Project overview: Neonatal Economic, Staffing and Clinical Outcomes Project (NESCOP)

Participants

- ⚒ The EPICure study group
- ⚒ British Association of Perinatal Medicine (BAPM)
- ⚒ National Neonatal Audit Project (NNAP)
- ⚒ Neonatal Data Analysis Unit (NDAU)
- ⚒ Bliss, the special care baby charity
- ⚒ Perinatal Healthcare Economic Evaluation Group (Warwick University)

Background

The UK Neonatal Staffing Study (UKNSS) identified variation in staffing and throughput as important variables in determining neonatal intensive care (NIC) outcomes in the mid-1990's. As part of the EPICure 2 programme, a similar investigation of neonatal units (NNUs) structures and staffing was undertaken in 2006 but this was in the early phase of network implementation. Subsequent further strengthening of the network structure and publishing of commissioning guidance and quality standards in 2007 (Toolkit for Quality Neonatal Services, Department of Health) and 2009 (National Institute for health and Clinical Excellence (NICE) quality standards) have changed the neonatal landscape further. In the recent EPICure 2 study, survival was significantly related to the size and expertise of the hospital of birth (level 2 versus level 3 survival: aOR 0.75 ((0.59 – 0.95); higher versus lower throughput level 3 survival: 1.4 (0.96 – 2.03)). This leads to the conclusion that organisation and expertise may have significant effects on outcomes and that this may relate therefore to availability of resources. This group of studies aims to evaluate that hypothesis.

We currently have two datasets available that have different strengths and limitations:

- ⚒ **EPICure2** – a national dataset collected in 2006 for mothers resident in England delivering between 22 and 26 completed weeks of gestation with locally based data capture for perinatal and neonatal variables, 100% data capture for NIC admissions; 3 year outcome data available.

- ⚒ **NDAU** – central collation of local routine data including detailed daily data collected by clinical staff at the point of care using the Badger system; less complete than EPICure 2 but covering all neonatal admissions from 164 of 170 Neonatal Units in England and a growing number of NNUs in Scotland; some 2 year data available.

Additionally, there are two further sources of data that will be available:

- ⚔ **Unit Profile Survey** – this survey of service provision by neonatal units in England contains similar questions to the UK Neonatal Staffing Study (1997) and the EPICure Unit Profile Survey (2006); it is being conducted by the EPICure study group in conjunction with BAPM, NNAP, NDAU, Bliss and Warwick University. Data is currently being collected.

- ⚔ **Bliss 'FOI' data** – Bliss have obtained data since 2008 under the Freedom of Information Act from English neonatal units which is available for use.

The use of these data will allow for an understanding of the way staffing levels, resourcing levels, unit size and volume, and other factors influence outcomes whilst controlling for patient clinical case mix and socio-demographic variables. The analysis will be further extended to analyse the factors that influence economic outcomes. These economic outcomes will include length of stay, cost per patient, and cost per bed day.

Objectives

The purpose of this project is to evaluate:

1. The current status of neonatal unit organization and staffing levels against activity using the third national survey of neonatal services.

2. The relationship between unit level data and a range of neonatal outcomes (survival; brain injury, bronchopulmonary dysplasia, necrotising enterocolitis, septicaemia, duration of intensive care/high dependency support), to answer the question, does adequacy of neonatal resources impact on outcome?

3. New markers of neonatal staffing based upon routine daily staffing data captured by Badger against neonatal outcomes.

4. The available 2-3 year outcome data against structure and staffing.

5. The economic impact of resource rich versus resource poor units in terms of children's lifetime costs.

Methods

EPICure 2 is currently evaluating issues 1 and 2 (Professor Marlow, Professor Costeloe, Professor Draper, Dr. Morgan) and the new UPS is being primarily conducted as a joint venture between EPICure, NNAP and BAPM data group, with input from the other partners involved (chair: Professor Draper). An appropriate data set will be extracted from NDAU to cover staffing and neonatal outcomes (issues 2&3). Analyses of activity against outcomes will be carried out by Dr Morgan (PhD supervised by Professor Marlow and Professor Draper), Ms. Shalini Santhakumaran (NDAU, supervised by Professor Modi) and Sam Watson (PhD supervised by Professor Petrou). Further

derivation of economic factors associated with these findings will be undertaken by the Economic Evaluation group at Warwick University.

The project will be coordinated through a shared website accessed securely over the internet. This will be located at www.nescop.org.uk

Research Governance

Permissions –

- the Unit Profile Survey is being conducted as an adjunct to the EPICure 2 study; REC guidance was sought but formal approval was not necessary (Marlow)

- permission to use the dataset will be sought from the REC facilitating NDAU (Modi)

- Bliss data is publicly available under the Freedom of Information Act and does not therefore require REC oversight; however, individual hospitals will be anonymised to preserve service confidentiality.

Supervision –

- A study steering group comprising:

  - EPICure 2 Team – Marlow, Costeloe, Draper, Morgan

  - NDAU – Modi, Santhakumaran

  - Economics – Petrou, Watson, Arulampalam

  - Bliss – Cole, Kirrane

Anticipated outputs

1. Neonatal structures over time using 1996, 2006 and 2011 data from unit profile survey.

2. Analysis of mortality by NNU level, (2010 and 2011) (NDAU).

3. Recommendations for BAPM over data capture to define neonatal services.

4. EPICure 2 – data to be used for Dr Morgan's PhD Thesis.

5. Issues 2&3 (outcomes against resources) – 1-2 papers defining this relationship.

6. Issue 4 – a single paper engaging the two sources of outcome data.

7. Issue 5 – a paper describing the economic data.

8. Report for BLISS identifying the added value of better staffing (if so).

Funding requirements

- Unit profile survey – costs covered by EPICure 2 (MRC programme grant)

- ⚑ NDAU data permissions, cleaning, extraction and merging

- ⚑ NDAU statistician

- ⚑ Economic analysis - PhD student (part-funded by BLISS)

- ⚑ Other costs – to be confirmed

Milestones

- ⚑ Ethics (UPS/EPICure) permission   Not required

- ⚑ Ethics (NDAU) permission   March 2012

- ⚑ UPS circulation   November 2011 – March 2012

- ⚑ UPS analysis   March – July 2012

- ⚑ NDAU data preparation   February – May 2012

- ⚑ BLISS data preparation   February – May 2012

- ⚑ UPS and NDAU staffing analysis   May – September 2012

- ⚑ Final data for economic analysis   July 2012

- ⚑ Publishing of clinical/economic data   September-December 2012