

of the body was carefully measured, and the location of the tip of the PICC lines was identified using agreed bony reference points, and its distance from the heart was measured. Paired X-rays (of the same baby) were compared with careful documentation of the perceived changes PICC line tip positions with respect to different angles of arm position.

Results A total of 32 pairs of X-rays that met our criteria were reviewed. Arm movements were associated with catheter displacement. For catheters placed in the basilic vein, there was a mean displacement of 0.17mm/degree (−0.53 to +1.4) towards the heart on adduction and 0.1mm/degree (−0.46 to +0.4) away from the heart on abduction of the arm. Similarly, for the cephalic vein, there was a mean displacement of 0.34mm/degree (−0.53 to +1.6) towards the heart on adduction and 0.32mm/degree (−0.8 to +0.43) away from the heart on abduction of the arm.

Conclusion Although this study did not establish any correlation in magnitude or direction, a clinically significant degree of catheter tip migration was observed with changes in arm position for each paired radiograph reviewed. A further prospective study under direct ultrasound visualisation is envisaged to study this relationship further.

G56(P) HOW TO CONSTRUCT HI-FIDELITY ONLINE MEDICAL DEVICE SIMULATORS

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Objectives I set out to investigate how the workings of a complex medical device could be visually represented and documented on paper, and then be translated into computer code to produce an online model.

The device chosen was a SiPAP® Infant Flow Driver (Carefusion, Ca) for providing nasal continuous positive airway pressure (NCPAP) ventilation to premature newborn infants. This device is used worldwide, and implements a touch screen control panel to set alarms and change settings.

Methods Statechart theory was designed in the late 1980s to diagram flight systems. This system was easy to learn and facilitates the conceptualization and illustration of both simple and, with practise, complex processes.

The Model-View-Controller (MVC) design pattern is a software engineering framework that requires the separation of the user interface from the functionality of the system. Using this pattern, the device was mapped by producing not one, but two statecharts – one for the user interface of the device, and the other for my perception of the inner workings.

Adobe Flash (Adobe, Ca) is a computer programme that is commonly used to create interactive multimedia web sites. Using the MVC design pattern I used FLASH to build up the physical 'View' of the device, and then coded the 'View Controller' and 'Model', by using the two statecharts as a map.

Results I discovered that by using statecharts and the MVC design pattern, both the inner workings and the user interface of a complex medical device could be represented and documented, then coded into a highly realistic working online simulator. The next stage is to create and implement a statechart for both training and assessment and finally compare the effectiveness with traditional clinical learning in a trial.

Conclusions Hi-fidelity online simulators of complex medical devices can be produced much more easily by harnessing the power of statechart theory with the flexibility of the Model-View-Controller design pattern.

Additional info The online simulator can be viewed at www.sipap.net.

G57(P) GENDER MORTALITY DIFFERENCES OF INFANTS ON PICU? AN ELABORATION ON ADDITIONAL ANALYSIS

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Background Developed countries have exhibited higher rates of PICU admission and case fatalities in male infants compared to females (Scott Watson *et al*, *Am J Respir Crit Care Med*, 2003). Contrastingly, in addition to the disease-specific protection vaccination offers, observational studies and randomised trials in developing countries have indicated there may also be non-specific effects to such vaccines, particularly in females (Aaby *et al*, *PIDJ*, 2007). Specifically, the diphtheria–tetanus–pertussis (DTP) vaccine has been associated with poor growth and increased morbidity in girls (Agergaard *et al*, *Vaccine*, 2011). Recent studies continue to highlight female infant mortality following early DTP vaccination within developing countries (Abay *et al*, *Arch Dis Child*, 2012).

Aims Expanding last years database to 5 years of PICU admissions, we hypothesise that non-specific vaccine effects would be demonstrated by differences in gender mortality and admission to PICU in infants with life-threatening infection.

