

Female admissions (aged 16-50 years) to adult, general critical care units in England, Wales and Northern Ireland, reported as “currently pregnant” or “recently pregnant”

1 January 2007 to 31 December 2007

Report for:

- The Royal College of Anaesthetists (RCoA)
- The Royal College of Obstetricians and Gynaecologists (RCOG)
- The Obstetric Anaesthetists' Association (OAA)

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1 Foreword

High quality data on maternal mortality in the UK, initially produced by the Confidential Enquiries into Maternal Death (CEMD) and currently the Confidential Enquiries into Maternal and Child Death (CEMACH)¹, has been collected for over 50 years and is world-renowned. This continuing audit has led to considerable improvements in maternity care and a major reduction in deaths related to pregnancy. It has been recognised that data on sick mothers who do not die is also required, to complement the CEMACH work on maternal mortality. One way of identifying cases is to look at ‘near-misses’ during management, such as the Scottish Programme for Clinical Effectiveness in Reproductive Health (SPCERH) system². Another recognised approach is to consider critical care unit admissions, although it is accepted that this may under-represent activity, as the sick mother is often managed in other hospital sites including the delivery suite.

The Intensive Care National Audit & Research Centre (ICNARC) was established in 1994 to provide a system to compare outcomes and identify key indicators in critical care management in adults. It aims to improve the organisation and practice of adult critical care which dovetails with the Royal College of Anaesthetists’ stated aim to improve standards in anaesthesia and critical care. ICNARC has a well-established Case Mix Programme (CMP) and approximately 82% of adult general critical care units in England, Wales and Northern Ireland contribute data. The Joint Standing Committee of the Royal College of Anaesthetists (RCoA) and the Royal College of Obstetricians and Gynaecologists (RCOG) commissioned ICNARC to include information on pregnancy and new fields for ‘currently pregnant’ and ‘recently pregnant’ women (aged 16-50) have been included in the CMP since February 2006. Funding for this project has been shared equally between the two Royal Colleges and the Obstetric Anaesthetists’ Association (OAA).

This first report summarises 2007 data on level 3 critical care obstetric admissions aged 16-50 years, with comparisons to age-matched, non-pregnant female controls. Overall, the incidence of “currently pregnant” or “recently pregnant” admissions to critical care units is approximately 260 per 100,000 maternities. This compares to a maternal death rate of 13.95 per 100,000 maternities in the 2007 CEMACH report¹.

Obstetric patients constituted 11.4% of admissions in females aged 16-50 years (513 of 4490 patients). 95 (18.5%) were reported as “currently pregnant” and 418 (81.5%) were “recently pregnant”). Overall, 61% were admitted for obstetric reasons. Interestingly, the vast majority (86%) of “currently pregnant” women were admitted for non-obstetric reasons, pneumonia being the single most common diagnosis (20%).

Conversely, the primary reason for admission in the larger “recently pregnant” sub-group were obstetric reasons, with ante- or post-partum haemorrhage reported as the primary diagnosis in 143(34%) cases. The data collection here differed from the conventional CEMACH grouping of haemorrhage cases. The number in this field is likely to be an under representation as there were further fields (e.g. ‘hypovolaemic shock’, ‘haemorrhage from the uterus and associated uterine rupture’) that were recorded separately in different sections (a further 23 patients).

Happily, the data confirm that obstetric patients admitted to CCU generally have better outcomes than other patients: the mean admission Acute Physiological and Chronic Health Evaluation (APACHE) II score of 12 correlates with age-matched controls. The mortality is different for the two sub-groups ‘currently pregnant’ and ‘recently pregnant’ (3.2% vs. 1.7%) but overall, there was a much lower overall ‘critical care unit mortality’ compared to controls (2% vs. 11%). Time in the critical care unit and overall in-hospital stay was also shorter (8 days vs. 11 days). This is consistent with a previous study that recommended the

development of a specific maternity scoring system, since the use of APACHE II scoring in obstetric patients tends to overestimate mortality³.

We are grateful to Professor Kathy Rowan and her staff at ICNARC for producing this first report, which provides an encouraging start to further and more in-depth analysis of obstetric patients requiring critical care. It confirms the need for nurses, midwives, obstetricians and anaesthetists to be aware of the many non-pregnancy related conditions that will require critical care during and immediately after pregnancy.

We hope that this first annual report will be valuable to all members of the multidisciplinary teams who care for critically ill pregnant women, as well as to local administrators and national planners. We are aware of some limitations in the collection and interpretation of this maternal critical illness data and will work closely with ICNARC to refine and develop both the dataset and the subsequent annual reports.

The Royal College of Anaesthetists

The Royal College of Obstetricians and Gynaecologists

The Obstetric Anaesthetists' Association

1. <http://www.cemach.org.uk/Publications.aspx>
2. http://www.nhshealthquality.org/nhsqis/files/Maternityservices_SPCERH30_4thAnnualReport_2006.pdf accessed 17/06/09
3. Harrison DA, Penny JA, Yentis SM, Fayek S, Brady A. Case mix, outcome and activity for obstetric admissions to adult, general critical care units: a secondary analysis of the ICNARC Critical Care 2005;9:S25-37

2 Introduction

The Intensive Care National Audit & Research Centre (ICNARC) has its origins in the UK APACHE II Study (1987-1993). Established in 1994 on a two-year (1994-1995), pump-priming grant from the Department of Health (England) and Welsh Health Common Services Authority (Wales), ICNARC became an independent Registered Charity in July, 1994 (Registered Charity Number: 1039417).

ICNARC's aim is to foster improvements in the organisation and practice of adult critical care (intensive and high dependency care) to improve patient care and outcomes. Towards achieving part of this aim, ICNARC coordinates a national, comparative audit of patient outcomes from adult, critical care units in England, Wales and Northern Ireland known as the Case Mix Programme (CMP). Currently, approximately 82% of adult, general critical care units in England, Wales and Northern Ireland are participating in the CMP.

The CMP is a voluntary, performance assessment programme using high quality clinical data to facilitate local quality improvement through routine feedback of comparative outcomes and key quality indicators to clinicians/managers in adult critical care units.

Following an approach from the Joint Standing Committee of the Royal College of Anaesthetists and Royal College of Obstetricians and Gynaecologists (JSC-RCOA/RCOG), an agreed number of obstetric-related fields were incorporated into the ICNARC Case Mix Programme Dataset Specification (Version 3.0), initially released to software developers in February 2006, and subsequently collected by units participating in the CMP, incrementally, from late 2006 onwards. Data for these obstetric-related fields are prompted for collection for all females admitted to participating critical care units.

This Report, the first of agreed annual reports to the JSC-RCOA/RCOG, is a baseline descriptive analysis of admissions, in 2007, to units participating in the CMP reported to be "currently pregnant" or "recently pregnant".

3 Background to the Case Mix Programme

The CMP recruits predominantly adult, general critical care units. Adult, general critical care units are defined as either standalone intensive care units (ICUs) or combined intensive care/high dependency units (ICU/HDUs). Participation in the CMP is entirely voluntary.

CMP specified data are recorded prospectively and abstracted retrospectively by trained data collectors according to precise rules and definitions - set out in the ICNARC Case Mix Programme Dataset Specification. Data collectors from each unit are trained prior to commencing data collection with retraining of existing staff, or training of new staff, also available. CMP training courses are held at least four times per year.

CMP specified data are collected on consecutive admissions to each participating critical care unit and are submitted to ICNARC quarterly. Data are validated locally, on data entry, and then undergo extensive central validation, for completeness, illogicalities and inconsistencies, with data validation reports returned to units for correction and/or confirmation. The validation process is repeated until all queries have been resolved and then the data are incorporated into the CMP Database (CMPD).

