auxiliary nurses were asked to voluntary fulfill the survey in January 2015 and January 2016. The survey consists of 42 items grouped into 12 composite measures. For each question, the percentage of positive and negative answers is calculated. A percentage of negative answer  $\geq 50\%$  is considered as an improvement possibility and percentage of positive answer  $\geq 75\%$  is considered as a strength. In addition, the survey includes two questions to provide an overall grade on patient safety for their unit and to indicate the number of events they reported over the previous 12 months.

**RESULTS**

In 2015, the survey was answered by 97 people (neonatologists 5.6%, nurses 60% and auxiliary nurses 34.4%), and by 65 in 2016 (neonatologists 8.8%, nurses 61.4% and auxiliary nurses 29.8%). The overload of the work rate, in the security perception dimension, was detected as an opportunity for improvement with better evaluation in 2016 (negative responses: 78.1% vs 58.5%). In both years the teamwork was proved as a “strong-point”. In 2015, 4 improvement points were detected and all of them improved after the safety plan: communication openness, feed-back and communication about errors, non punitive response to errors and teamwork across units (negative answers: 65.6% vs 48.4%; 56.9% vs 47.6%; 56.3% vs 39.7% y 58.8% vs 46%). The overall grade on patient safety improved from 2015 with a median of 7 to 8 in 2016. Also, the number of people who reported an incident increased in the second year (18.1% vs 29.3%).

**CONCLUSIONS**

An improvement in the safety culture of the service staff was observed thanks to the patient safety plan developed in our unit.

**ABS 56****SHORT AND LONG TERM OUTCOMES RELATED TO UMBILICAL VENOUS CATHETER PLACEMENT IN PRETERM INFANTS**

L. Arques<sup>1</sup>, R. del Rio<sup>1</sup>, C. Balcells<sup>1</sup>, E. Inarejos<sup>2</sup>, V. Aldecoa-Bilbao<sup>3</sup>, I. Iglesias-Platas<sup>1</sup>

<sup>1</sup>*Servei de Neonatologia, Hospital Sant Joan de Déu, ICGON BCNatal, Facultat de Medicina, Universitat de Barcelona, Barcelona, Spain*

<sup>2</sup>*Radiology Department, Hospital Sant Joan de Déu, Barcelona Spain*

<sup>3</sup>*Servei de Neonatologia, Hospital Clínic, seu Maternitat. ICGON BCNatal. Facultat de Medicina, Universitat de Barcelona, Barcelona, Spain*

## INTRODUCTION

Umbilical venous catheter (UVC) malposition is often difficult to diagnose using conventional radiographs and can be related to complications such as necrotizing enterocolitis (NEC), localized liver injury or portal vein thrombosis. The aim of this study was to analyze UVC position in preterm infants admitted to our hospital and its relationship to liver anomalies assessed by abdominal ultrasound during follow-up.

## METHODS

In this retrospective study, infants admitted to our unit between 2011 and 2014 with a) gestational age under 32 weeks and b) UVC placement during first days of life were included. Parental informed consent was obtained. Patients with chromosomal abnormalities, major congenital malformations or imminently foreseeable death upon admission were excluded. Position of the UVC was assessed for each patient independently using the first anteroposterior chest and abdominal X-ray available by a Pediatric resident, a Neonatologist and a Radiologist (gold standard). Weighted Kappa coefficients were calculated to evaluate interobserver agreement. Abdominal ultrasound was performed at 2-4 years of age by a Radiologist that was blinded to initial UVC position to evaluate possible complications

## RESULTS

112 patients were included. Mean gestational age was 29.0 (SD 2) with a birth weight of 1,144 g (SD 325). Median duration of UVC was 5 days (range 0.5 to 13) Only 23.4% of UVC were initially correctly placed. A good concordance was observed between the Radiologist and the Neonatologist UVC's position assessment (92.1% agreement,  $k = 0.79$ , 95% CI 0.67 to 0.91,  $p < 0.05$ ). However poor agreement was observed between the Pediatric resident and the Neonatologist (57.1% agreement,  $k = 0.14$ , 95% CI 0 to 0.28,  $p = 0.07$ ) and between the Pediatric Resident and the Radiologist (56.1% agreement,  $k = 0.15$ , 95% CI 0.02 to 0.29,  $p < 0.05$ ). Three of the included patients developed NEC during hospital stay. All of these newborns had the UVC initially incorrectly placed. During follow

up, 31 abdominal ultrasounds were performed. No focal hepatic injuries, calcifications, or portal hypertension signs were observed.

## CONCLUSIONS

UVC position is difficult to assess only using plain chest and abdominal radiographs and discordance might exist between different observers. Other diagnostic techniques such as ultrasound performed at the bench side might improve the accuracy of this evaluation. Currently most of the UVC might be incorrectly placed in preterm newborns, increasing the risk of potentially severe short and long term complications.