Method Using the UK PICANET database from January 2006 to December 2010 we gathered a database of 38,157 infants <12 months of age. Stringent criteria excluded planned admissions, non-infectious aetiologies, and infants of unknown gender. Cohorts were then categorised into those >6 months and those <6 months, with the assumption that all those >6 months of age have received their primary course of DTP/IPV immunisation. From this, we established mortality percentages for females and males admitted due to infectious causes within their age-defined groups.

Results Total infant PICU admissions due to infectious causes were greater in both male cohorts compared to female cohorts (M<6-months = 3,592, F<6-months = 2,468; M>6-months = 1,020, F > 6-months = 781). However, female mortality due to infectious causes for admission was greater than male mortality in both the under 6-month cohort (F = 4.94%, M = 3.54%) and the over 6-month cohort (F = 6.27%, M = 5.10%).

Conclusion Further analysis persistently displays increased female mortality percentages within both cohorts of infants. This recurrence is greater due to a greater population thereby; the expansion of data has yielded stronger correlations. With the help of PICANET epidemiologist, we are increasing this population size further and focusing on admissions related to respiratory infections.

G58(P) A NATIONAL AUDIT OF PARENTERAL NUTRITION PRACTISE IN UK NEONATAL INTENSIVE CARE UNITS: IS PRACTISE CONSISTENT WITH GUIDELINES?

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Background Parenteral nutrition (PN) is a lifesaving modality providing vital nutrients for neonates unable to tolerate enteral feeding. It has serious complications, including metabolic derangements, infection and line displacements which can be fatal. Positive outcomes can be maximised and complications minimised by appropriate biochemical monitoring, multidisciplinary involvement, adherence to evidence based clinical guidelines and careful venous line management.

Objective To audit current PN practises in all UK neonatal units against ESPGHAN European guidelines 2005 on protein and lipid introduction, American clinical guidelines for hyperglycaemia and

hypoglycaemia in neonates receiving PN 2012, and the UK National Confidential Enquiry into Outcome and Death (NCEPOD) recommendations 2010 for venous access.

Methods A questionnaire was devised by a pharmacist, paediatrician and neonatologist. Questions focused on key areas commonly encountered in routine PN practice, for which guidance is available. These included protein and lipid introduction, monitoring and complications of lipids, management of hyperglycaemia and venous access. One researcher conducted a telephone survey to registrars working in all 58 level 3 neonatal intensive care units (NICU) throughout the UK.

Results The response rate was 58/58 units (100%). For preterm neonates requiring PN, protein is commenced on day 1 in 88% of units and lipids by day 3 in 91%. Most units exclusively use central lines for PN administration. All units use x-ray verification of catheter tip position with 19 units also using contrast. Triglyceride levels are not monitored in 22 units. Management of hyperglycaemia is variable, with 25 units using insulin first line and not altering glucose infusion. Seven units avoid insulin use completely.

Conclusion Many nutritional support practices were consistent and in line with guidelines. However over a third of units fail to monitor triglyceride levels despite the known consequences of high lipid infusions and recommendations for monitoring. The high usage of insulin in the management of hyperglycaemia may not be advantageous considering recent findings around the risks of hypoglycaemia and mortality. The use of contrast for line verification is not nationally standardised.

G59(P) LONG-TERM PSYCHOLOGICAL AND SOCIAL IMPACT REPORTED BY CHILDHOOD CRITICAL ILLNESS SURVIVORS: A SYSTEMATIC REVIEW AND THEMATIC SYNTHESIS

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Aims Over 250,000 children annually in the US and UK experience critical illnesses. Advances in medicine and care have significantly reduced mortality, with over 95% of patients that survive. However, the long term psychological and social impact, as reported by children and adolescents that survive critical illness, is unclear. This paper reports a systematic review and thematic synthesis of qualitative literature that aims to explore and understand these phenomena.