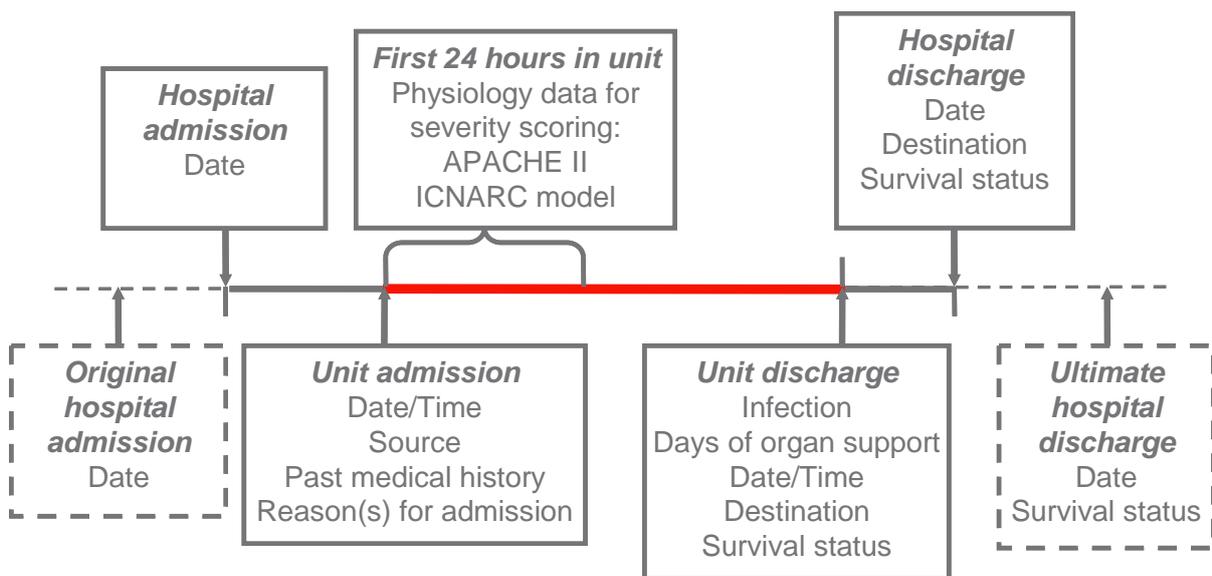
Participating units receive comparative data analysis reports on outcomes and key quality indicators, in which they can identify their own unit data and compare with all units participating in the CMP. In addition, staff at units can interrogate the CMPD by submitting ad hoc analysis requests which are provided free-of-charge.

Data collected for the CMP include alphanumeric unit/admission identifiers, demographics (e.g. age, sex, ethnicity), case mix (e.g. acute severity, comorbidity, surgical status, reason for admission), outcome (e.g. unit/acute hospital survival) and activity (e.g. unit/acute hospital length of stay) for each admission to each critical care unit.

Details of the timing and overview of data collected for the CMP are shown in Figure 1.

Figure 1

Timing and overview of data collected for the Case Mix Programme



Acute severity is measured by the APACHE II and the ICNARC Physiology scores. These scores are based on raw physiology data collected in the first 24 hours following admission to the critical care unit. For each physiological variable that contributes to the score, a weighting is added based on the degree of derangement from the normal range. These weightings are summed to calculate a score. The range of scores is 0 to 71, with higher scores indicating increased severity. Figure 2 shows the scoring system used to calculate the APACHE II score. For example, for female admissions to adult general critical care units, aged 16 to 50 years and reported as “currently pregnant” or “recently pregnant”, lower scores of 0-17 are associated with a hospital mortality rate of approximately 1%, rising to approximately 85% for higher scores >42.

Figure 2

Example of calculation of APACHE II score

| Physiology | Weighting |
|----------------------------|------------------|
| Temperature | 4 |
| Blood pressure | 4 |
| Respiratory rate | 4 |
| Heart rate | 4 |
| Oxygenation | 4 |
| Ph | 4 |
| Sodium | 4 |
| Potassium | 4 |
| Creatinine | 4 |
| Haematocrit | 4 |
| White blood cell count | 4 |
| Glasgow Coma Score | 12 (15-GCS) |
| Severity of illness | =60 |
| Age | 6 |
| Comorbidity | 5 |
| APACHE II score | =71 |

Reason for admission is coded using the ICNARC Coding Method (ICM). The ICM, developed specifically for the CMP, is a five-tiered (type of condition – surgical/non-surgical, body system, anatomical site, pathological/physiological process and condition), hierarchical method for coding reasons for admission or underlying conditions in critical care.

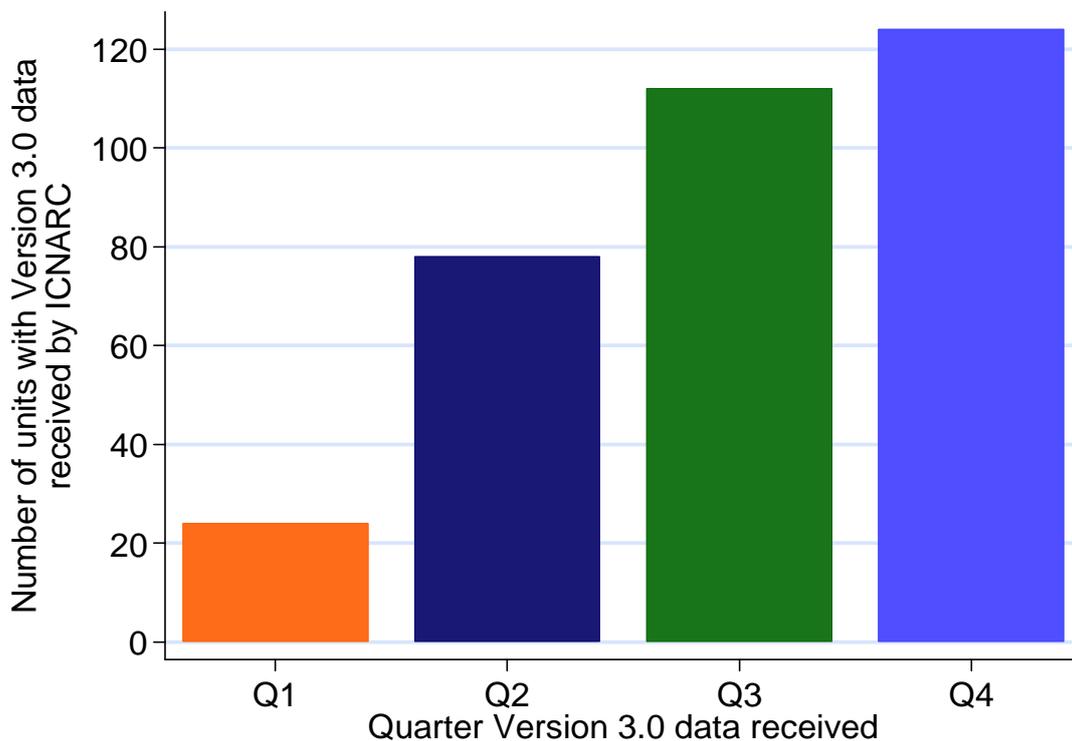
The primary reason for admission is assessed and recorded at admission to and during the first 24 hours in the critical care unit. It is deemed to be the most important underlying condition or reason for admission to the critical care unit and should describe what is happening to the admission that precluded management on the hospital ward. Each reason for admission should contain a minimum of three levels in the hierarchical structure.

Raw data, rather than derived variables (e.g. date of birth rather than age in years etc.), are collected for all variables, where possible. Data are collected for each admission and readmissions are linked.

Version 3.0 of the ICNARC Case Mix Programme Dataset Specification, incorporating the obstetric-related fields, was initially released to all CMP software developers in February 2006. Following export and process-flow compliance testing with ICNARC, the software was subsequently released to participating units permitting transition from Version 2.0 to Version 3.0 data collection. The timing of transition of units to Version 3.0 during 2007 is shown in Figure 3 (Q1 – January to March, Q2 – April to June, etc.).

Figure 3

Timing of transition of units to Version 3.0 in 2007



4 Obstetric-related fields in Version 3.0 of the Case Mix Programme dataset

For all female admissions to a unit participating in the CMP, data are collected as to whether the woman is reported as “currently pregnant”, “recently pregnant” (within 42 days of admission to the critical care unit) or neither of these.

For female admissions that are reported as “currently pregnant”, either the gestation or the expected date of delivery is requested.

For female admissions that are reported as “recently pregnant”, the following fields are requested:

- assisted conception used for recent pregnancy;
- gestation at delivery of recent pregnancy;
- actual date of delivery of recent pregnancy;
- molar pregnancy associated with recent pregnancy;
- number of live births (babies) or stillbirths from previous pregnancies;
- number of previous Caesarean sections excluding most recent pregnancy;
- outcome of recent pregnancy;
- number of live births (babies) from recent pregnancy;
- number of stillbirths from recent pregnancy;
- number of babies in NICU following recent pregnancy; and
- hysterectomy at/since delivery of recent pregnancy.

Flow diagrams and full definitions for the obstetric-related fields in the CMP Dataset are included in Appendix 1.

5 Results

Between 1 January and 31 December 2007, 38,461 admissions to 107 adult general critical care units were recorded using Version 3.0 of the CMP Dataset and were included in this descriptive analysis of obstetric-related admissions. Of 16,793 female admissions, 4,490 (26.7%) were aged between 16 and 50 years (deemed to be of child-bearing age). Of female admissions aged 16-50 years, 95 (2.1%) were reported as “currently pregnant” and 418 (9.3%) reported as “recently pregnant” (Figure 4). [Note: Two further admissions, less than 16 years, were reported as “currently pregnant”.]

The estimated total numbers of admissions to all adult, general critical care units in England, Wales and Northern Ireland in 2007 were obtained by calculating the rate of admissions in 2007 (number of observed admissions divided by proportion of the year for which data were collected) for each unit in the CMPD, averaging over the units, and multiplying by the total number of adult, general critical care units in England, Wales and Northern Ireland. This was assumed to be 240 units.