## ABS 57

### ACHIEVING NORMOTHERMIA IN INFANTS ADMITTED TO THE NEONATOLOGY DEPARTMENT – A QUALITY IMPROVEMENT PROJECT AT THE KAROLINSKA UNIVERSITY HOSPITAL

K. Jonsson<sup>1</sup>, A. Gudmundsdottir<sup>1</sup>, A. Chakhunashvili<sup>2</sup>, A.-S. Ingman<sup>1</sup>, C. Branvik-Ingelsson<sup>1</sup>, E. Wilson<sup>1</sup>, I. Edqvist<sup>1</sup>, M. Viberg<sup>1</sup>, B. Hallberg<sup>1</sup>, M. Breindahl<sup>1</sup>

<sup>1</sup>*Department of Neonatology, Karolinska University Hospital, Stockholm, Sweden*

<sup>2</sup>*Strategic Health Care Development and Operations, Karolinska University Hospital, Stockholm, Sweden*

## INTRODUCTION

Maintaining a stable body temperature in the sick newborn infant immediately after birth and upon admission to the neonatal department is a recognised quality indicator for the level of care and treatment provided. Optimal temperature for a newborn has been defined, by the World Health Organisation, as the range between 36.5-37.5°C (normothermia). Temperatures out of that range have been associated with increased mortality and morbidity in very preterm infants but also in infants born term [1, 2, 3]. We aimed to study how temperature control could be improved in all infants admitted to our department, regardless of the infant's gestational age.

## METHODS

A quality improvement team was built, including neonatal nurses and neonatologists working at three neonatal intensive care units at the Karolinska University Hospital, Stockholm. The team worked according to the approach, Quality by Design,

developed by the Dartmouth Institute for Health Policy & Clinical Practice. The team analyzed the infant's pathway from the delivery department to admission to identify risk factors for hypothermia. Structured PDSA cycles were run in the routine care of the infants. Firstly a structured protocol for temperature registration was introduced and secondly educational inputs, on temperature control, were provided. Data are described as means ( $\pm$  SD) and proportions. Associations of hypothermia and covariates were analyzed with ANOVA regression models.

## RESULTS

During a three-month period in 2017, 89 infants were admitted and had a mean first temperature measured after birth of  $36.8^{\circ}\text{C} \pm 0.7^{\circ}\text{C}$ . 53 of the 89 infants (59.6%) had a temperature within the normothermic range. This was an improvement when compared to 2015, where 50% of admitted infants, had a temperature  $< 36.5^{\circ}\text{C}$  on the first measured temperature. ANOVA regression analysis showed that the risk of hypothermia was not associated to gestational age, birth weight or sex. The average time point at the first measured temperature after birth differed between the three units, at 17.5 minutes, 8 minutes and 10 minutes, respectively (n.s. statistically). Notably, the unit with the average earliest measurement also had the highest rate of normothermia during the first hours after birth. A limited size sample of 89 infants has been used to come to this outcome.

## CONCLUSIONS

This study/project suggests that successful changes can be implemented in neonatal care by using the clinical microsystems approach for quality improvement. A systematic application of PDSA cycles combined with the improved communication and educational efforts on the importance of temperature control are probably the key for improving the normothermia rates (proportion) in the admitted infants.

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## ABS 58

### PERSONALITY TRAITS AND STYLES OF COPING WITH STRESS AMONG MIDWIVES

B. Zych<sup>1,2</sup>, W. Blaz<sup>1,3</sup>, M. Muster<sup>4</sup>, M. Mazur-Magoła<sup>5</sup>, G. Raba<sup>2,6</sup>

<sup>1</sup>Department of Perinatology, Faculty of Medicine, University of Rzeszow, Rzeszow, Poland

<sup>2</sup>Innovative Research Laboratory in Maternity Care, Center for Medical and Natural Sciences Research and Innovation, Rzeszow, Poland

<sup>3</sup>Neonatal Clinic with the Neonatal Intensive Care Unit, St Jadwiga Provincial Clinical Hospital No. 2, Rzeszow, Poland

<sup>4</sup>Institute of Nursing and Health Sciences, Medical Faculty, University of Rzeszow, Rzeszow, Poland

<sup>5</sup>Forensic Specialists Centre at the District Court in Przemysl, Poland

<sup>6</sup>Institute of Obstetrics and Medical Rescue, Medical Faculty, University of Rzeszow, Rzeszow, Poland

## INTRODUCTION

Stress related to performing the profession of a midwife especially in the labor room and taking decisions at work is one of the strongest emotions that the midwives have to deal with. Stress management styles are determined by many psychological factors, including personality traits. The aim of the study was to evaluate the association of personality traits with stress coping strategies in midwives undertaking cardio-pulmonary resuscitation of a newborn.

