National Perinatal Epidemiology Unit

Annual Report 2009
This six week old Ghanian baby was born to a mother participating in the international CORONIS Trial of caesarean section surgical techniques. The trial is co-ordinated by the NPEU Clinical Trials Unit.

For more information about CORONIS see: www.npeu.ox.ac.uk/coronis
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Welcome to the 2009 Annual Report from the National Perinatal Epidemiology Unit. This year has been another good year for the NPEU with a number of important publications, new grants and continued growth of the Unit.

One of the highlights of 2009 was the publication of the results of the TOBY Trial in the New England Journal of Medicine. The TOBY Trial was a randomised controlled trial of whole body cooling for babies born with evidence of moderate or severe encephalopathy. The trial demonstrated benefit of cooling for these babies in terms of their disability-free survival up to the age of eighteen months. When the results from TOBY were combined with the results of existing randomised controlled trials (published in the BMJ), it is clear that whole body hypothermia is an effective intervention in this group of babies and for the first time neonatologists have something helpful to offer this group of severely ill babies. What has also been gratifying is that the MRC, who funded the trial, have agreed to fund a follow-up study of babies born in the TOBY Trial who have survived to the age of 5-7 years. Follow-up is very important following interventions in the perinatal period because short-term outcomes may not predict long-term outcomes. We look forward to starting this important follow-up project in 2010.

We have also conducted focused work on alcohol drinking in pregnancy with four publications of analyses trying to find a link between low or moderate alcohol use in pregnancy and adverse outcomes for the children. We found none.

Other notable publications from the Unit in 2009 include a number of new papers arising from the UK Obstetric Surveillance System (UKOSS). These includes the reports of studies on TB in pregnancy in the UK, an analysis of ethnic variations in severe morbidity looking across of range of the conditions studies in UKOSS to date, and the Annual Report, which contains a summary of all the on-going and planned studies. Marian Knight, who runs UKOSS, was also awarded a NIHR Programme Grant entitled Beyond maternal mortality: improving the quality of maternity care through national studies of “near miss” maternal morbidity This programme of research (called UKNeS) will run from January 2010 until the end of December 2014.

A number of health economic papers were also published in 2009, including economic evaluations alongside clinical trials, methodological papers and papers which discuss approaches to valuing health utilities in children, which remains a challenging issue with respect to economic evaluations of childhood diseases and treatments.

As always, if you have any questions about any of the planned or on-going topics in our work programme, please get in touch with either myself or the contact person.
Contact Details

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For individual staff contact details and email addresses, please go to:
www.npeu.ox.ac.uk/staff
The website continues to grow ever more popular with tens of thousands of requests each month. Behind the scenes the website continues to be developed, improving the experience for all our visitors.

Website Statistics

- The website currently still receives a steady average of over 1000 page requests per day.
- Currently, the top 3 most frequently visited areas of the website, in order, are:
  1. Jobs: www.npeu.ox.ac.uk/jobs
  2. UKOSS: www.npeu.ox.ac.uk/ukoss
  3. TOBY: www.npeu.ox.ac.uk/t Toby
- The top three most popular pdf’s downloaded are:
  1. Recorded delivery: a national survey of women’s experience of maternity care 2006: www.npeu.ox.ac.uk/recorded-delivery
  3. UKOSS Annual Report 2009 www.npeu.ox.ac.uk/ukoss/annual-reports
- The top three most popular search terms which lead people to our site are:
  1. “npeu”
  2. “ukoss”
  3. “toby trial”

The homepage for the INFANT trial
Programme of Work

Introduction

The NPEU programme of work for the period 2008 to 2010 is described in this section of the report. The programme of work is conceptualised and illustrated above using the framework of four streams of work with two cross-cutting themes and the rods denoting the different research methodologies used. A summary of all the work in progress and work completed during 2008 and 2009 is given in the following two tables which separate work in progress, listed in the first table, from completed studies which are given in the second table. Following the summary tables and to avoid the repetition from year to year we have included the full details of only new projects which started in 2009. These are described after the summary table under the headings of the four streams of work.
## Programme of Work – Ongoing Studies

### NPEU Table of Work Key

NPEU contact: Most projects involve an NPEU team and often outside collaborators. The postscript (a) means that the grant holder or chief investigator for the project is from outside the NPEU.

The initials of the NPEU researchers are used in the table for brevity and represent the chief investigator or the researcher who is taking the lead for the project at the NPEU:

- PB Peter Brocklehurst
- TB Tricia Boyd
- RG Ron Gray
- JH Jennifer Hollowell
- EJ Ed Juszczak
- MK Marian Knight
- JK Jenny Kurinczuk
- SP Stavros Petrou
- MQ Maria Quigley
- MR Maggie Redshaw
- RR Rachel Rowe
- GS Geraldine Surman
- LS Liz Schroeder
- MV Mara Violato

<table>
<thead>
<tr>
<th>Stream 1: The compromised fetus and baby</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Neonatal encephalopathy, cerebral palsy and other childhood impairments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaching consensus on the definition of neonatal encephalopathy for surveillance purposes</td>
<td>2005-11</td>
<td>JK</td>
</tr>
<tr>
<td>Secondary analysis of Western Australian case control data to further investigate the relationship between intrapartum events, neonatal encephalopathy and cerebral palsy</td>
<td>2005-12</td>
<td>JK</td>
</tr>
<tr>
<td>NEST trial - Whole body cooling for neonates undergoing extracorporeal membrane oxygenation (ECMO)</td>
<td>2005-12</td>
<td>PB</td>
</tr>
<tr>
<td>INFANT trial - A multi-centre randomised controlled trial of an intelligent system to support decision making in the management of labour using the cardiotocogram</td>
<td>2009-14</td>
<td>PB</td>
</tr>
<tr>
<td>4Child - Monitoring rates of cerebral palsy, particularly in high risk subgroups</td>
<td>2003-10</td>
<td>JK</td>
</tr>
<tr>
<td>4Child - Monitoring rates of vision loss and hearing loss in children</td>
<td>2003-10</td>
<td>JK</td>
</tr>
<tr>
<td>Economic evaluation alongside INFANT trial - Cost-effectiveness of an intelligent decision support system</td>
<td>2009-14</td>
<td>PB</td>
</tr>
<tr>
<td>Economic evaluation alongside TOBY trial - Cost-effectiveness of total body cooling</td>
<td>2006-13</td>
<td>SP</td>
</tr>
<tr>
<td>UK TOBY Cooling Register - Register of the use of moderate hypothermia in neonates</td>
<td>2007-10</td>
<td>PB(a)</td>
</tr>
<tr>
<td>TOBY Children Study - School age outcomes following a newborn cooling trial</td>
<td>2009-13</td>
<td>PB(a)</td>
</tr>
<tr>
<td>TOBY Xenon - Neuroprotective effects of hypothermia combined with inhaled xenon following perinatal asphyxia</td>
<td>2009-12</td>
<td>EJ</td>
</tr>
</tbody>
</table>
### Stream 1: The compromised fetus and baby

#### 1.2 Child health outcomes following assisted reproductive technologies (ART) and related fertility issues

<table>
<thead>
<tr>
<th>Description</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>International collaborative work using record linkage methods to investigate the risks of cerebral palsy, intellectual disability, hospitalisation and congenital anomalies associated with ART</td>
<td>2003-10</td>
<td>JK(a)</td>
</tr>
<tr>
<td>A comparison of the early parenting experience of parents of multiples and singletons arising from natural conception and infertility treatment</td>
<td>2006-10</td>
<td>MR</td>
</tr>
<tr>
<td>A population-based study of the effect of infertility and its treatment on child health and development</td>
<td>2008-11</td>
<td>MQ</td>
</tr>
</tbody>
</table>