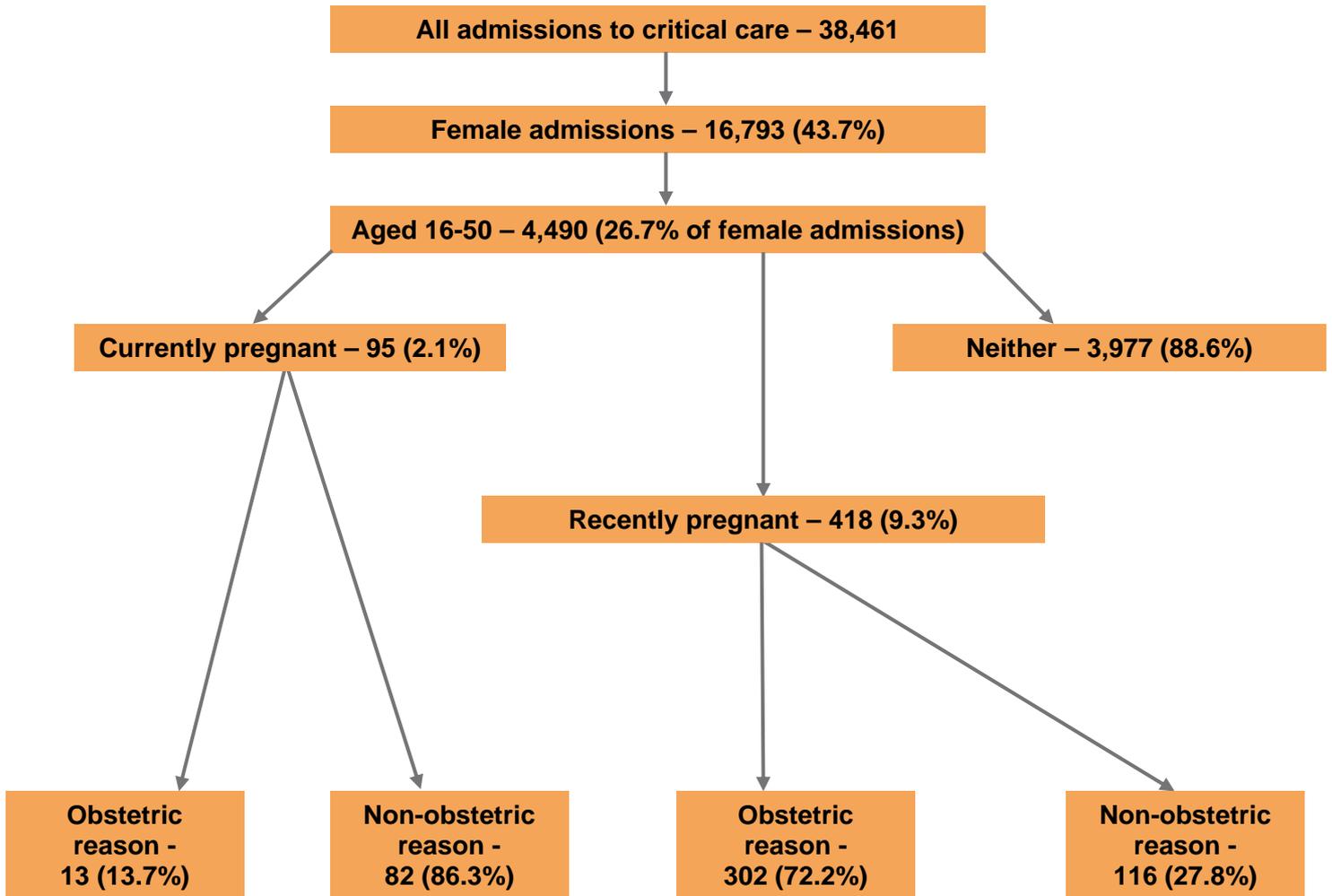
The proportion of admissions in the CMPD during 2007 that were reported as “currently pregnant” or “recently pregnant” female admissions to critical care aged 16-50 was calculated. This proportion was then applied to the estimated total number of admissions to estimate the extrapolated total number of admissions to all adult, general critical care units in England, Wales and Northern Ireland that were currently or recently pregnant women aged 16-50.

This extrapolated figure was compared with population figures obtained from the Office for National Statistics (www.ons.gov.uk) and Northern Ireland Statistics and Research Agency (www.nisra.gov.uk) of the number of women aged 16-50 years, number of live births and number of maternities (pregnancies ending in stillbirths or live births) in England, Wales and Northern Ireland

In England, Wales and Northern Ireland the extrapolated figure was estimated to represent approximately 15 currently/recently pregnant women admitted to adult, general critical care per 100,000 women aged 16-50 years, approximately 2.5 currently/ recently pregnant women admitted per 1,000 live births, or approximately 2.6 currently/recently pregnant women admitted per 1,000 maternities.

Figure 4

Flow diagram of female admissions to critical care, aged 16-50 years, reported “currently pregnant”, “recently pregnant” or neither on admission to the critical care unit



5.1 All female admissions aged 16-50 years

The following tables (Tables 1 – 4) present the primary reasons for admission for female admissions to critical care, aged 16-50 years, reported as “currently pregnant” or “recently pregnant” on admission to the critical care unit. Non-obstetric and obstetric reasons for admission are presented for each group in separate tables.

Reasons for admission were classified as either non-obstetric or obstetric based on all relevant information included in the CMPD admission record, including secondary reason for admission, gestation, time from delivery to admission to the critical care unit, location prior to admission, etc.

[Note: Recording of a primary reason for admission is compulsory for all admissions in the CMPD. Recording of a secondary reason for admission is optional. The accuracy of the classification of reasons for admission into non-obstetric and obstetric may therefore be dependent on the level of detail included in the admission record.]

The case mix, outcome and length of stay for female admissions to critical care, aged 16-50 years, are presented in Tables 5a and 5b for admissions reported as “currently pregnant”, “recently pregnant” and neither at the time of admission to the critical care unit.

The calendar days of level of care for female admissions to critical care, aged 16-50 years, by admissions reported as “currently pregnant”, “recently pregnant” and neither at the time of admission to the critical care unit are shown in Figure 5.

Sections 5.2 and 5.3 then provide results for admissions “currently pregnant” or “recently pregnant”, separately.

Table 1

Primary reason for female admissions to critical care, aged 16-50 years, reported “currently pregnant” (N=95) on admission to the critical care unit - non-obstetric

| Primary reason for admission | n (%*) |
|---|-----------|
| <i>Respiratory:</i> | 33 (34.7) |
| Pneumonia | 19 (20.0) |
| Asthma attack in new or known asthmatic | 7 (7.4) |
| Exacerbation of chronic obstructive airways disease | 1 (1.1) |
| Hanging or strangulation | 1 (1.1) |
| Lung collapse due to pneumothorax | 1 (1.1) |
| Lung collapse or atelectasis | 1 (1.1) |
| Pulmonary fibrosis or fibrosing alveolitis | 1 (1.1) |
| Pulmonary haemorrhage not defined | 1 (1.1) |
| Tuberculosis | 1 (1.1) |
| <i>Cardiovascular:</i> | 7 (7.4) |
| Pulmonary embolus (thrombus) | 2 (2.1) |
| Acute myocardial infarction | 1 (1.1) |
| Cardiogenic pulmonary oedema | 1 (1.1) |
| Left ventricular failure | 1 (1.1) |
| Supra-ventricular tachycardia, atrial fibrillation | 1 (1.1) |
| Traumatic rupture of thoracic aorta | 1 (1.1) |
| <i>Gastrointestinal:</i> | 11 (11.6) |
| Appendicitis or appendix abscess | 3 (3.2) |
| Acute pancreatitis | 2 (2.1) |
| Intra-peritoneal abscess (not pelvic) | 1 (1.1) |
| Oesophageal varices | 1 (1.1) |
| Small bowel adhesions | 1 (1.1) |
| Small bowel infarction due to herniation, volvulus | 1 (1.1) |
| Small bowel volvulus | 1 (1.1) |
| Tuberculous peritonitis | 1 (1.1) |
| <i>Neurological:</i> | 5 (5.3) |
| Meningitis | 2 (2.1) |
| Bacterial meningitis, not meningococcal | 1 (1.1) |
| Non-traumatic subarachnoid haemorrhage | 1 (1.1) |
| Status epilepticus or uncontrolled seizures | 1 (1.1) |
| <i>Poisoning:</i> | 3 (3.2) |
| Self poisoning with paracetamol | 2 (2.1) |
| Self poisoning with narcotics | 1 (1.1) |
| <i>Genito-urinary:</i> | 8 (8.4) |
| Pyelonephritis or pyonephrosis | 3 (3.2) |
| Acute renal failure | 2 (2.1) |
| Cystitis, pyocystis or urethritis | 1 (1.1) |
| Pelvic infection or abscess (Gynaecological) | 1 (1.1) |
| Ureteric or renal obstruction | 1 (1.1) |

| Primary reason for admission | n (%*) |
|---|---------------|
| <i>Endocrine, metabolic and thermoregulation:</i> | 8 (8.4) |
| Diabetic ketoacidosis | 3 (3.2) |
| Alcohol withdrawal seizures | 1 (1.1) |
| Inborn errors of metabolism | 1 (1.1) |
| Lactic acidosis | 1 (1.1) |
| Thyroid crisis | 1 (1.1) |
| Water depletion | 1 (1.1) |
| <i>Haematological:</i> | 2 (2.1) |
| Sickle cell disease | 2 (2.1) |
| <i>Incomplete codes:</i> | 5 (5.3) |

