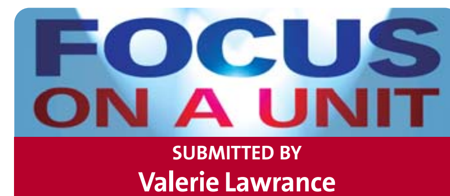
Surgical transport at the cutting edge for Hull



Hull and the surrounding area has a birth population of 5,500-6,000 per annum, 10-12% requiring admission to the newly-built Level III NICU, of which around 1% will require surgery. These infants are served by Hull Women and Children's Hospital which tackled the tricky issue of transporting babies to theatre in an innovative and effective way.

Having moved into a new unit, road transport was no longer needed as a corridor connects the NICU with theatres in the main building. It had become clear to staff that incubator transfers were putting babies through increased risk of extubation, accidental removal of venous lines and trauma to surgical sites. So the NICU team reviewed the mode of transport they used for surgical infants and, with input from staff and help from the medical physics department and workshops, the surgical cot was born.

Using charitable money donated for the paediatric surgical service, the concept of unification of transport incubator, operating table, recovery cot and resuscitation station was developed. It was decided the new cot had to be portable, stable, safe and appropriately equipped, while allowing the surgical baby to receive all care on one cot, without the need for handling or moving.

Once a neonatal resuscitaire with a removable lid had been acquired on loan, work could begin to add the necessary equipment, including an independent ventilator, suction, venous infusion pumps and a monitoring system.

There were several issues to be overcome by the in-house medical physics department and workshops:

- Thermoregulation during transit had to be maintained, particularly as the radiant heater was mains driven. However with the manufacturer's hood in place heat loss is less than 1°C on arrival in theatre. Preterm infants lie on a gel warming mattress.
- Gas cylinders for the ventilator were initially suspended precariously by their yokes and a possible hazard if connections worked loose. These are now fixed to specially made racks below the cot.
- Initially the cot was 'top-heavy' and cumbersome with so much equipment on top. Syringe pumps were fitted below the cot on tailor-made racks which, together with the gas cylinders, lowered the centre of gravity and the cot gained stability.
- New handles front and rear were specially designed and fitted.
- To reduce the need for re-training, devices for monitoring, ventilation and suction are consistent with the equipment used on NICU.
- A maximum weight for equipment has been defined and a minimum of three staff are required to escort the baby to theatre.

Celebrating the surgical cot's success at the National Health and Social Care Awards at Wembley Stadium. From left: Medical Physics Engineer Alan High, Professional Development Nurse NICU Val Christian, Mechanical Workshop Engineer Dave Cunningham, ANNP Valerie Lawrance and Medical Physics Team Leader Paul Capes.

The cot is made available at the anticipated delivery of a surgical infant when it is used to resuscitate and stabilise the baby prior to transfer, in the cot, to NICU. The baby is then prepared and transferred to theatre in the cot where surgeons use it as the operating table.

In theatre surgeons can raise or lower the cot; the radiant heater keeps the baby warm on servo-control and the cot's bright lights augment theatre lights.

After surgery, the baby is returned to NICU in the cot and remains there until stable enough to be moved into a traditional cot.

Instead of six moves into and out of the transport incubator, Hull NICU's surgical patients are moved only once, at delivery, into the cot where they remain for three to five days.

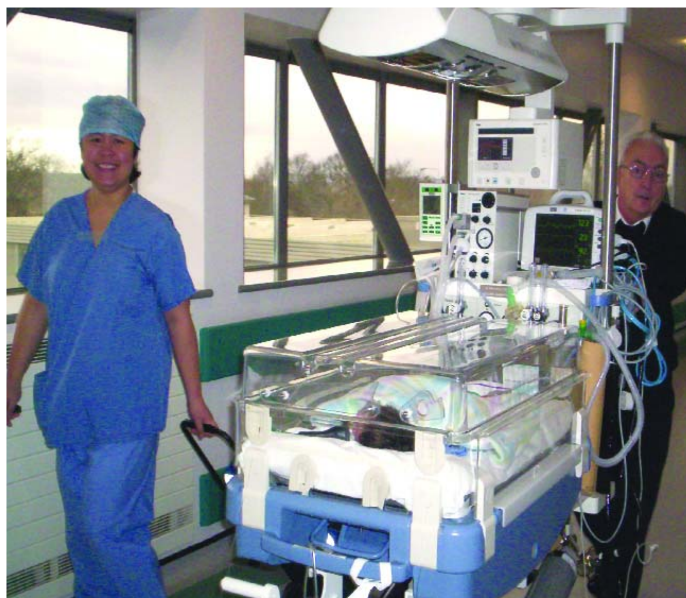
This method protects the baby from excessive handling – an audit of transfers has found that blood pressure, temperature, respiratory and heart rates remain stable while using the cot.