#### 1.3 Congenital anomalies

<table>
<thead>
<tr>
<th>Description</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAROBB - Monitoring rates of congenital anomalies for surveillance purposes</td>
<td>2003-11</td>
<td>TB</td>
</tr>
<tr>
<td>FOCaL - Feasibility of investigating the long-term outcomes of specific congenital anomalies using congenital diaphragmatic hernia as the examplar</td>
<td>2006-10</td>
<td>JK</td>
</tr>
<tr>
<td>EUROCAT - European Surveillance of Congenital Anomalies - Survey of prenatal diagnosis screening methods across Europe Perinatal screening for birth defects in Europe - a EUROCAT study of the impact of different national policies</td>
<td>2005-10</td>
<td>TB</td>
</tr>
</tbody>
</table>

#### 1.4 Preterm birth

<table>
<thead>
<tr>
<th>Description</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents’ experience of care following admission of their infant to a neonatal unit</td>
<td>2006-10</td>
<td>MR</td>
</tr>
<tr>
<td>INIS trial - International Neonatal Immunotherapy Study - intravenous immunoglobulin for babies with sepsis</td>
<td>2000-10</td>
<td>PB</td>
</tr>
<tr>
<td>PROGRAMS trial - GM-CSF for sepsis prophylaxis in preterm growth-restricted babies</td>
<td>2001-12</td>
<td>PB(a)</td>
</tr>
<tr>
<td>BOOST-II UK trial - Targeting oxygen saturation levels in preterm babies</td>
<td>2006-12</td>
<td>PB</td>
</tr>
<tr>
<td>PIPS - Probiotics in preterm babies study</td>
<td>2009-13</td>
<td>PB</td>
</tr>
<tr>
<td>I2S2 - Iodine supplementation trial - iodine supplementation for premature babies</td>
<td>2009-14</td>
<td>PB</td>
</tr>
<tr>
<td>Economic evaluation alongside PROGRAMS trial - the cost-effectiveness of GM-CSF for sepsis prophylaxis in preterm growth-restricted babies</td>
<td>2001-10</td>
<td>SP</td>
</tr>
<tr>
<td>A population-based study of the health and developmental consequences of preterm birth</td>
<td>2009-11</td>
<td>MQ</td>
</tr>
<tr>
<td>ePRIME - Evaluation of MR imaging to predict neurodevelopmental impairment in preterm infants</td>
<td>2009-14</td>
<td>MR</td>
</tr>
</tbody>
</table>
### Stream 1: The compromised fetus and baby

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
<th>Contact</th>
</tr>
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<tbody>
<tr>
<td>1.5 Fetal and infant effects of rare disorders of pregnancy (see Stream 3)</td>
<td>2006-12 MK</td>
<td>MK</td>
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<tr>
<td>Development of the British Association of Paediatric Surgeons Congenital Anomalies Surveillance System (BAPS-CASS)</td>
<td>2006-12 MK</td>
<td>MK</td>
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<tr>
<td>BAPS-CASS - A population-based national study of surgical outcomes of infants born with oesophageal atresia</td>
<td>2008-10 MK</td>
<td>MK</td>
</tr>
<tr>
<td>BAPS-CASS - Before, during and after birth - how does care affect the future health prospects of infants with congenital diaphragmatic hernia?</td>
<td>2009-12 JK</td>
<td>JK</td>
</tr>
</tbody>
</table>

### Stream 2: Care of the healthy woman and baby

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Attitudes towards pregnancy and childbirth</td>
<td></td>
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<tr>
<td>Nothing currently in progress under this heading - see table of completed studies for work in this area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Recent users’ views and experience of maternity care</td>
<td>2009-10 MR</td>
<td>MR</td>
</tr>
<tr>
<td>Analysis of trust-based data from National Maternity Surveys on women’s experience of care</td>
<td>2009-10 MR</td>
<td>MR</td>
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<tr>
<td>National Maternity Survey 2010: Women’s Experience of Maternity Care</td>
<td>2009-10 MR</td>
<td>MR</td>
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<tr>
<td>Women’s experience of support for breastfeeding</td>
<td>2009-10 MR</td>
<td>MR</td>
</tr>
<tr>
<td>Multiple births and women’s experience of maternity care</td>
<td>2010</td>
<td>MR</td>
</tr>
<tr>
<td>2.3 Antenatal screening</td>
<td></td>
<td></td>
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<tr>
<td>Nothing currently in progress under this heading - see table of completed studies for work in this area</td>
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<td></td>
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<tr>
<td>2.4 Minor problems in pregnancy</td>
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<tr>
<td>Nothing currently in progress under this heading - see table of completed studies for work in this area</td>
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<tr>
<td>2.5 Care in labour and delivery</td>
<td>2006-11 PB</td>
<td>PB</td>
</tr>
<tr>
<td>CORONIS Trial - Fractional factorial trial of caesarean section surgical techniques in developing countries</td>
<td>2006-11 PB</td>
<td>PB</td>
</tr>
<tr>
<td>Changes in maternity care over time</td>
<td>2007-11</td>
<td>MR</td>
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</table>
### Stream 2: Care of the healthy woman and baby

<table>
<thead>
<tr>
<th>Study Title</th>
<th>Duration</th>
<th>NPEU Contact</th>
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</thead>
<tbody>
<tr>
<td>An international comparison of maternity care</td>
<td>2007-11</td>
<td>MR</td>
</tr>
<tr>
<td>Women’s worries about labour and birth - Social and ethnic differences</td>
<td>2007-10</td>
<td>MR</td>
</tr>
<tr>
<td>Women’s perceptions of maternity care</td>
<td>2007-10</td>
<td>MR</td>
</tr>
<tr>
<td>BUMPES - Upright maternal position in second stage labour in women with epidural analgesia; a randomised controlled trial</td>
<td>2009-13</td>
<td>PB</td>
</tr>
<tr>
<td>Cochrane review - Psychosocial and educational interventions in latent phase or early labour for improving birth outcomes</td>
<td>2009-11</td>
<td>MQ(a)</td>
</tr>
</tbody>
</table>

#### 2.6 Postnatal health and care

<table>
<thead>
<tr>
<th>Study Title</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding twins, triplets and higher order multiples: a systematic review, secondary data analysis and development of evidence-based guidelines</td>
<td>2007-10</td>
<td>MQ</td>
</tr>
<tr>
<td>The impact of family income on child cognitive and behavioural outcomes in the United Kingdom</td>
<td>2007-10</td>
<td>SP</td>
</tr>
<tr>
<td>The effect of breastfeeding on child development</td>
<td>2009-10</td>
<td>MQ</td>
</tr>
<tr>
<td>Maternal health and wellbeing in the perinatal period</td>
<td>2010-11</td>
<td>MR</td>
</tr>
<tr>
<td>Cost analysis of breastfeeding outcomes in the UK</td>
<td>2010-12</td>
<td>MQ(a)</td>
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</table>

#### 2.7 Organisation of maternity care

<table>
<thead>
<tr>
<th>Study Title</th>
<th>Duration</th>
<th>NPEU Contact</th>
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<tbody>
<tr>
<td>Birthplace in England Research Programme (incorporating the Evaluation of Maternity Units in England (EMU) research programme)</td>
<td>2006-11</td>
<td>PB</td>
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<tr>
<td>Birth at Home Study</td>
<td>2006-11</td>
<td>PB</td>
</tr>
<tr>
<td>Modelling efficiency and cost-effectiveness in maternity care in the UK</td>
<td>2007-11</td>
<td>SP</td>
</tr>
<tr>
<td>Transfer from midwifery unit to obstetric unit during labour: rates, process, outcomes and women’s experience</td>
<td>2007-11</td>
<td>JK</td>
</tr>
</tbody>
</table>

### Stream 3: Maternal morbidity

#### 3.1 Maternal mental illness
### Stream 3: Maternal morbidity

<table>
<thead>
<tr>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing currently in progress under this heading - see table of completed studies for work in this area</td>
<td></td>
</tr>
</tbody>
</table>

#### 3.2 Obesity and outcome of pregnancy

Nothing currently in progress under this heading - see table of completed studies for work in this area

#### 3.3 Smoking, alcohol and drug misuse in pregnancy

- **Effects of prenatal alcohol consumption and alcohol metabolising genes on child growth and neurodevelopment in the ALSPAC study**
  - 2008-10
  - RG