Methods CINAHL; MEDLINE; PMC; PsychINFO; ASSIA and Dissertation and Thesis Databases were searched between 1806 and February 2012. Studies were selected using eight predetermined criteria (e.g. only qualitative empirical studies) and methodological quality was assessed using two standardised checklists (1, 2). Thematic synthesis (3) was used to extract, code and synthesise data.

Results From the 1307 studies identified, three met the inclusion criteria which were all of moderate methodological quality. All included studies were conducted in the UK involving a total of 51 participants aged 1–25 years. Reasons for participant critical illness were predominantly due to head/spinal injury, sepsis, or malignancies.

Eighty-six codes and six novel themes emerged from the data. Themes included: confusion and uncertainty; other people's narratives; focus on former self and normality; social isolation and loss of identity; transition and transformation. Analytical synthesis culminated in a framework which attempts to conceptualise the childhood survivors' journey.

Conclusions Childhood critical illness can expose survivors to a complex trajectory of recovery with residual psychosocial adversity manifesting in the long-term. Health professionals need to comprehend and support the potential complex psychological and social

needs that may occur. Further empirical research is required to explore and test the conceptual framework developed from this thematic synthesis.

REFERENCES

- Walsh D, Downe S. Appraising the quality of qualitative research. *Midwifery*. 2006; **22**:108–19.
- Thomas J, Sutcliffe K, Harden A, *et al*. Children and Healthy Eating: A systematic review of barriers and facilitators. London: EPPI-Centre, University of London 2003.
- Thomas J, Harden A, Oakley A, *et al*. Integrating qualitative research with trials in systematic reviews. *BMJ*. 2004; **328**:1010–2.

G60(P) THREE YEAR RETROSPECTIVE REVIEW OF VIRAL RESPIRATORY INFECTION IN PAEDIATRIC INTENSIVE CARE ADMISSIONS

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Introduction During the H1N1 2009 Pandemic season, all children ventilated on Paediatric Intensive Care (PICU) for respiratory failure had respiratory samples taken for virology screen.

H1N1 (2009) was declared eradicated both national and internationally in August 2010. We reviewed results of samples taken during and beyond this period and compared the respiratory isolates.

Methods All Nasopharyngeal Aspirates, Non-direct bronchoalveolar lavage or tracheal secretions from admissions in the months of September to April of 2009/2010, 2010/2011 and 2011/2012 were reviewed. The months of May to August of each year were regarded as off peak and so left out of the study. PICU admissions, discharges and death notifications records were correlated with virology reports.

Results Samples were processed from 287 PICU patients or episodes. 192(67.1%) of the children were ages 0–2 years. (154)53.8% of the patients were male. One or more Respiratory viruses was isolated in 159 samples (55%). RSV accounted for 77(48.4%) of the positive samples, Rhinovirus 45(28.6%), Para-influenza virus Type1–4, 14(8.8%), Adenovirus 9(5.7%), Pandemic H1N1 (2009) 8(5.1%), Influenza A or B 3(1.9%) and Human Metapneumovirus 2(1.3%). Coinfection was found in 12(7.5%) of the positive samples.

Oseltamivir (Tamifu) was prescribed to positive cases in the population. Resistance to Oseltamivir was reported in one case treated. There were ten (3.4%) mortalities from the study population two of whom were positive for Pandemic H1N1 (2009). A serious co-morbidity was present in all 10(100%) mortalities. We isolated a virus in 7/10 (70.0%) deaths. No positive swabs for H1N1 (2009) was found after January 2011.

Conclusion While we continue to carry out surveillance for sporadic or seasonal cases of H1N1 (2009), with the pandemic truly over, resources need to be devoted to common respiratory viruses with greater burden of disease.

G61(P) SEVERE DIABETIC KETOACIDOSIS: THE BENEFITS OF 'PHONING A FRIEND'

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Aim To evaluate the management and outcome of children with severe DKA who were referred by different District General hospitals within the region to Regional retrieval team for advice.

Method Retrospective audit of all patients with diagnosis of DKA, referred to Regional Retrieval Team between November 2010 – June