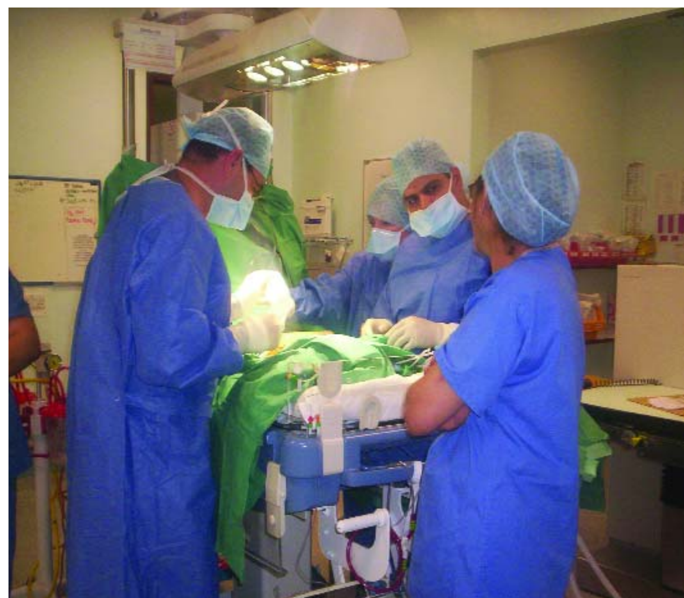
The unit has found that all concerned are less stressed by visits to theatre, babies are less physiologically stressed and parents are able to see their infant almost as soon as it returns from theatre.

If a sick infant is delivered at home or en-route to hospital, the surgical cot can be used as the initial resuscitation platform in the hospital foyer, with heat, light, monitoring and a ventilator if necessary.

Over three years of using the cot, the potential for inadvertent complications has been dramatically reduced and theatre turnaround times have been reduced fourfold.

A staff survey has been very positive and found that theatre staff favour the cot for its improved turnaround times and simplicity. Meeting the requirements of those working with the cot has been paramount and so more storage has been





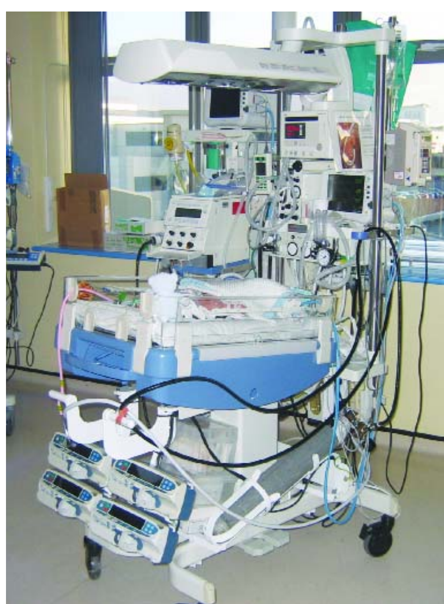
added at the request of the neonatal nurses, while a handle at the rear was fitted for the porters. Infection control have agreed to its use provided that it is scrubbed weekly and between uses.

As the cot is needed frequently babies are sometimes moved into their own cot or incubator sooner than ideal and so a second cot is planned, funded by money donated by families and local charities. This is intended to have the same equipment fitted with, hopefully, a battery-powered heated mattress to maintain temperature more cost effectively.

The cot has won local, regional and national recognition in several award ceremonies. At the Regional Health and Social Care Awards in Sheffield it won the Innovations in Practice Award, and at the National Health and Social Care Awards at Wembley Stadium in July 2008 it was runner-up in the Innovations in Practice category.

Meanwhile, Hull Women and Children's Hospital has been working on improvement in other areas. Stringent measures by Infection Control Link Nurse Sister Carole Rowlands have cut the infection rate for MRSA on NICU by almost 80% in 12 months. Swabbing of all admissions to NICU and weekly swabs for MRSA are now processed within 36 hours to enable early action. Parents are encouraged to be an active part of improved hygiene, questioning staff who do not wash their hands, using hand gel and removing outdoor clothing.

The tissue viability link nurse Senior Staff Nurse Nicola Sheppard has been working on a skin integrity chart to aid treatment of fragile and excoriated skins.



Hull's surgical cot in use. En-route to theatre via the link corridor (above left), surgery gets underway (above right), and back in NICU for recovery (left).

Prior to this there was no protocol and treatments were variable, ad hoc and changed daily with staff preference.

An adapted score chart is used for measuring sore bottoms and how to treat them accordingly. This has led to a trial of two different creams – Metanium for red bottoms and Orabase for excoriated bottoms – that is being audited and a guideline will follow. Anti-fungal cream is applied where Candida has been swabbed and confirmed. This protocol is taught in the new staff induction training and is being cascaded to all NICU staff.

Over the last two years the unit has been striving for Breastfeeding Initiative accreditation. To gain this each midwife has annual mandatory training, new midwives undergo a two-day training course, which includes sessions by the neonatal outreach nurses promoting breastfeeding on NICU. Staff also have annual update study days to promote breastfeeding on NICU.

NICU staff support advice given to all new mothers by the neonatal outreach midwives who discuss breastfeeding and expressing with mothers of preterm babies within 48 hours of birth, specifically those below 34 weeks' gestation.

Consequently, over the last 12 months the figures for babies being given breast milk while in NICU has increased to 88%. On discharge this is still a creditable 40%, and 50% of those are still receiving breast milk when discharged from neonatal outreach care.

Neonatal outreach nurses are also piloting short-term home nasogastric tube feeding for babies who are taking 50% of their feed from the breast, starting early in 2009; it is hoped that this will be extended to all babies, whether breast or bottle fed, in the future.

The NICU are pre-empting the expected NICE Guidelines on using donor breast-milk, and are in the process of securing a supply for patients who require it.

Hull, like many units, is working hard to improve practice and the care of their vulnerable patients, but in creating the surgical cot it has taken a truly innovative approach to a common issue faced by most NICUs.

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