#### 3.4 Surveillance of rare disorders of pregnancy

- **Continued development of the UK Obstetric Surveillance System (UKOSS)**
  - 2005-14
  - MK
- **Surveillance of amniotic fluid embolism**
  - 2005-12
  - MK
- **Surveillance of pulmonary vascular disease**
  - 2006-12
  - MK
- **Surveillance of myocardial infarction in pregnancy**
  - 2006-11
  - MK
- **Surveillance of pregnancy in women following non-renal solid organ transplant**
  - 2007-12
  - MK
- **Surveillance of uterine rupture**
  - 2009-11
  - MK
- **Surveillance of failed intubation**
  - 2008-11
  - MK(a)
- **Surveillance of multiple repeat caesarean section**
  - 2009-10
  - MK(a)
- **Surveillance of aortic dissection/dissecting aortic aneurysm in pregnancy**
  - 2009-12
  - MK
- **Surveillance of pituitary tumours in pregnancy**
  - 2009-12
  - MK
- **Surveillance of myeloproliferative disorders in pregnancy**
  - 2010-13
  - MK(a)
- **Before, during and after birth - how does care affect the future health prospects of infants with congenital diaphragmatic hernia? (UKOSS study)**
  - 2009-12
  - MK
- **Surveillance of sickle cell disease in pregnancy**
  - 2010-12
  - MK
- **Surveillance of placenta accreta**
  - 2010-11
  - MK

#### 3.5 Pregnancy complications

- **UKNeS - Beyond maternal death: Improving the quality of maternity care through national studies of “near-miss” maternal morbidity**
  - 2010-14
  - MK
### 4.1 Methodological developments

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparison of different sources of incidence data for rare disorders of pregnancy</td>
<td>2007-10</td>
<td>MK</td>
</tr>
<tr>
<td>INLET trial - Cluster trial of newsletters and educational supplements to centres participating in INIS trial</td>
<td>2006-10</td>
<td>PB</td>
</tr>
<tr>
<td>Dealing with childhood deaths in randomised trials (BRACELET)</td>
<td>2008-12</td>
<td>PB(a)</td>
</tr>
<tr>
<td>Programme of methodological research on economic aspects of perinatal and paediatric health care</td>
<td>2006-11</td>
<td>SP</td>
</tr>
<tr>
<td>Health, medicines and self-care choices made by children, young people and their families - Information to support decision making</td>
<td>2006-10</td>
<td>PB(a)</td>
</tr>
<tr>
<td>Evidence into practice - Evaluating a child-centred intervention for diabetes medicine management</td>
<td>2008-11</td>
<td>PB(a)</td>
</tr>
<tr>
<td>Development and validation of instrument measuring aspects of the working environment in maternity and healthcare</td>
<td>2008-10</td>
<td>MR</td>
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### Programme of Work – Studies Completed in 2008-09

#### Stream 1: The compromised fetus and baby

<table>
<thead>
<tr>
<th>Study</th>
<th>Duration</th>
<th>NPEU Contact</th>
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</thead>
<tbody>
<tr>
<td>TOBY trial - Whole body cooling for babies born with neonatal encephalopathy</td>
<td>2002-09</td>
<td>PB</td>
</tr>
<tr>
<td>UKCP Collaboration - Regional variations in the relationship between cerebral palsy and socio-economic deprivation</td>
<td>2005-08</td>
<td>JK</td>
</tr>
<tr>
<td>Economic evaluation of progesterone for the prevention of preterm birth in twins</td>
<td>2005-09</td>
<td>SP</td>
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<tr>
<td>Economic evaluation of outpatient cervical ripening prior to induction of labour</td>
<td>2005-09</td>
<td>SP</td>
</tr>
<tr>
<td>Survey of fertility, reproductive choices and future plans (FINE study)</td>
<td>2006-08</td>
<td>JK(a)</td>
</tr>
<tr>
<td>The effects of psychosocial stress on time to conception</td>
<td>2005-09</td>
<td>RG(a)</td>
</tr>
<tr>
<td>Congenital hydrocephalus - A population based study on prevalence and outcome</td>
<td>2005-08</td>
<td>TB</td>
</tr>
<tr>
<td>Cognitive and behavioural outcomes of children with an extra sex chromosome</td>
<td>2006-09</td>
<td>TB</td>
</tr>
<tr>
<td>Prenatal diagnosis and outcome of pregnancy of sex chromosome trisomies in Europe</td>
<td>2007-09</td>
<td>TB</td>
</tr>
</tbody>
</table>
### Stream 1: The compromised fetus and baby

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminations of pregnancy at ≥24 weeks of gestation after prenatal diagnosis of fetal abnormality in Europe</td>
<td>2007-09</td>
<td>TB</td>
</tr>
<tr>
<td>Economic impact of preterm birth</td>
<td>2005-09</td>
<td>SP</td>
</tr>
<tr>
<td>ADEPT trial - Early versus delayed enteral feeding for babies born with absent or reversed end-diastolic flow and growth restriction</td>
<td>2005-09</td>
<td>PB</td>
</tr>
<tr>
<td>Economic impact of preterm birth (II)</td>
<td>2006-09</td>
<td>SP</td>
</tr>
<tr>
<td>Neonatal unit survey of communication, facilities and support for parents of preterm babies</td>
<td>2007-09</td>
<td>MR</td>
</tr>
<tr>
<td>Neonatal Taskforce Workforce - Neonatal staff survey analysis</td>
<td>2008-09</td>
<td>MR</td>
</tr>
</tbody>
</table>

### Stream 2: Care of the healthy woman and baby

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Duration</th>
<th>NPEU Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Oxford Worries about Labour Scale - Maternal concerns about labour and birth</td>
<td>2008</td>
<td>MR</td>
</tr>
<tr>
<td>Cost-effectiveness of alternative prevention and treatment strategies for GBS</td>
<td>2005-09</td>
<td>SP</td>
</tr>
<tr>
<td>Offer and uptake of antenatal screening for Downs syndrome in women from different social and ethnic backgrounds using national maternity survey data</td>
<td>2007-08</td>
<td>MR</td>
</tr>
<tr>
<td>Health and wellbeing in pregnancy</td>
<td>2008-09</td>
<td>MR</td>
</tr>
<tr>
<td>ELSA trial of home versus hospital support in early labour</td>
<td>2004-09</td>
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<td>The protective effects of breastfeeding in a national UK survey</td>
<td>2005-09</td>
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<td>Relationship between family income and child asthma - An econometric perspective</td>
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<td>Birth and beyond: antenatal education and preparation for parenthood - a review of the literature and current service provision</td>
<td>2009</td>
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<td>Having a baby in rural areas in England</td>
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<td>The association between alcohol consumption in pregnancy and emotional and behavioural problems in childhood</td>
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<td>Effect of maternal alcohol consumption on fetal growth, preterm birth, birth defects and child behaviour problems</td>
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<td>Using verbal autopsy to assign stillbirths and neonatal causes of death</td>
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<td>Social capital and its relationship with preference-based measures of health status</td>
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<td>Valuation of prenatal life in economic evaluations of perinatal interventions</td>
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<td>Validation of a perceptions of care adjective check list for labour and birth</td>
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<td>Preference-based Health Utilities Index scores for childhood conditions</td>
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Stream 1: The compromised fetus and baby

1.1 Neonatal encephalopathy, cerebral palsy and other childhood impairments

**INFANT trial - A multi-centre randomised controlled trial of an intelligent system to support decision making in the management of labour using the cardiotocogram**

**Chief investigator:**
NPEU: Peter Brocklehurst.

**Other investigators:**
(Listed alphabetically)

**External:**
David Field (University of Leicester), Keith Greene (University of Plymouth), Sara Kenyon (University of Birmingham), Mary Newburn (NCT), Rachel Plachinski (NCT), Phillip Steer (Chelsea and Westminster Hospital, London), David Wright (University of Plymouth).

**NPEU:**
Ed Juszczak, Stavros Petrou, Maria Quigley.

Babies continue to die in labour or be born with brain injury due to lack of oxygen during their birth. One way of trying to prevent babies suffering due to a lack of oxygen during birth is to monitor the baby’s heart rate. This monitoring is not always easy to interpret. Some patterns are the baby’s normal response to the stress of labour whilst others indicate a lack of oxygen. Expertise and experience are essential for accurate interpretation and mistakes are common.