*Calculated as a percentage of female admissions to critical care, aged 16-50 years, reported "currently pregnant" on admission to the critical care unit

Table 2

Primary reason for female admissions to critical care, aged 16-50 years, reported “currently pregnant” (N=95) on admission to the critical care unit – obstetric

| Primary reason for admission | n (%*) |
|--|---------------|
| <i>Cardiovascular:</i> | 2 (2.1) |
| Pre-eclampsia | 2 (2.1) |
| <i>Genito-urinary:</i> | 10 (10.5) |
| Ectopic pregnancy | 5 (5.3) |
| Amnionitis | 2 (2.1) |
| Antepartum haemorrhage | 1 (1.1) |
| Eclampsia | 1 (1.1) |
| Septic abortion | 1 (1.1) |
| <i>Endocrine, metabolic, thermoregulation and poisoning:</i> | 1 (1.1) |
| Ovarian hyperstimulation | 1 (1.1) |

*Calculated as a percentage of female admissions to critical care, aged 16-50 years, reported “currently pregnant” on admission to the critical care unit

Table 3

Primary reason for female admissions to critical care, aged 16-50 years, reported “recently pregnant” (N=418) on admission to the critical care unit - non-obstetric

| Primary reason for admission | n (%*) |
|---|----------|
| <i>Respiratory:</i> | 33 (7.9) |
| Pneumonia | 15 (3.6) |
| Non-cardiogenic pulmonary oedema (ARDS) | 7 (1.7) |
| Lung collapse or atelectasis | 2 (0.5) |
| Angio-neurotic oedema due to drug or treatment reaction | 1 (0.2) |
| Empyema or infected effusion | 1 (0.2) |
| Extrinsic compression of airway by abscess | 1 (0.2) |
| Laryngeal trauma or perforation | 1 (0.2) |
| Oedema due to venous obstruction | 1 (0.2) |
| Pleural effusion | 1 (0.2) |
| Pneumonitis due to food and vomit | 1 (0.2) |
| Ruptured diaphragm | 1 (0.2) |
| Traumatic pneumothorax | 1 (0.2) |
| <i>Cardiovascular:</i> | 21 (5.0) |
| Pulmonary embolus (thrombus) | 4 (1.0) |
| Anaphylaxis | 3 (0.7) |
| Abnormality of aortic valve | 2 (0.5) |
| Supra-ventricular tachycardia, atrial fibrillation or flutter | 2 (0.5) |
| Accelerated or malignant hypertension | 1 (0.2) |
| Acute myocardial infarction | 1 (0.2) |
| Atrial septal defect | 1 (0.2) |
| Cardiogenic pulmonary oedema | 1 (0.2) |
| Essential hypertension | 1 (0.2) |
| Heart block | 1 (0.2) |
| Infective pericarditis | 1 (0.2) |
| Lower limb embolus | 1 (0.2) |
| Other cardiomyopathies | 1 (0.2) |
| Ventricular tachycardia or fibrillation | 1 (0.2) |
| <i>Gastrointestinal:</i> | 17 (4.1) |
| Non-traumatic large bowel perforation or rupture | 2 (0.5) |
| Retroperitoneal abscess or infection | 2 (0.5) |
| Acute pancreatitis | 1 (0.2) |
| Biliary tree obstruction | 1 (0.2) |
| Bleeding from the biliary tree | 1 (0.2) |
| Drug induced hepatitis or hepatic necrosis | 1 (0.2) |
| Gastric perforation due to ulcers | 1 (0.2) |
| Infective pancreatitis | 1 (0.2) |
| Instrumental damage to small bowel | 1 (0.2) |
| Large bowel tumour | 1 (0.2) |
| Leaking large bowel anastomosis | 1 (0.2) |
| Non-accidental injury to large bowel, rectum or anus | 1 (0.2) |
| Non-traumatic small bowel perforation | 1 (0.2) |

| Primary reason for admission | n (%*) |
|--|-----------------|
| Small bowel herniation | 1 (0.2) |
| Traumatic large bowel perforation or rupture | 1 (0.2) |
| <i>Neurological:</i> | 21 (5.0) |
| Status epilepticus or uncontrolled seizures | 11 (2.6) |
| Thrombo-occlusive disease of brain | 2 (0.5) |
| Bacterial meningitis, not meningococcal | 1 (0.2) |
| Epidural injection or infusion | 1 (0.2) |
| Intracerebral haemorrhage | 1 (0.2) |
| Intracranial injury, unspecified | 1 (0.2) |
| Meningitis, unspecified | 1 (0.2) |
| Metabolic coma or encephalopathy | 1 (0.2) |
| Post-anaesthetic encephalopathy aetiology uncertain | 1 (0.2) |
| Pseudocholinesterase deficiency | 1 (0.2) |
| <i>Poisoning:</i> | 1 (0.2) |
| Self poisoning with paracetamol | 1 (0.2) |
| <i>Genito-urinary:</i> | 4 (1.0) |
| Acute renal failure | 1 (0.2) |
| Cystitis, pyocystis or urethritis | 1 (0.2) |
| Pyelonephritis or pyonephrosis | 1 (0.2) |
| Toxic shock syndrome | 1 (0.2) |
| <i>Endocrine, metabolic and thermoregulation:</i> | 8 (1.9) |
| Diabetic ketoacidosis | 3 (0.7) |
| Diabetes mellitus | 2 (0.5) |
| Failure of reversal of non-depolarising neuromuscular blockers | 1 (0.2) |
| Lactic acidosis | 1 (0.2) |
| Phaeochromocytoma | 1 (0.2) |
| <i>Haematological:</i> | 2 (0.5) |
| Acute myeloblastic leukaemia | 1 (0.2) |
| Disseminated intravascular coagulation | 1 (0.2) |
| <i>Musculoskeletal:</i> | 1 (0.2) |
| Pelvic fracture | 1 (0.2) |
| <i>Dermatological:</i> | 5 (1.2) |
| Necrotising fasciitis | 3 (0.7) |
| Cutaneous cellulitis | 2 (0.5) |
| <i>Incomplete codes:</i> | 3 (0.7) |

*Calculated as a percentage of female admissions to critical care, aged 16-50 years, reported "recently pregnant" on admission to the critical care unit

Table 4

Primary reason for female admissions to critical care, aged 16-50 years, reported “recently pregnant” (N=418) on admission to the critical care unit – obstetric

| Primary reason for admission | n (%*) |
|--|---------------|
| <i>Respiratory:</i> | 2 (0.5) |
| Pneumonia | 2 (0.5) |
| <i>Cardiovascular:</i> | 15 (3.6) |
| Hypovolaemic shock | 9 (2.2) |
| Cardiogenic pulmonary oedema | 3 (0.7) |
| Bi-ventricular failure | 1 (0.2) |
| Essential hypertension | 1 (0.2) |
| Septic shock (no underlying condition given) | 1 (0.2) |
| <i>Gastrointestinal:</i> | 3 (0.7) |
| Acute fatty liver of pregnancy | 2 (0.5) |
| Appendicitis or appendix abscess | 1 (0.2) |
| <i>Neurological:</i> | 11 (2.6) |
| Eclampsia | 6 (1.4) |
| Intracerebral haemorrhage | 3 (0.7) |
| Degenerative coma or encephalopathy | 1 (0.2) |
| Myasthenia gravis | 1 (0.2) |
| <i>Genito-urinary:</i> | 269 (64.4) |
| Peri- and postpartum haemorrhage | 143 (34.2) |
| Pre-eclampsia | 29 (7.0) |
| Ectopic pregnancy | 18 (4.3) |
| HELLP syndrome | 10 (2.4) |
| Uterine rupture or perforation | 10 (2.4) |
| Infected retained products of conception | 8 (1.9) |
| Antepartum haemorrhage | 7 (1.7) |
| Haemorrhage post termination | 7 (1.7) |
| Normal pregnancy (reason for admission not given) | 7 (1.7) |
| Pelvic infection or abscess | 7 (1.7) |
| Amnionitis | 5 (1.2) |
| Haemorrhage from uterus | 5 (1.2) |
| Instrumental damage to uterus, ovaries or fallopian tubes | 3 (0.7) |
| Intrauterine death | 3 (0.7) |
| Amniotic fluid embolus | 2 (0.5) |
| Uterine cavity infection | 2 (0.5) |
| Haemorrhage from ovary or fallopian tubes | 1 (0.2) |
| Septic abortion | 1 (0.2) |
| Total abdominal hysterectomy following intrauterine death (Ashermans syndrome) | 1 (0.2) |

| Primary reason for admission | n (%*) |
|-------------------------------|---------|
| <i>Musculoskeletal:</i> | 2 (0.5) |
| Congenital muscular dystrophy | 1 (0.2) |
| Kyphoscoliosis | 1 (0.2) |

