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 where 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