This randomised controlled trial will test whether an intelligent computer program can help midwives and doctors improve the care they give in response to abnormalities of the baby’s heart rate and whether this will lead to fewer babies being harmed because of a lack of oxygen. 46,000 women who are having continuous monitoring of their baby’s heart rate in labour will take part in the study. The study will take place in at least 10 hospitals in the UK and Ireland and will last for at least 5 years.

**Contact person:** Peter Brocklehurst

**Funding:** NIHR HTA

**Status of project:** In progress
Economic evaluation alongside INFANT trial - cost-effectiveness of an intelligent decision support system

Chief investigator: NPEU
Peter Brocklehurst.

Other investigators:
(Listed alphabetically)
External:
David Field (University of Leicester), Keith Greene (University of Plymouth), Sara Kenyon (University of Birmingham), Mary Newburn (NCT), Rachel Plachinski (NCT), Phillip Steer (Chelsea and Westminster Hospital, London), David Wright (University of Plymouth).

NPEU:
Ed Juszczak, Stavros Petrou.

Other NPEU staff involved:
(Listed alphabetically)
Vicki Barber, Ursula Bowler, Bob Gatten, Katie Lean, Dean Regier, Clare Shakeshaft.

A prospective economic evaluation will be conducted alongside the INFANT trial with the aim of estimating the cost-effectiveness of the intelligent decision support system. The cost differences between the two groups, the expert system and conventional CTG groups, will be measured, valued and combined with the clinical-effectiveness data from the trial. The economic evaluation will be conducted from a health service perspective and will incorporate data from all subjects recruited into the trial.

Contact person: Peter Brocklehurst
Funding: NIHR HTA
Status of project: In progress

TOBY Children Study - School age outcomes following a newborn cooling trial

Chief investigator:
External:
Denis Azzopardi (Hammersmith Hospital, Imperial College, London).

Other investigators:
(Listed alphabetically)
External:
David Edwards (Imperial College, London), Henry Halliday (Queen’s University of Belfast), Malcolm Levene (University of Leeds), Neil Marlow (University College London), Marianne Thoresen (St Michael’s Hospital, Bristol), Andrew Whitelaw (University of Bristol).

NPEU:
Peter Brocklehurst, Ed Juszczak.

Other NPEU staff involved:
(Listed alphabetically)
Ursula Bowler, Oya Eddama, Louise Linsell, Stavros Petrou, Brenda Strohm.

The aim of this study is to determine the effects of therapeutic hypothermia following perinatal asphyxia on neurological and neuropsychological outcomes at age 6-7 years and also to assess academic attainment and any additional health, societal or educational costs associated with changes in outcome as a result of the intervention. This study will determine whether the apparent initial benefits of cooling are maintained in the longer term.

Contact person: Peter Brocklehurst
Funding: MRC
Status of project: In progress

TOBY Xenon: Neuroprotective effects of hypothermia combined with inhaled xenon following perinatal asphyxia

Chief investigators:
(Listed alphabetically)
External:
Denis Azzopardi (Hammersmith Hospital, Imperial College, London), David Edwards (Imperial College, London).

Other investigators:
(Listed alphabetically)
External:
Ernest Cady (University College London), Nicholas Franks (Imperial College, London), Joseph Hajnal (Imperial College,
NPEU: Peter Brocklehurst, Ed Juszczak.

Other NPEU staff involved: (Listed alphabetically)
Ursula Bowler, Louise Linsell, Brenda Strohm.

This proof-of-concept study will test the hypothesis that following perinatal asphyxia treatment with a combination of hypothermia and inhaled xenon reduces cerebral biochemical abnormality, assessed by Magnetic Resonance Spectroscopy, preserves cerebral structures, assessed by visual and computational analysis of MRI, and leads to improved clinical outcomes at hospital discharge.

Contact person: Ed Juszczak
Funding: MRC
Status of project: In progress

1.2 Child health outcomes following assisted reproductive technologies (ART) and related fertility issues

HFEA data: Analysis of long-term trends and outcomes following ART treatment in 2006

Chief investigator: NPEU:
Jenny Kurinczuk.

Other investigator:
NPEU:
Chris Hockley.

We were commissioned by the Human Fertilisation and Embryology Authority (HFEA) to analyse and present the long-term trends in outcomes following assisted reproductive technology (ART) treatment using the data the HFEA have been collecting since the inception of the HFEA register. The outputs from the analysis of long-term trends are available as web-pages at: http://www.hfea.gov.uk/fertility-treatment-trends.html. We also undertook an indepth analysis of the data relating to treatment cycles started in 2006 presenting the data in a form suitable for public presentation. A full report of the analysis of treatment cycles started in 2006 is available at: http://www.hfea.gov.uk/5777.html

Contact person: Jenny Kurinczuk
Funding: HFEA
Status of project: Completed

1.3 Congenital anomalies

To assess information availability on prevalence and prenatal detection rates of congenital anomalies in the South East Region to allow the monitoring of screening programmes

Chief investigator: External:
Diana Wellesley (University of Southampton Hospitals NHS Trust).

Other investigators: (Listed alphabetically)
External:
Val Armstrong (Imperial College Healthcare NHS Trust, London).

NPEU:
Patricia Boyd.

The aim of this project was to find out what information on congenital anomalies is held, by whom and in what format, throughout the South East Region of the UK in order to inform antenatal and neonatal screening programmes. Part of the South East Region is covered by South Central Strategic Health Authority.
(SHA) which is served by two congenital anomalies registers (CAROBB and the WESSEX Register); the rest of the South East Region is not covered by a congenital anomalies register.

All 23 antenatal screening co-ordinators across the South East Region responded and provided data.

A paper is currently in preparation to report the findings.

**Contact person:** Jenny Kurinczuk  
**Funding:** DH Registers and South Central SHA  
**Status of project:** Completed

### Evaluation of prenatal diagnosis rates for major structural congenital anomalies across areas covered by BINOCAR register 2005-2006

**Chief investigator:** NPEU: Patricia Boyd.

**Other investigators:** (Listed alphabetically)  
External:  
Elizabeth Draper (University of Leicester), Judith Rankin (University of Newcastle), Ann Tonks (West Midlands Perinatal Institute), Diana Wellesley (University of Southampton Hospitals NHS Trust).

**NPEU:** Catherine Rounding.

This is a collaborative project across the congenital anomalies registers which are members of the British Isles Network of Congenital Anomalies Registers (BINOCAR). BINOCAR was approached by the National Screening Committee (NSC) Fetal Anomaly Screening Programme (FASP) to assess the feasibility of providing prevalence and prenatal detection rates for specific major structural congenital anomalies which are ameable to prenatal detection by ultrasound to enable monitoring of the NSC FASP. This project has recently been completed and a paper has been submitted for publication.

**Contact person:** Jenny Kurinczuk  
**Status of project:** Completed

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### 1.4 Preterm birth

**PiPS - Probiotics in preterm babies study**

**Chief investigator:**  
External: Kate Costeloe (Homerton Hospital, London).

**Other investigators:** (Listed alphabetically)  
External: Michael Miller (Homerton Hospital, London), Mark Wilks (Homerton Hospital, London).

**NPEU:** Peter Brocklehurst.

**Other NPEU staff involved:** (Listed alphabetically)  
Ursula Bowler, Bob Gatten, Paul Heal, Ed Juszczak, Ann Kennedy, Andy King.

Preterm babies are at increased risk of episodes of bacterial infection which may be fatal and are associated with chronic complications in survivors. This is largely because preterm babies have immature defences against infection. An important way in which the body is protected is through the ‘friendly bacteria’ that normally live in the gut. At birth there are no organisms in the gut but healthy babies who are nursed with their mothers quickly become colonised with their ‘friendly’ bacteria. Preterm babies who are separated from their mother at birth are more likely to become colonised with bacteria in the environment of the Neonatal Unit that may cause disease. It is possible that if these babies are given ‘friendly bacteria’ (probiotic), these will multiply in the gut, improve the general health of the intestine and reduce the chance of potentially pathogenic organisms becoming established; this should reduce infection.