## METHODS

The study group consisted of 69 midwives. The stress coping style was assessed with Coping Inventory for Stressful Situations, and personality traits were assessed based on the subjective assessment of the respondents.

## RESULTS

The dominant style of coping with stress among midwives was task oriented coping (mean sten value:  $6.28 \pm 1.94$ ). Sanguinism clearly dominated among all the examined midwives (average value: 37.7%). Among the subjective traits of the character dominated empathy (average value: 4.32), tolerance (average value: 4.14) and ambition (average value: 4.01). The respondents who responded more often to stress by means of the task oriented style had more strongly expressed such personality traits as ambition ( $r = 0.28$ ), empathy ( $r = 0.34$ ), knowledge of people ( $r = 0.29$ ), resistance to stress ( $r = 0.25$ ) and tolerance ( $r = 0.28$ ). More frequent reactions to stress through avoidance coping style were present in the midwives expressing such personality

traits as optimism ( $r = 0.26$ ). Self-confidence ( $r = 0.27$ ) and optimism ( $r = 0.53$ ) were associated with engagement in substitution activities. Both self-confidence ( $r = -0.31$ ), ambition ( $r = -0.26$ ), optimism ( $r = -0.25$ ) and resistance to stress ( $r = -0.27$ ) correlated negatively with the choice of emotion oriented style on ( $p < 0.05$ ) in a stressful situation.

#### CONCLUSIONS

The dominant way of coping with stress in the group of midwives was task oriented coping. The presence of positive correlations of the majority of midwife's subjective personality traits correlates with task oriented stress management style and negatively with emotions oriented style.

#### ABS 59

### EVALUATING MATERNAL CLOSENESS AND SEPARATION IN NICU. GUIDELINES FOR THE CREATION OF PERINATAL CENTERS

A. Karkani, K. Konstadinidi, M. Theodoraki, S. Gancheva, M. Papadopoulou

*NICU, General Hospital of Nikaia Agios Panteleimonas, Piraeus, Greece*

#### INTRODUCTION

This work is the result of a research conducted in a Greek NICU. The aim of this study was to evaluate a number of differentiating factors concerning perinatal care, posttraumatic maternal stress. We like to highlight the need for acknowledging the importance and impact of both physical and emotional separation, between the preterm infant and the mother in the neonatal care unit. Prolonged physical separation between mothers and infants is a risk factor for maternal stress, anxiety and depression, alters infant's brain development, impairs the ongoing bonding attachment process and has long lasting effects on emotional programming. Unfortunately, the prematurity rates, given from the Hellenic Statistical Authority, were substantially higher in the last years, and have risen to second highest place (9.63%). On top of that the Island complexes of Greece impose almost daily transfers towards a fully equipped perinatal center.

#### METHODS

We evaluated the results of clinical interview for parents (CLIP) of high-risk infants, as well as the results of PTSD questionnaire of 25 mothers of preterm infants < 37 weeks gestational age. The control group consisted of 25 mothers not separated

from their infants during their hospitalization, in the maternity clinic of the same hospital.

#### RESULTS

Principal analysis of PTSD revealed significant emotional distress during postnatal period especially in mothers whose infants undergoing extended hospitalization. Equally the thematic analysis of interviews of all mothers revealed that they perceive their labor and separation from their infant as an extremely traumatic event.

#### CONCLUSIONS

There is evidence supporting the benefits of early mother-infant closeness during hospitalization and all the medical team should facilitate attachment and bonding process. Transfer and hospitalization in perinatal centers may cause tremendous socioeconomic difficulties for the families. For this reasons, we have to improve social strategies and empower the perinatal care system. This intervention can enable the family unity during the critical period of hospitalization and represents an efficient way of primary intervention.

#### ABS 60

### CURRENT PARENT FEEDBACK RESPONSE RATES AND FEEDBACK METHODS IN NEONATAL TRANSPORT SERVICE ACROSS THE UK

P. Bhat<sup>1,2</sup>, D. Winderbank-Scott<sup>1,2</sup>, C. Garland<sup>1,2</sup>, L. Watts<sup>1,2</sup>, C. Leach<sup>1,2</sup>, A. Frame<sup>2</sup>, G. Bullimore<sup>2</sup>, C. Lawn<sup>1,2</sup>

<sup>1</sup>Royal Sussex County Hospital, Brighton, UK

<sup>2</sup>Sussex Neonatal Transport Service, Brighton, Sussex, UK

#### INTRODUCTION

Feedback and experiences of parents whose infants are transferred between hospitals by the neonatal transport service are essential for identifying areas where the service can be improved. Although there is a lack of data in the literature with regards to the parental feedback response rates to the neonatal transport service, the general perception is that the response rates across the UK neonatal transport teams are very poor. The aim of this survey was to determine the current parental feedback response rates and the various feedback practices adopted by the neonatal transport services across the UK.