*Calculated as a percentage of female admissions to critical care, aged 16-50 years, reported "recently pregnant" on admission to the critical care unit

Table 5a

Comparison of the case mix and source of admission for female admissions to critical care, aged 16-50 years, reported either “currently pregnant”, “recently pregnant” or neither on admission to the critical care unit (see: Appendix 2 for definitions)

| Female admissions aged 16-50 years | | Currently pregnant | Recently pregnant | Neither |
|--|-------------------------------------|--------------------|-------------------|--------------|
| N | | 95 | 418 | 3,977 |
| Age (years), mean (SD) | | 29.2 (6.4) | 30.9 (6.3) | 36.2 (9.7) |
| ICNARC physiology score, mean (SD) | | 13.1 (7.6) | 11.6 (6.2) | 15.6 (9.1) |
| APACHE II score*, mean (SD) | | 12.0 (5.0) | 10.4 (5.3) | 13.3 (7.1) |
| Surgical status, n (%) | Non-surgical | 77 (81.1) | 180 (43.1) | 2,846 (71.6) |
| | Elective | 3 (3.2) | 32 (7.7) | 653 (16.4) |
| | Emergency | 15 (15.8) | 206 (49.3) | 478 (12.0) |
| Last non-transient location prior to admission to critical care, n (%) | Ward | 46 (48.4) | 161 (38.5) | 2,072 (52.1) |
| | Obstetrics area | 19 (20.0) | 199 (47.6) | 0 (0.0) |
| | Other intermediate care area | 4 (4.2) | 11 (2.6) | 153 (3.9) |
| | Paediatric/neonatal ICU/HDU | 0 (0.0) | 0 (0.0) | 7 (0.2) |
| | Level 3 bed in adult ICU or ICU/HDU | 1 (1.1) | 3 (0.7) | 94 (2.4) |
| | Level 2 bed in adult ICU or ICU/HDU | 0 (0.0) | 2 (0.5) | 56 (1.4) |
| | Adult HDU | 0 (0.0) | 0 (0.0) | 92 (2.3) |
| | Not in hospital | 25 (26.3) | 42 (10.1) | 1,503 (37.8) |

* The performance of the APACHE II model has previously been assessed in obstetric admission in the CMPD¹. The APACHE II score was found to have good discrimination, but the risk predictions overestimated mortality.

Table 5b

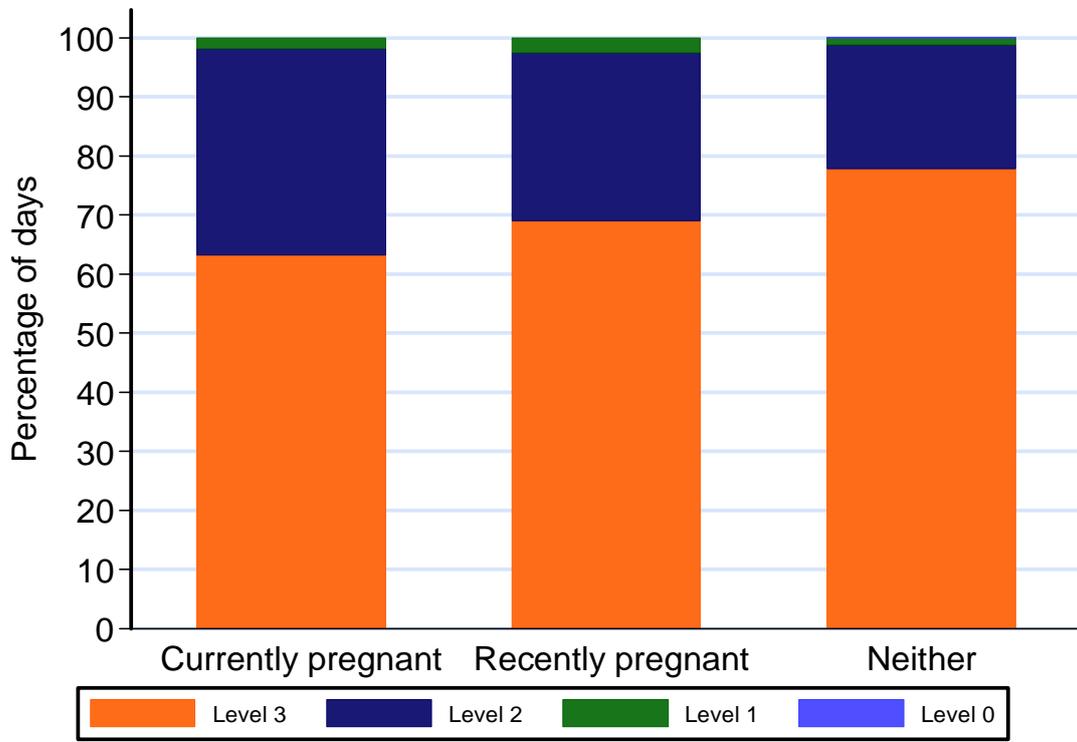
Comparison of the outcome, destination and length of stay for female admissions to critical care, aged 16-50 years, reported either “currently pregnant”, “recently pregnant” or neither on admission to the critical care unit (see: Appendix 2 for definitions)

| Female admissions aged 16-50 years | | Currently pregnant | Recently pregnant | Neither |
|--|-------------------------------------|---------------------------------|---------------------------------|----------------------------------|
| N | | 95 | 418 | 3,977 |
| Critical care unit mortality, deaths (%) [95% CI of %] | | 3 (3.2) [0.7 – 9.0] | 7 (1.7) [0.7 – 3.4] | 439 (11.0) [10.1 – 12.1] |
| Destination following discharge from critical care, n (%) | Ward | 65 (70.7) | 214 (52.1) | 2,779 (78.6) |
| | Obstetrics area | 16 (17.4) | 161 (39.2) | 0 (0.0) |
| | Other intermediate care area | 3 (3.3) | 5 (1.2) | 83 (2.4) |
| | Recovery only | 0 (0.0) | 3 (0.7) | 9 (0.3) |
| | Paediatric/neonatal ICU/HDU | 0 (0.0) | 0 (0.0) | 9 (0.3) |
| | Level 3 bed in adult ICU or ICU/HDU | 1 (1.1) | 5 (1.2) | 142 (4.0) |
| | Level 2 bed in adult ICU or ICU/HDU | 1 (1.1) | 6 (1.5) | 115 (3.3) |
| | Adult HDU | 2 (2.2) | 12 (2.9) | 211 (6.0) |
| | Not in hospital | 4 (4.4) | 5 (1.2) | 190 (5.4) |
| Acute hospital mortality†, deaths (%) [95% CI of %] | | 3 (3.2) [0.7 – 9.0] | 7 (1.7) [0.7 – 3.5] | 561 (14.9) [13.8 – 16.0] |
| Readmissions within the same acute hospital stay, n (%) | | 0 (0.0) | 7 (1.8) | 154 (5.0) |
| Critical care unit length of stay (days), median (IQR) [min – max] | All | 1.9 (0.9 – 3.7) [0.1 – 43.6] | 1.1 (0.7 – 2.1) [0.1 – 51.9] | 1.8 (0.9 – 4.1) [0.0 – 103.2] |
| | Unit survivors | 2.0 (0.9 – 3.8) [0.1 – 43.6] | 1.1 (0.7 – 2.1) [0.1 – 51.9] | 1.8 (0.9 – 4.0) [0.0 – 103.2] |
| | Unit non-survivors | 1.0 (0.4 – 1.2) [0.4 – 1.2] | 1.5 (1.0 – 3.8) [0.4 – 7.5] | 1.8 (0.6 – 4.6) [0.0 – 77.2] |
| Total acute hospital length of stay (days)†, median (IQR) [min – max] | All | 8 (5 – 14) [1 – 96] | 8 (5 – 12) [0 – 371] | 11 (5 – 24) [0 – 429] |
| | Hospital survivors | 8 (5 – 15) [2 – 96] | 8 (5 – 12) [0 – 371] | 11 (5 – 25) [0 – 411] |
| | Hospital non-survivors | 2 (1 – 6) [1 – 6] | 3 (2 – 8) [1 – 8] | 6 (2 – 17) [0 – 429] |

† Excluding readmissions within the same acute hospital stay and admissions missing acute hospital outcome (0 currently pregnant, 7 recently pregnant, 154 neither currently nor recently pregnant)

Figure 5

Calendar days (00:00 to 23:59) of care, by Level of care, for female admissions to critical care, aged 16-50 years, reported either “currently pregnant”, “recently pregnant” or neither on admission to the critical care unit (see: Appendix 2 for definitions)