There is some evidence of the beneficial effects of probiotics in the published literature but they have not been adequately tested in a study involving more than one hospital and including the babies at greatest risk. Probiotics do seem to be safe, but again more data are needed. This randomised trial will test whether giving preterm babies a single probiotic bacterium will improve their health and decrease their risk of infection.
The main outcomes that will be measured are episodes of infection, episodes of necrotising enterocolitis, death, growth, use of antibiotics and length of stay.

**Contact person:** Peter Brocklehurst  
**Funding:** NIHR HTA  
**Status of project:** In progress

**I2S2 - Iodine supplementation trial - iodine supplementation for premature babies**

**Chief investigator:**  
NPEU: Peter Brocklehurst.

**Other investigators:**  
(Listed alphabetically)  
**External:**  
Robert Hume (University of Dundee), Simon Ogston (University of Dundee), Theo Visser (Erasmus University, Brussels, Belgium), Peter Willatts (University of Dundee), Fiona Williams (University of Dundee).

**NPEU:**  
Peter Brocklehurst.

**Other NPEU staff involved:**  
(Listed alphabetically)  
Ursula Bowler, Ed Justczak, Stella Khenia, Andy King, Kayleigh Morgan.

Cerebral damage and neurodisability are common among extremely preterm infants who survive and there are about 7000 such infants born each year in the UK. The aetiology of this cerebral damage and neurodisability is multifactorial, and is associated with a number of factors including hypothyroxinaemia. Thyroid hormone is essential for normal development of the human brain in utero and for the first two years after birth. Damage through deficiency of thyroxine is irreversible.

Transient hypothyroxinaemia in preterm infants is common and studies have linked low plasma T4 in preterm infants with later neurodevelopmental deficits in motor and cognitive function. Iodine is essential for the synthesis of T4. Mild and moderate deficiencies of iodine are associated with neuropsychointellectual deficits in infants and children. This randomised trial will test the hypothesis that iodine supplementation of extremely preterm infants improves neurodevelopmental outcome at 2.5 years of age.

**Contact person:** Peter Brocklehurst  
**Funding:** MRC  
**Status of project:** In progress

**A population-based study of the health and developmental consequences of preterm birth**

**Chief investigator:**  
NPEU: Maria Quigley.

**Other investigators:**  
(Listed alphabetically)  
**External:**  
Zarko Alfirevic (University of Liverpool), Elaine Boyle (University of Leicester), David Field (University of Leicester), Dieter Wolke (University of Warwick).

**NPEU:**  
Jenny Kurinczuk.

**Other NPEU staff involved:**  
Gry Poulsen.

While there is a growing body of literature describing health outcomes in very preterm babies, few studies have focused on outcomes in moderately preterm babies that is, those born at gestations of 32-36 weeks. This group of babies represents a relatively large proportion of births, and therefore, even modest increases
in health problems may have important implications for public health and for the allocation of health and educational resources. The aim of this study is to describe gestation-specific effects on a range of child health and, cognitive and developmental outcomes measured at age 3 and 5 years in a national cohort study (the Millennium Cohort Study). Babies born at all gestations will be included, and the analysis will describe effects according to gestation in weeks, gestation in broader groups (23-31, 32-33, 34-36, 37+ weeks), birth weight and “small for gestational age”.

Contact person: Maria Quigley
Funding: BUPA Foundation
Status of project: In progress

**ePRIME - Evaluation of MR imaging to predict neurodevelopmental impairment in preterm infants**

Chief investigator:
External: David Edwards (Imperial College, London).

Other investigators:
(Listed alphabetically)
External:
Denis Azzopardi (Hammersmith Hospital, Imperial College, London), James Boardman (Imperial College, London), Serena Counsell (Imperial College, London), Frances Cowan (Hammersmith Hospital, London), Jan de Vega (Lambeth PCT), Nigel Kennea (Imperial College, London), Mary Rutherford (Imperial College, London), Merran Thomson (Imperial College, London).

NPEU:
Peter Brocklehurst, Oya Eddama, Maggie Redshaw.

Other NPEU staff involved:
(Listed alphabetically)
Ursula Bowler, Ed Juszczak.

Preterm birth is the leading cause of perinatal mortality and morbidity in developed countries, and leads to neurological impairment in a significant proportion of survivors. Targeting follow-on services to children who need them is difficult, particularly with inaccurate early diagnosis of neurodevelopmental impairment. In a research environment magnetic resonance imaging (MR) is more accurate at detecting cerebral abnormalities than standard care cranial ultrasonography and might provide a more accurate neurological prognosis and improve overall care. The aim of the research programme will be to provide the evidence-base for NHS policy on the use of MR of the brain for preterm infants.

The component project objectives are:
to determine with high precision the sensitivity and specificity of cerebral MR imaging for predicting neurodevelopmental impairment in the context of the NHS; to use a randomised design to compare the effect of MR and ultrasound imaging on total healthcare usage and costs, and assess its effect on unplanned and planned care; to compare the influence of MR- and ultrasound-based information on parental perceptions, stress and coping using qualitative and quantitative research methods and to compare routine local bedside imaging with specialist centralised ultrasound imaging; and to survey current MR use and capacity in the NHS.

Preliminary qualitative work has been carried out with parents whose babies have been cared for in a neonatal intensive care unit to support the development of appropriate data collection instruments for use with parents in the main study. Analysis of these qualitative data are being used in preparing a paper for publication on communication and information-giving in a neonatal unit.

Contact person: Maggie Redshaw
Funding: NIHR
Status of project: In progress
1.5 Fetal and infant effects of rare disorders of pregnancy (see Stream 3)

**BAPS-CASS - Before, during and after birth - how does care affect the future health prospects of infants with congenital diaphragmatic hernia?**

**Chief investigator:** NPEU: Jenny Kurinczuk.

**Other investigators:**
(Listed alphabetically)

- **External:**
  - Elizabeth Draper (*University of Leicester*),
  - David Howe (*University of Southampton Hospitals NHS Trust*),
  - Paul Johnson (*Oxford Children’s Hospital*),
  - Paul Losty (*University of Liverpool*),
  - Sean Marven (*Sheffield Children’s Hospital*),
  - Judith Rankin (*University of Newcastle*).

- **NPEU:**
  - Peter Brocklehurst, Marian Knight.

**Other NPEU staff involved:**
(Listed alphabetically)

- Alex Bellenger, Carole Harris, Patsy Spark.

Congenital diaphragmatic hernia (CDH) is a musculoskeletal defect of the diaphragm which occurs during fetal development affecting between 1 in 2,000 and 1 in 4,000 births. During fetal development the defect allows the abdominal contents to move into the chest and impedes cardiac and lung development. CDH can be diagnosed prenatally on ultrasound.

At present we have incomplete information about the incidence, optimal pregnancy management, survival to delivery, optimal surgical management, survival to discharge and longer term outcomes. Given the rarity of CDH available data mainly come from major referral centres and may be biased in favour of better outcomes; available survival data following surgery are thus contentious. Nevertheless, current data suggest that a significant proportion of infants experience substantial ongoing problems of respiratory, neurological, growth and GI function, and life-long disability.

This project is a UK-wide study of a 1-year birth cohort of all cases of CDH using three related tried and tested data collection systems: the UK Obstetric Surveillance System (UKOSS) to collect antenatal and perinatal information; and BAPS-CASS to collect neonatal and surgical information, and outcomes at both discharge and age one year. Cross validation of cases with the British Isles Network of Congenital Anomalies Registers (BINOCAR) will ensure we have identified all cases to provide a total population picture not subject to referral bias.

These data will contribute to improvements in counselling for parents, contribute to the management evidence base and support the development of new management strategies and services for long-term care. Ascertainment of cases is now completed, and data collection for the final few cases is underway; one year follow-up data collection is also now underway.

**Contact person:** Jenny Kurinczuk

**Funding:** AMR

**Status of project:** In progress
Stream 2: Care of the healthy woman and baby

2.2 Recent users’ views and experience of maternity care

Analysis of trust-based data from National Maternity Surveys on women’s experience of care

Chief investigator: NPEU: Maggie Redshaw.