#### METHODS

An electronic survey (email or online) request was sent to each of the UK neonatal transport teams. The

individual response rates were categorised as very poor (< 25%), poor (25-50%), good (50-75%) and excellent (> 75%). The various feedback practices adopted by the teams (paper, email, online, mobile device etc.) were also noted. The results received from the transport teams were entered and analysed using a Microsoft® Excel® spreadsheet.

## RESULTS

13/17 UK neonatal transport teams (76%) responded to the survey. The overall parent feedback response rates were “very poor” in 77% (10/13 teams) and “poor” in 15% (2/13 teams). One team did not formally request feedback. None of the teams reported a response rate of > 50%. Self-addressed envelope made no difference to the paper feedback return rates. Paper based feedback was the method of feedback in 61% (8/13 teams) and email (email form/survey link) in 31% (4/13).

## CONCLUSIONS

The parent feedback response rates in neonatal transport are generally poor across all the UK neonatal transport teams with none of the teams reporting rates > 50%. Paper and email are the two predominant feedback methods used. New methods of receiving feedback like tablet-based, Facebook and self-addressed postcard system need to be explored to improve response rates.

## ABS 61

### ENHANCING NEONATAL AND PARENTAL OUTCOMES THROUGH THE OPTIMIZATION OF EVIDENCE-BASED NURSING PRACTICES

M. Aita<sup>1</sup>, S. Semenic<sup>2</sup>, N. Feeley<sup>2</sup>, L. Haiek<sup>3</sup>, M. Héon<sup>1</sup>, A. Larone Juneau<sup>4</sup>, K. Levasseur<sup>5</sup>, G. Roch<sup>5</sup>, L. Talbot<sup>6</sup>

<sup>1</sup>Faculty of Nursing, Université de Montréal, Montréal, Canada

<sup>2</sup>Ingram School of Nursing, McGill University, Montréal, Canada

<sup>3</sup>Ministère de la Santé et des Services Sociaux, Québec, Canada

<sup>4</sup>CHU Sainte-Justine, Montréal, Canada

<sup>5</sup>Faculty of Nursing, Université Laval, Québec, Canada

<sup>6</sup>École des Sciences Infirmières, Université de Sherbrooke, Sherbrooke, Canada

## INTRODUCTION

Nurses have a leading role in humanizing the NICU experience and improving neonatal and parental outcomes by implementing evidence-based practices such as optimizing breast milk feedings, skin-to-skin contact (SCC), developmental care (DC) and family-centered

care (FCC). Hence, challenges to the adoption of these practices include lack of training and resources. Through an innovative clinical project, a virtual community of practice (CVP) was developed among university-based nurse researchers and nurse leaders across all level III NICU in Quebec, to support and harmonize the implementation of these evidence-based practices and to share resources to reduce duplication in improvement efforts.

## METHODS

Supported by funding from the Quebec Network on Nursing Intervention Research and a major grant from the Order of Nurses of Quebec, the steps taken to implement the CVP-Neon@t included holding workshops with key stakeholders from all level III NICUs to collaboratively establish CVP objectives and format; hiring of a CVP expert and animator to design and manage a virtual CVP (CVP-Neon@t) to enable communication and sharing of resources across the NICUs, organizing face-to-face educational, networking and tool-sharing activities among CVP members, engaging CVP members in the selection of nursing-sensitive indicators for collection of baseline data for the targeted NICU best-practices, and development of an evaluation framework to measure the impact of the project activities.

## RESULTS

To date, the CVP-Neon@t is accessible to members (nurses) through an internet platform: <http://liferay6.cess-labs.com/web/cvp-en-neonatalogie>. Based on clinical and research experience as well as on a literature review, members of the CVP have identified nursing-sensitive indicators for the 4 targeted practices to be collected in baseline. The evaluation of these indicators in baseline will serve as identifying which practices among the 4 targeted requires care improvement and as a benchmarking between all level III NICUs. These indicators will also be measured after the CVP-Neon@t major activities.

## CONCLUSIONS

Through the CVP-Neon@t, our innovative clinical project serves to share educational strategies (i.e. programs, tools...) in order to harmonize care practices between all Québec level III NICUs, to collect baseline as well as outcome data to evaluate the effects of the CVP on optimizing the implementation of the evidence-based nursing practices. Ultimately, the goal is to enhance neonatal and parental outcomes in the NICU.