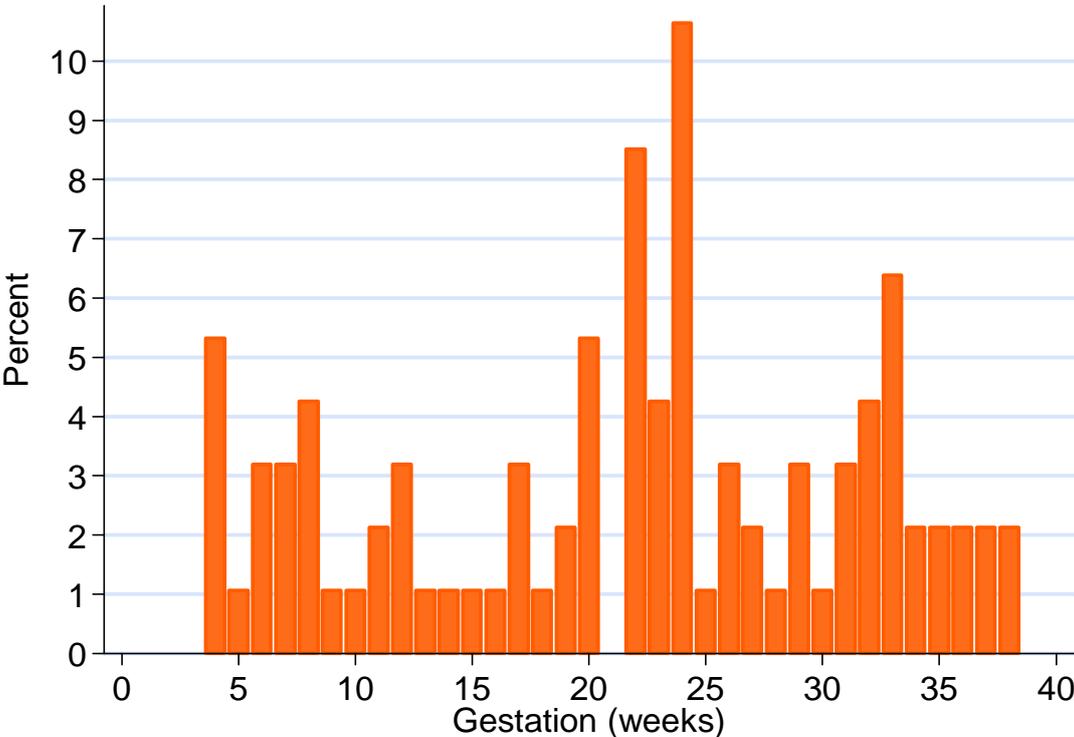
5.2 Currently pregnant

Female admissions to critical care, aged 16-50 years, reported as “currently pregnant” on admission consumed 0.5% of total unit bed-days and 2.0% of unit bed-days for female admissions aged 16-50 years.

Mean gestation at admission to critical care was 21.6 weeks (SD 9.9 weeks). Median gestation was 23 weeks (IQR 13 – 30 weeks) and ranged from 4 to 38 weeks. The distribution of gestation by week is shown in Figure 6 and the distribution of gestation by trimester is shown in Figure 7. The distribution of gestation by trimester and obstetric or non-obstetric primary reason for admission is presented in Figure 8.

Figure 6

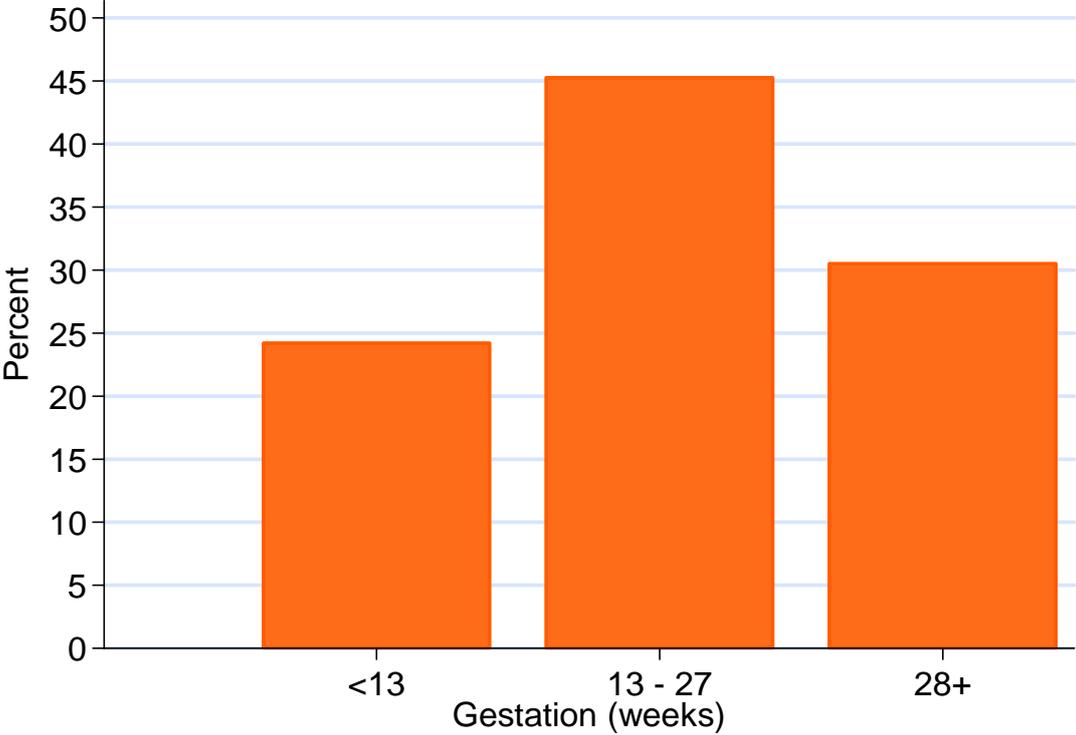
Gestation* (in weeks) for female admissions to critical care, aged 16-50 years, reported “currently pregnant” on admission to the critical care unit



* Expected date of delivery was used to calculate gestation, where gestation was not available

Figure 7

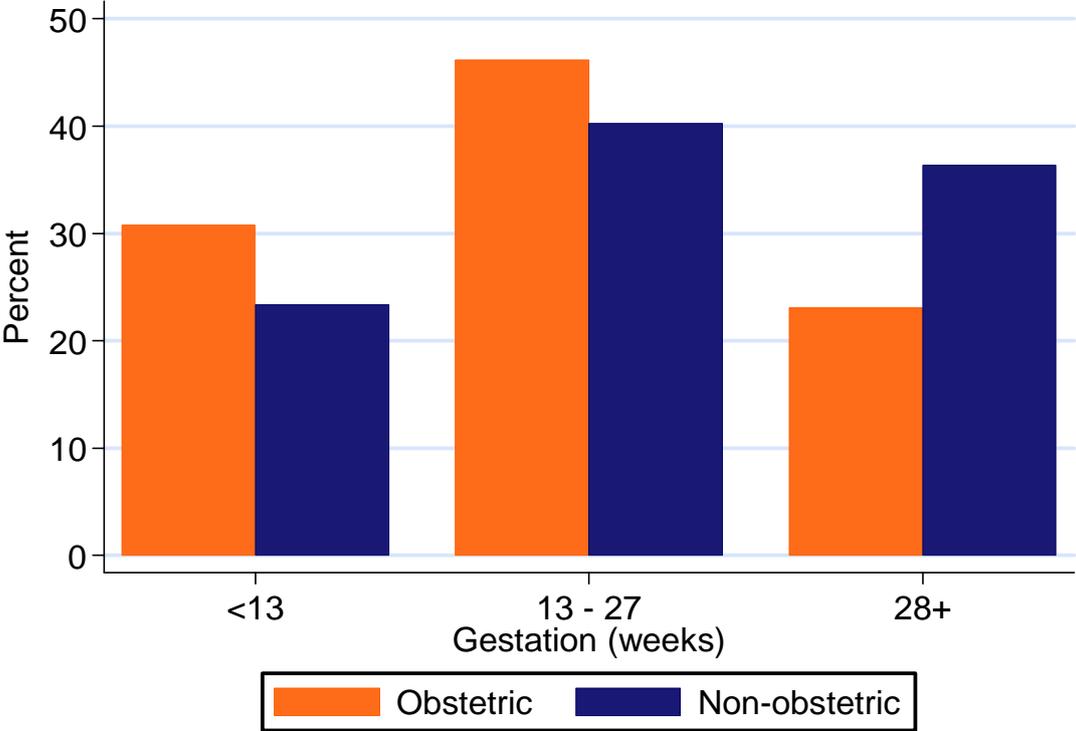
Gestation* (in trimesters) for female admissions to critical care, aged 16-50 years, reported “currently pregnant” on admission to the critical care unit



* Expected date of delivery was used to calculate gestation, where gestation was not available

Figure 8

Gestation* (in trimesters) for female admissions to critical care, aged 16-50 years, reported “currently pregnant” on admission to the critical care unit by obstetric or non-obstetric primary reason for admission



* Expected date of delivery was used to calculate gestation, where gestation was not available

5.3 Recently pregnant

Female admissions to critical care, aged 16-50 years, reported as “recently pregnant” consumed 1.2% of total unit bed-days and 5.1% of unit bed-days for female admissions aged 16-50 years.