Other investigator: NPEU: Katriina Heikkila.

Data collected by Hospital Trusts in the course of the 2007 Healthcare Commission review of maternity care are being analysed to explore variations in the type and quality of maternity care provided and in women’s views of that care. The initial focus is on inequalities, access to and engagement with antenatal care and the experience of women from disadvantaged and Black and Minority Ethnic Groups. A paper is in preparation, presenting data on timing of initial antenatal contact with health professionals and at booking and the type of health professional involved, numbers of checks and take-up of antenatal dating and anomaly scans, as well as offers of antenatal education classes, using an eight-way classification of ethnicity.

Contact person: Maggie Redshaw
Status of project: In progress

National Maternity Survey 2010: Women’s Experience of Maternity Care

Chief investigator: NPEU: Maggie Redshaw.

Other investigator: NPEU: Katriina Heikkila.

A new national maternity survey has been undertaken by the NPEU using the same methods as were employed in 2006, the results of which were reported as ‘Recorded Delivery’ (2007). Compare with the survey in 2006, the target sample size was increased to 10,000 and additional sections on fathers’ involvement and on women whose babies were admitted to neonatal care were included.

Mailings of questionnaires went out to women at three months after the birth in January 2010 and an online questionnaire option was made available. The aim of the survey is to provide updated information about choice and information, care and services from the perspective of women who have recently given birth, looking at the experience of different groups of women, to be able to make comparisons across time and between women receiving care in different Strategic Health Authorities.

Contact person: Maggie Redshaw
Funding: DH
Status of project: In progress

Women’s experience of support for breastfeeding

Chief investigator: NPEU: Jane Henderson.

Other investigator: NPEU: Maggie Redshaw.

Up-to-date information about the support and care available for women wishing to breastfeed is needed. Secondary analysis of data from the large-scale national survey of women’s experience of maternity care collected in 2006 is planned.
care carried out by NPEU in 2006 and published as ‘Recorded Delivery’ (2007) has been used to explore the factors that contribute to successful breastfeeding and to investigate the midwifery role in supporting initiation and continued breastfeeding. A quantitative paper has been submitted for publication and a qualitative paper is currently in preparation.

Contact person: Maggie Redshaw  
Status of project: In progress

2.5 Care in labour and delivery

**BUMPES - Upright maternal position in second stage labour in women with epidural analgesia; a randomised controlled trial**

Chief investigators: (Listed alphabetically)  
External:  
Christine MacArthur (University of Birmingham).

NPEU:  
Peter Brocklehurst.

Other investigators: (Listed alphabetically)  
External:  
Debra Bick (Thames Valley University), Janesh Gupta (Birmingham Women’s Hospital), Philip Moore (Queen Elizabeth Hospital, Birmingham), Mary Nolan (NCT), Geraldine O’Sullivan (Guy’s and St Thomas’ Hospital, London), Julia Sanders (Cardiff and Vale NHS Trust), Andy Shennan (King’s College, London), Matt Wilson (Sheffield Teaching Hospitals NHS Trust).

NPEU:  
Ursula Bowler, Ed Juszczak, Lynn Lynch, Rachel Roberts.

Other NPEU staff involved: (Listed alphabetically)  
Rachel Roberts, Lydia Saroglou.

As the most effective form of pain relief in labour, epidural analgesia is chosen by up to 30% of women. Previous randomised controlled trials have shown that epidural analgesia is associated with increased risk of instrumental vaginal delivery (IVD), prolonged labour and oxytocic augmentation. These effects have been attributed to dense epidural motor block.

‘Mobile epidurals' which use low-dose local anaesthetic in combination with opioids (Fentanyl) are now routine practice and have been shown to result in a lower risk of IVD. However risk of IVD is still higher compared with women with no epidural. Although mobile epidurals preserve motor function, allowing greater mobility throughout labour and can enable women to adopt upright positions, there is controversy about whether an upright posture in second stage increases the spontaneous vaginal delivery (SVD) rate.

This pragmatic randomised controlled trial will recruit 3,000 women to evaluate whether a policy of enabling upright position increases the incidence of SVD and decreases the incidence of IVD compared to a policy of lying down amongst women in first time labour with a mobile epidural who enter second stage.

Contact person: Peter Brocklehurst  
Funding: NIHR HTA  
Status of project: In progress

**Cochrane review: Psychosocial and educational interventions in latent phase or early labour for improving birth outcomes**

Chief investigator:  
External:  
Helen Spiby (University of York).

Other investigators: (Listed alphabetically)  
External:  
Ellen Hodnett (Lawrence S. Bloomberg Faculty of Nursing, Toronto, Canada), Patricia Janssen (UBC School of Health and Population, Vancouver, Canada).

NPEU:  
Maria Quigley.
In western settings, the majority of women give birth in hospitals or birth centres. Admission often occurs early in labour in order that women can receive confirmation that labour has commenced, to access advice and support from birth attendants and to relieve anxiety about birth occurring unplanned at home or in transit to hospital. However, early admission to maternity units has been associated with repeated admissions to hospital (if labour is found not to be established) and has the potential for increased interventions if women remain in hospital prior to established labour.

The objective of this review is to assess the effects of early labour interventions that aim to promote normal childbirth for women labouring at term on the following outcomes: maternal and neonatal health and wellbeing; interventions during labour; and women’s experiences of care. This review will focus on the time prior to admission, in contrast with the existing review of continuous support during labour following admission to delivery suites.

**Contact person:** Maria Quigley  
**Status of project:** In progress

### 2.6 Postnatal health and care

**The effect of breastfeeding on child development**

**Chief investigator:** External: Jane Barlow (University of Warwick).

**Other investigators:**  
(Listed alphabetically)  
External: Yvonne Kelly (University College London), Mary Renfrew (University of York), Amanda Sacker (University College London).

**NPEU:** Claire Carson, Katriina Heikkila, Christine Hockley.

The literature to date gives conflicting findings as to the effect of breastfeeding on child cognitive development and behaviour. The objective of this study is to assess the relationship between breastfeeding and child cognitive development and behaviour in a large population-based UK cohort, and to assess whether these relationships vary according to prematurity.

We are using data from Sweeps 1 and 3 of the UK Millennium Cohort Study. Children are grouped according to their breastfeeding status (ever versus never; and duration of any and exclusive breastfeeding). Results will be stratified according to gestational age at birth. The main outcome measures are the British Ability Scales tests and the Strengths and Difficulties Questionnaire which were administered when the children were aged 5 years. In the analysis, we will take account of potential confounders and mediators of the effect of breastfeeding on child development and behaviour.

**Contact person:** Maria Quigley  
**Status of project:** In progress

### 2.7 Organisation of maternity care

**Birth and beyond: antenatal education and preparation for parenthood - a review of the literature and current service provision**

**Chief investigator:** External: Jane Barlow (University of Warwick).

**Other investigators:**  
(Listed alphabetically)  
External: Christine Coe (School of Health and Social Studies, University of Warwick, Coventry), Angela Underdown (University of Warwick).

**NPEU:** Maggie Redshaw.

The aim of the project was to contribute to the promotion of universal access to high quality evidence-based antenatal education and preparation for parenthood. It did so by producing a review of the published literature on this topic and an overview of the range and diversity of provision available.

The first objective was to identify from existing databases published evidence concerning the following: the effectiveness of antenatal education/preparation for
parenthood for mothers and fathers, with a range of outcomes including antenatal health, childbirth, child health and well-being, adjustment to becoming a parent and child care; the evidence relating to the benefits of antenatal education, the cost-benefits of preparation for parenthood across a range of outcomes, the effectiveness of different models of provision and learning methods. The second objective was to conduct case studies in different regions in order to obtain an overview of provision across England in NHS and the 3rd sector with some examples of innovative practice. A report has been completed and papers submitted for publication.

Contact person: Maggie Redshaw
Funding: DH
Status of project: Completed

**Having a baby in rural areas in England**

Chief investigator:
NPEU:
Maggie Redshaw.

