Chartered Institute of Ergonomics & Human Factors

Case Study 17

Safer neonatal care

Sector: Healthcare

The design of the modern Neonatal Intensive Care Units (NICUs) varies but is often one large, open room with the cots (incubators) side by side. This has observation and access advantages but also disadvantages, for example, noise levels, lighting and privacy. Recently there have been moves toward more family-centred care, accompanied by a trend to increase the number of single rooms. In addition, technology developments in NICUs have increased the spatial requirements for clinical activities.

The Department of Health asked healthcare ergonomists at Loughborough University to determine the space required to care for and treat neonates using human factors principles to ensure efficient and safe working conditions.

The ergonomists observed 87 clinical tasks with 28 staff providing care to 15 newborn babies and then confirmed that the tasks were representative of daily work activities and that no major activities had been omitted.

It was found that there was insufficient space for families and staff. There was no family space for the parents to stay with their child, storage was limited, there were no nursing trolleys and clinical bins in the cot space, and staff sometimes worked in awkward positions due to the cramped space.

Simulating the environment

The ergonomists developed a simulation scenario to test their space recommendations with clinical tasks for emergency admission, connecting ventilators, inserting gastric tubes, giving drugs and taking a chest x-ray. They also simulated a visit to the new born baby from the mother on her hospital bed.

The simulation was carried out in a full size mock-up with 21 clinical staff. Staff actions and task behaviours were recorded with multi-directional video data which were then were analysed frame by frame to plot the movements of each participant, equipment and furniture during the tasks.

It was found that the average space needed for an individual neonatal intensive care unit cot space was 13.5m^2 (or 145.3ft^2). When circulation and storage space requirements were included this increased to 18.46m^2 (or 198.7ft^2).

An expert panel of clinicians and architects reviewed the recommendation and agreed that the average individual cot space of 13.5m^2 (or 145.3ft^2) could accommodate variations in working practices.

Workspace design

As well as designing specific products, ergonomists and human factors specialists can help understand how the space within which we work can be best designed.

This can help encourage effective communication in a workplace, as well as considering the comfort of all those present. It is therefore extremely important that the needs of all people are considered, especially when a setting combines workers and members of the public.

Impact

Improved safety

Improved working conditions

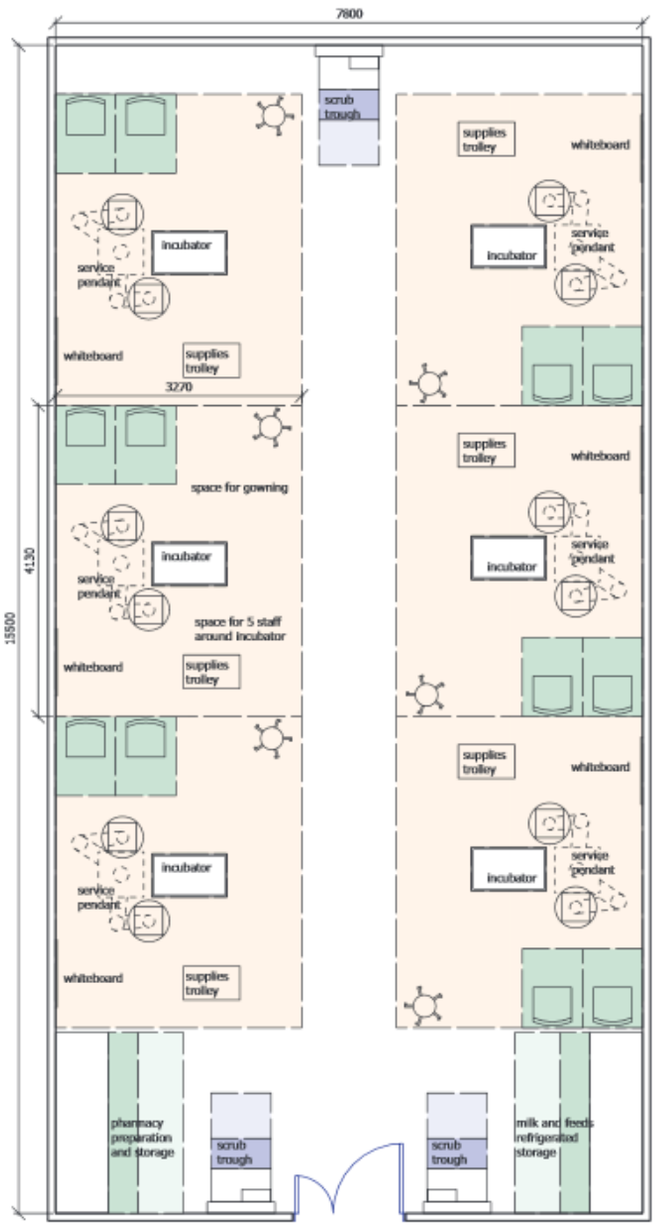
> *“This research has fed into ‘best practice’ guidance on the design and planning of new healthcare buildings and on the adaptation/ extension of existing facilities.”*

Making a difference

This research has fed into Health Building Note 09-03, produced by the Department of Health, which gives 'best practice' guidance on the design and planning of new healthcare buildings and on the adaptation/extension of existing facilities.

The guidelines provide information to support the briefing and design processes for individual projects in the NHS building programme. The Care Quality Commission uses these guidelines to assess neonatal units.

The guidelines have also informed the reconfiguration of services and the refurbishment of maternity units in Shrewsbury and Telford Hospitals NHS Trust and The Whittington Hospital NHS Trust.



Example layout of multi-cot neonatal unit from DoH building note

Wider applications

This approach can be applied in any setting where people are working together, such as a GP surgery, an operating theatre, a retail business or a safety-critical control room.

The way that we design workplace equipment and layout can affect communication and collaboration, making it easier for workers to support each other and for members of the public to speak to professionals.

Further information

Hignett, S, Lu, J, & Fray, M (2010). Observational Study of Treatment Space in Individual Neonatal Cot Spaces. *The Journal of Perinatal and Neonatal Nursing*, 24(3), pp267-273

S Hignett, J Lu, & M Fray (2010). Two Case Studies Using Mock-Ups for Planning Adult and Neonatal Intensive Care Facilities. *Journal of Healthcare Engineering*, 1(3), pp399-414.

Consultation with others

The research was carried out with the help of clinicians working in the neonatal environment.

Acknowledgements

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