Of all female admissions reported as “recently pregnant”, 23 (5.5%) did not have a gestation at delivery of recent pregnancy recorded. Mean gestation at end of pregnancy was 33.7 weeks (SD 9.7 weeks). Median gestation was 38 weeks (IQR 32 – 40 weeks) and ranged from 3 to 43 weeks.

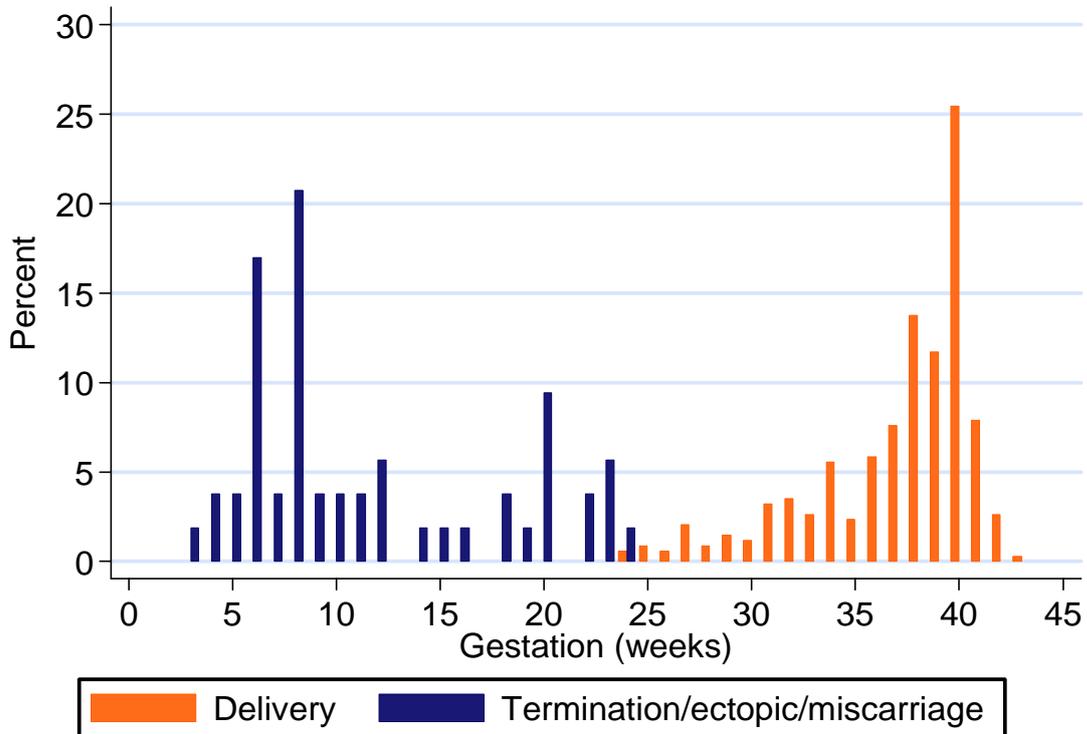
For admissions where outcome of the recent pregnancy was either Caesarean section or vaginal birth (spontaneous or assisted) that either resulted in a live birth or a stillbirth of gestation 24 weeks or more, mean gestation was 37.1 weeks (SD 3.9 weeks). Median gestation for these admissions was 38 weeks (IQR 36 – 40 weeks) and ranged from 24 to 43 weeks.

For admissions where outcome of the recent pregnancy was termination, ectopic pregnancy or miscarriage (stillbirth with gestation less than 24 weeks), mean gestation was 11.5 weeks (SD 6.3 weeks). Median gestation for these admissions was 8 weeks (IQR 6 – 18 weeks) and ranged from 3 to 24 weeks.

The distribution of gestation by week and by outcome of recent pregnancy is shown in Figure 9 and the distribution of the gestation by trimester and by outcome of recent pregnancy is shown in Figure 10.

Figure 9

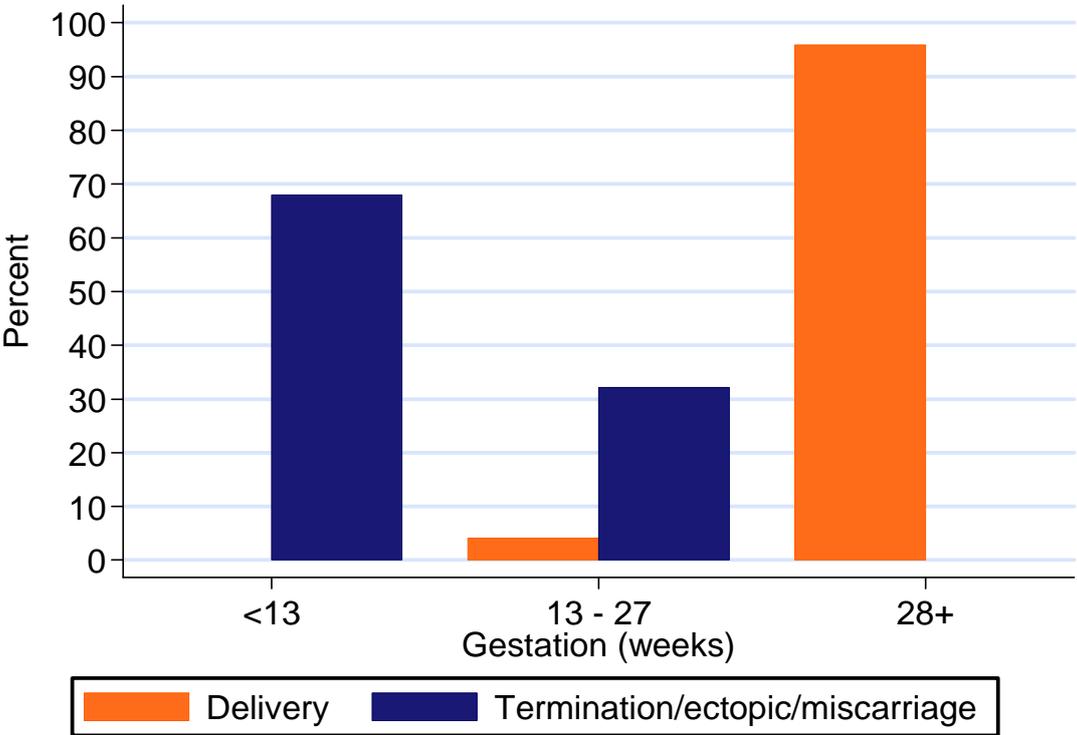
Gestation (in weeks) by outcome of recent pregnancy* for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



* Delivery = outcome of the recent pregnancy was either Caesarean section or vaginal birth (spontaneous or assisted) that resulted in a live birth or stillbirth at a gestation of 24 weeks or more

Figure 10

Gestation (in trimesters) by outcome of recent pregnancy* for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



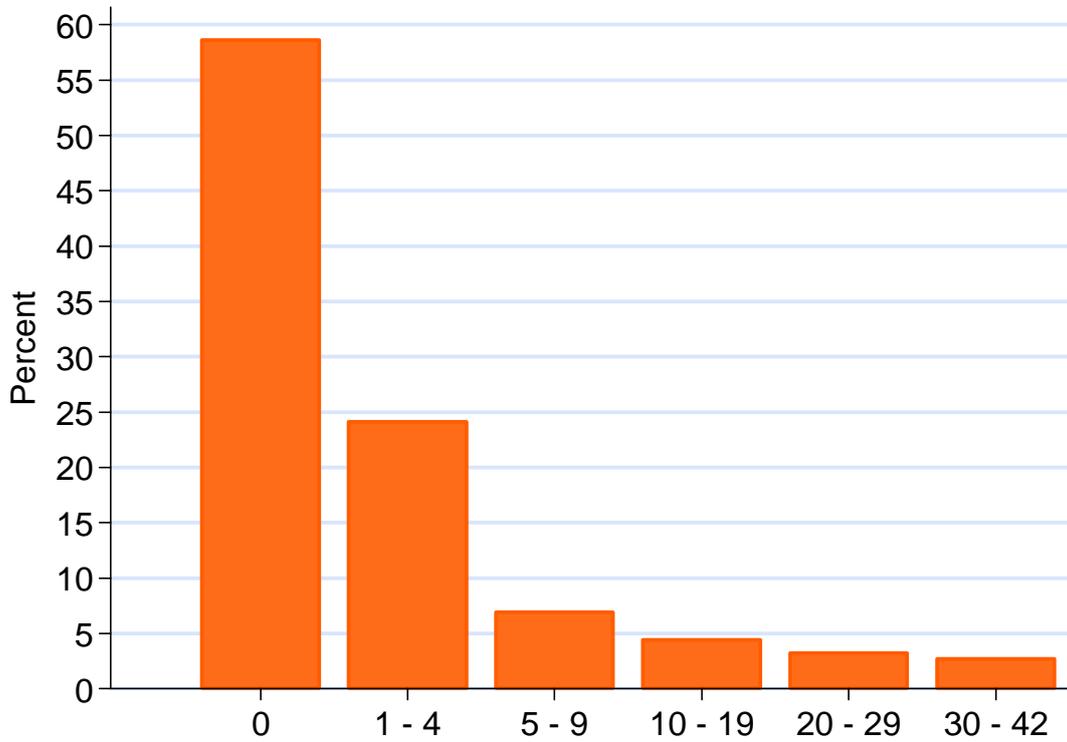
* Delivery = outcome of the recent pregnancy was either Caesarean section or vaginal birth (spontaneous or assisted) that resulted in a live birth or stillbirth at a gestation of 24 weeks or more