Other investigators:
(Listed alphabetically)
External:
Vanita Bhavnani (King’s College, London), Mary Newburn (NCT).

The birth of a baby for individual women, their families and their communities is a significant and life-changing event. This work was part of a larger Commission for Rural Communities (CRC) project looking at major life events of different kinds taking place in rural areas of England, with a specific focus on needs and provision relating to pregnancy and childbirth.

Key aspects of published guidelines relating to maternity care were described and a review undertaken of what is known of the organisation of care in rural areas and the experience of women living in those areas. Issues that may particularly impact on services for pregnant and new mothers and their families in rural areas were explored.

Providing maternity services in rural areas presents many challenges. Significant issues in delivering care to women and families in rural areas are location and accessibility, the range of services provided and staff able to provide the care, distance from parents’ homes to services vary and travel time to the nearest obstetric unit. Travel difficulties are exacerbated by poor road quality, transportation services and weather.

Poor accessibility impacts most on those with high risk pregnancies, young parents and low income families. Long distances from regional centres and other resources, the unpredictable nature of childbirth and possible distress associated with transfer to regional centres may result in further difficulties. The practical problems associated with midwifery staffing levels and distance to travel between homes and hospital are also important factors in planning and providing perinatal care.

The report is due to be published on the CRC website.

Contact person: Maggie Redshaw
Funding: CRC
Status of project: Completed

**Stream 3: Maternal morbidity**

3.4 Surveillance of rare disorders of pregnancy

[UKOSS logo]
Surveillance of uterine rupture

Chief investigator: NPEU:
Marian Knight.

Other investigators: (Listed alphabetically)
External: Zarko Alfirevic (University of Liverpool).
NPEU: Peter Brocklehurst, Jenny Kurinczuk.

Other NPEU staff involved: (Listed alphabetically)
Carole Harris, Patsy Spark.

True uterine rupture is a catastrophic event with significant associated maternal and fetal morbidity and mortality. In the developed world it most commonly occurs in women who have previously delivered by caesarean section. This observation has led to debate about the optimal management of labour and delivery in women who have delivered by caesarean section in previous pregnancies.

Women with a previous caesarean delivery have generally been encouraged to attempt a trial of labour in subsequent pregnancies, but recent reports of an increased risk of morbidity, particularly due to uterine rupture, are thought to have contributed to a marked decrease in the number of women attempting vaginal birth after caesarean section.

The rate of caesarean section delivery in the UK is increasing, with previous caesarean section being the most common primary obstetric indication for repeat caesarean.

Two recent systematic reviews have attempted to quantify the incidence of uterine rupture. Both these reviews identified a number of deficiencies in the few existing studies in developed countries and suggested that a prospective national study of uterine rupture would offer the best opportunity to guide preventive strategies. They identified only one previous UK population-based study, which reported 12 ruptures in 48,865 deliveries, a rate of approximately 1 in 4,000 deliveries.

In addition to difficulties in quantifying the incidence of uterine rupture, it has been noted that existing observational studies are insufficient to answer additional questions about the risks of rupture associated with induction and augmentation of labour. This prospective, descriptive study using the UK Obstetric Surveillance System will address these questions and quantify the national incidence of uterine rupture.

Contact person: Marian Knight
Funding: Wellbeing of Women
Status of project: In progress

Surveillance of multiple repeat caesarean section

Chief investigator: NPEU:
Marian Knight.

Other investigators: (Listed alphabetically)
External: Mandish Dhanjal (Queen Charlotte’s and Chelsea Hospital, London).
NPEU: Marian Knight.

Other NPEU staff involved: (Listed alphabetically)
Carole Harris, Patsy Spark.

The incidence of primary caesarean section is rising throughout the world and the UK also demonstrates this trend. This is thought to be due to fetal monitoring in labour, maternal preference, maternal obesity, and possibly defensive obstetric practice.

After having three lower segment caesareans women are advised to undergo repeat elective caesarean in any subsequent pregnancies, rather than attempt a vaginal delivery. This practice is thought to reduce the risk of uterine rupture which can be life-threatening for both mother and baby. All caesarean procedures however, have associated risks: venous thromboembolism and haemorrhage which are leading causes of maternal mortality, infection, and damage to the viscera. Repeated caesareans are also associated with placental invasion into the myometrium and peripartum hysterectomy. Babies born via caesarean are more likely to experience breathing difficulties and require admission to a specialist unit.
Current knowledge concerning the maternal-fetal outcomes and management of multiple repeat caesarean is limited and mainly derived from hospital-based retrospective case analysis outside of the UK. No population-wide studies of incidence or complications have been undertaken.

This study will determine the national incidence of multiple repeat caesarean section in the UK and identify the accompanying complications and their respective rates. It will allow comparison between the risks associated with multiple repeat caesarean and those described in fewer repeat procedures. It will also ascertain the current UK practice in such cases with regards to timing of elective caesarean and postnatal counselling for future pregnancies.

**Contact person:** Marian Knight  
**Funding:** RCOG  
**Status of project:** In progress

**Surveillance of aortic dissection/dissecting aortic aneurysm in pregnancy**  
**Chief investigator:**  
External: Sheba Jarvis (Queen Charlotte’s and Chelsea Hospital, London).

**Other investigators:**  
(Listed alphabetically)  
External: Mandish Dhanjal (Queen Charlotte’s and Chelsea Hospital, London).

**NPEU:** Marian Knight.

**Other NPEU staff involved:**  
(Listed alphabetically)  
Carole Harris, Patsy Spark.

Aortic dissection is a potentially life-threatening condition that requires rapid identification and immediate medical treatment. The exact cause of aortic dissection remains unknown, but risk factors may include inherited weak blood vessels walls (connective tissue diseases), atherosclerosis (fat deposition in arteries causing them to narrow and become weak), congenital heart disease and high blood pressure.

Aortic dissection in pregnancy is a life-threatening event to both mother and baby and accounts for 14% of maternal cardiac deaths. Although rare, an association between pregnancy and aortic dissection has been reported and its incidence in pregnancy is rising. Approximately 50% of aortic dissection cases in women under the age of 40 occur whilst they are pregnant.

Between 2002-2005, there were 9 reported deaths from aortic dissection from a total of 248 maternal deaths (3.6%) in the UK. Worryingly, analysis of these cases has indicated that the care provided was deemed sub-standard in 44%. These highly publicised findings prompt an urgent approach to improve our understanding of this condition with early identification of pregnant patients at risk of this disease.

This study, using the UK Obstetric Surveillance System (UKOSS) will estimate disease incidence, describe risk factors, management and outcomes with the aim of informing guidelines for the prevention and treatment of the condition.

**Contact person:** Marian Knight  
**Funding:** Heart UK  
**Status of project:** In progress

**Surveillance of pituitary tumours in pregnancy**  
**Chief investigator:**  
External: Kimberley Lambert (Imperial College, London).

**Other investigators:**  
(Listed alphabetically)  
External: Mandish Dhanjal (Queen Charlotte’s and Chelsea Hospital, London), David McCance (Royal Victoria Hospital, Belfast), Catherine Williamson (Imperial College, London).

**NPEU:** Marian Knight.

**Other NPEU staff involved:**  
(Listed alphabetically)  
Carole Harris, Patsy Spark.

Women with functioning anterior pituitary disease are often anovulatory. Once the condition is treated with medication or surgery, women are able to ovulate and conceive. This can occur before their first
normal menstruation, so unless adequate contraception is used, they will conceive whilst still on medical treatment. Therefore the fetus may be exposed to dopamine agonists at an early stage in development.

With the exception of macroprolactinoma there is limited knowledge about the maternal and fetal consequences of pituitary tumours and the drugs used to treat them in pregnancy. The pituitary increases in size in all pregnancies, if there is an underlying adenoma, the normal growth in addition to an abnormal pituitary can have serious consequences if not diagnosed early and treated appropriately. As the disease is rare the only information we have so far is based on case studies.

UKOSS provides the opportunity to collect some much needed data on these conditions in pregnancy and the effect on the mother and fetus. We know from case reports that Cushing’s disease and acromegaly can have devastating consequences including fetal and maternal mortality and serious morbidity. Macroprolactinomas and non-functioning tumours may enlarge, thereby threatening vision and necessitating surgery.

We will use the information gathered through UKOSS to write guidelines for the management of these conditions. The data obtained will help us in advising patients on the safety regarding established medication, and will also give limited insights into new treatments such as pegvisomon and somatostatin analogues.

**Contact person:** Marian Knight
**Funding:** SPARKS
**Status of project:** In progress

**Before, during and after birth - how does care affect the future health prospects of infants with congenital diaphragmatic hernia? (UKOSS study)**

**Chief investigator:**
NPEU:
Marian Knight

**Other investigators:**
(Listed alphabetically)

**External:**
Elizabeth Draper (University of Leicester),
David Howe (University of Southampton Hospitals NHS Trust), Paul Johnson (Oxford Children’s Hospital), Paul Losty (University of Liverpool), Sean Marven (Sheffield Children’s Hospital), Judith Rankin (University of Newcastle).

**NPEU:**
Peter Brocklehurst, Jenny Kurinczuk.

**Other NPEU staff involved:**
(Listed alphabetically)
Alex Bellenger, Carole Harris, Patsy Spark.

Congenital diaphragmatic hernia (CDH) is a musculoskeletal defect of the diaphragm which occurs during fetal development affecting between 1 in 2,000 and 1 in 4,000 births. During fetal development the defect allows the abdominal contents to move into the chest and impedes cardiac and lung development. CDH can be diagnosed prenatally on ultrasound.

At present we have incomplete information about the incidence, optimal pregnancy management, survival to delivery, optimal surgical management, survival to discharge and longer term outcomes. Given the rarity of CDH available data mainly come from major referral centres and may be biased in favour of better outcomes; available survival data following surgery are thus contentious. Nevertheless, available data suggest that a significant proportion of infants experience substantial ongoing problems of respiratory, neurological, growth and GI function, and life-long disability.

This project is a UK-wide study of a 1-year birth cohort of all cases of CDH using three related tried and tested data collection system: the UK Obstetric Surveillance System (UKOSS) to collect antenatal and perinatal information; and BAPS-CASS to collect neonatal and surgical information, and outcomes at both discharge and age one year. Cross validation of cases with the British Isles Network of Congenital Anomalies Registers (BINOCAR) will ensure we have identified all cases to provide a total population picture not subject to referral bias.

These data will contribute to improvements in counselling for parents, contribute to the management evidence base and support the development of new management strategies and services for long-term care.

**Contact person:** Marian Knight
**Funding:** AMR
**Status of project:** In progress
Surveillance of A/H1N1v influenza in pregnancy

Chief investigator: NPEU: Marian Knight.

Other investigators: (Listed alphabetically)
External: Simon Thomas (University of Newcastle), Laura Yates (University of Newcastle).

NPEU: Peter Brocklehurst, Jenny Kurinczuk.

Other NPEU staff involved: (Listed alphabetically)
Carole Harris, Patsy Spark.

This research identified through UKOSS, all pregnant women hospitalised with confirmed influenza A/H1N1v in the UK between September 2009 and January 2010.

A total of 241 pregnant women were admitted to hospital with laboratory confirmed A/H1N1v infection. Eighty-three percent of women hospitalised with A/H1N1v influenza were treated with antiviral agents, but only 6% received antiviral treatment before hospital admission.

Women hospitalised with A/H1N1v in pregnancy more likely to be overweight (aOR 1.7, 95% CI 1.2-2.4) or obese (aOR 2.0, 95% CI 1.3-3.0) than the comparison cohort. They were also more likely to have asthma requiring inhaled or oral steroids (aOR 2.3, 95% CI 1.4-3.9), to be multiparous (aOR 1.6, 95% CI 1.1-2.2), to have a multiple pregnancy (aOR 5.2, 95% CI 1.9-13.8) and to be from a black or other minority ethnic group (aOR 1.6, 95% CI 1.1-2.3).

Younger smokers had a raised odds of admission with confirmed A/H1N1v influenza (aOR 4.2, 95%CI 2.0-8.9) when compared with older non-smokers. Treatment within two days of symptom onset was associated with an 84% reduction in the odds of admission to ITU (OR 0.16, 95%CI 0.08-0.34); women admitted to ITU were three times more likely to be obese (aOR 3.4, 95%CI 1.2-9.2) than women not admitted to an ITU.

Sixty-three percent of hospitalised women had completed their pregnancies at the time of reporting. Women admitted to hospital with A/H1N1v infection are more likely to deliver preterm; a conservative estimate accounting for the high proportion of women who were undelivered suggests a three fold increased risk compared to an uninfected population cohort (OR 3.1; 95% CI 2.1, 4.5).

Conclusions: Earlier treatment with antiviral agents is associated with improved outcomes for pregnant women and further actions are needed in future pandemics to ensure that antiviral agents and vaccines are provided promptly to pregnant women, particularly in the primary care setting.

Contact person: Marian Knight
Funding: NIHR HTA
Status of project: Completed
Publications 2008 – 2010

2008


2008-34 Pyper C, Knight J. Fertility awareness methods of family planning for achieving or avoiding pregnancy. Glob libr women’s med (ISSN: 1756-2228) 2008; DOI 10.3843/GLOWM.10384.


2009


2010


Unit Reports 2008-2010


Forthcoming


7* Jayaweera H, Quigley MA. Health status, health behaviour and healthcare use among migrants in the UK: evidence from mothers in the Millennium Cohort Study. Social Science and Medicine.


NPEU Advisory Committee 2009

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Sarah Purdy
Consultant Senior Lecturer/MRC Clinician Scientist
Academic Unit of Primary Health Care, University of Bristol
Royal College of General Practitioners Representative
Alternate Representative of Royal College of General Practitioners (vacant)
# General Advisory Group Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Jane Abbott</td>
<td>Head of Programmes, Bliss, the special care baby charity</td>
</tr>
<tr>
<td>John Cairns</td>
<td>Professor of Health Economics&lt;br&gt;London School of Hygiene and Tropical Medicine</td>
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<tr>
<td>David Dunn</td>
<td>Senior Statistician, HIV and Infections Group&lt;br&gt;MRC Clinical Trials Unit, London</td>
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<tr>
<td>Pat Doyle</td>
<td>Professor, Non-communicable Disease Epidemiology Unit, Department of Epidemiology and Population Health&lt;br&gt;London School of Hygiene and Tropical Medicine.</td>
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<tr>
<td>Hilary Graham</td>
<td>Director, Department of Health Public Health Research Consortium and Professor of Health Sciences, Department of Health Sciences, University of York</td>
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<tr>
<td>Jenny Hewison</td>
<td>Professor of the Psychology of Healthcare&lt;br&gt;Leeds Institute of Health Sciences, School of Medicine, University of Leeds</td>
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<tr>
<td>Stuart Logan</td>
<td>Cerebra Professor of Paediatric Epidemiology and Director, Institute of Health Service Research&lt;br&gt;Director, NIHR PenCLAHRC, Peninsula College of Medicine and Dentistry, Peninsula Medical School, Exeter</td>
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<tr>
<td>Mary Newburn</td>
<td>Head of Research and Information, NCT (National Childbirth Trust) and Honorary Professor, Thames Valley University</td>
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<tr>
<td>Lynne Paterson</td>
<td>Nurse Consultant, Neonatal Unit&lt;br&gt;James Cook University Hospital, Middlesbrough</td>
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<tr>
<td>Alan Stein</td>
<td>Professor of Child and Adolescent Psychiatry&lt;br&gt;University of Oxford, Warneford Hospital, Oxford</td>
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<tr>
<td>David J Taylor</td>
<td>Director of The FIGO-Gates Initiative in Maternal &amp; Newborn Health, London</td>
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## Sources of funding

### Summary of Income in 2009

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<td>Tracheo-oesphagal Fistula Support</td>
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<td>Wellbeing of Women</td>
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<td>Wellcome Trust</td>
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<td>World Health Organisation</td>
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<td><strong>Grand Total</strong></td>
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