Mean duration from end of recent pregnancy to admission to critical care for female admissions aged 16-50 years was 3.2 days (SD 7.3 days). Median duration was 0 days (IQR 0 – 1 days) and ranged from 0 to 40 days. The distribution of the number of days from the end of recent pregnancy to admission to critical care is shown in Figure 11.

The outcome (delivery) of recent pregnancy is shown in Figure 12.

Figure 11

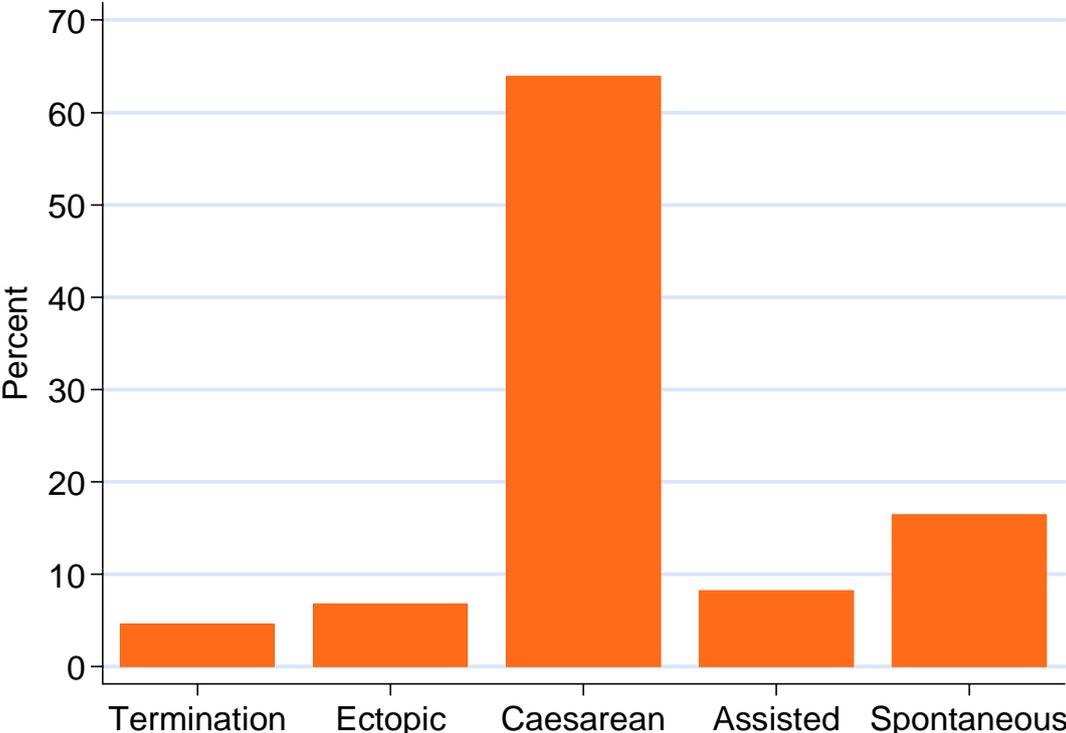
Number of days from end of recent pregnancy to admission for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



Excluding 12 (2.9%) recently pregnant female admissions that were missing the actual date of delivery of recent pregnancy.

Figure 12

Outcome (delivery) of recent pregnancy for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



Excluding 5 (1.2%) recently pregnant female admissions that were missing the outcome of the recent pregnancy.

There were 19 recently pregnant female admissions aged 16-50 that had a termination as the outcome of their pregnancy. Their mean gestation was 11.5 weeks (SD 5.9 weeks) and ranged from 5 to 24 weeks. The gestation, source of admission and time from termination to admission to the critical care unit are presented in Table 6.

Table 6

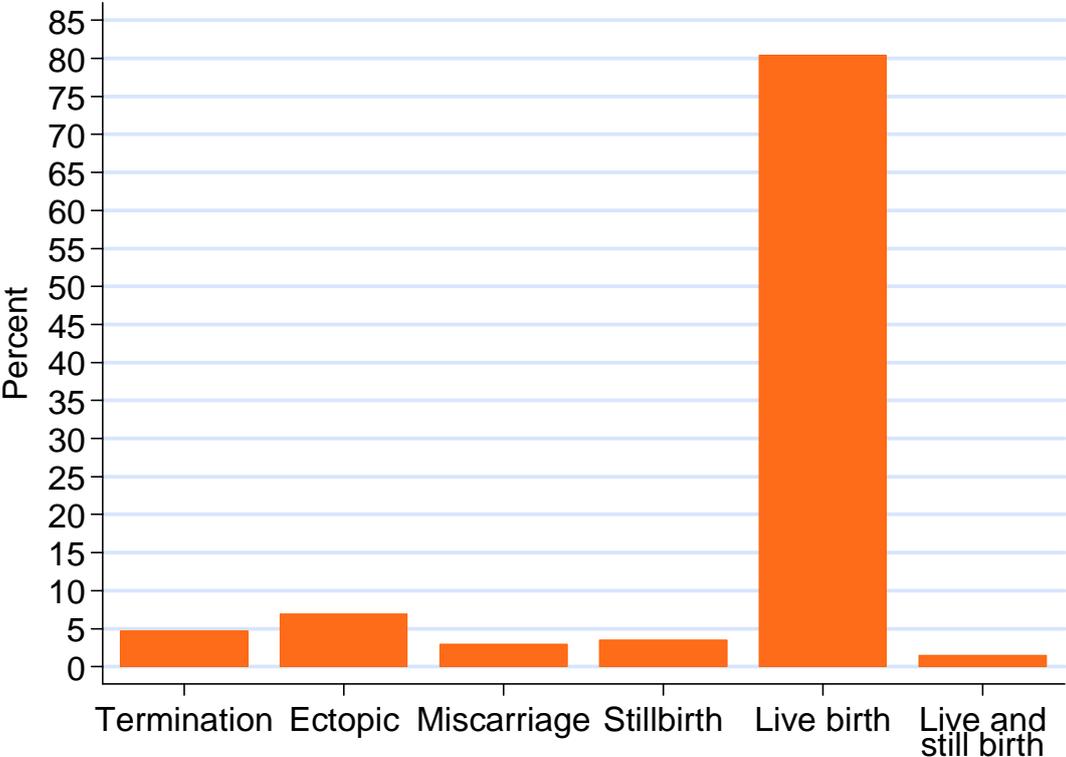
Complications following or reason for admission for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit that had a termination as the outcome of their pregnancy

| Gestation | Source of admission | Time from termination to admission to the unit (days) | Primary reason for admission |
|--------------|--|---|--|
| 5 | Ward, same hospital | 0 | Haemorrhage post termination |
| 6 | Theatre for urgent surgery, same hospital | 9 | Haemorrhage post termination |
| 6 | Theatre for emergency surgery, same hospital | 1 | Pseudocholinesterase deficiency |
| 7 | Theatre for emergency surgery, same hospital | 26 | Haemorrhage post termination |
| 8 | Theatre for emergency surgery, same hospital | 0 | Infected retained products of conception |
| 8 | Theatre for elective surgery, same hospital | 0 | Status epilepticus or uncontrolled seizures |
| 8 | Recovery only, other non-acute hospital | 7 | Extrinsic compression of airway by abscess |
| 8 | Ward, same hospital | 8 | Self poisoning with paracetamol post termination |
| 8 | Theatre for urgent surgery, same hospital | 4 | Total abdominal hysterectomy following intrauterine death (Ashermans syndrome) |
| 9 | Theatre for emergency surgery, same hospital | 1 | Haemorrhage post termination |
| 11 | Theatre for emergency surgery, same hospital | 1 | Haemorrhage post termination |
| 14 | Theatre for emergency surgery, same hospital | 0 | Infected retained products of conception |
| 15 | Theatre for urgent surgery, same hospital | 2 | Infected retained products of conception (following intrauterine death) |
| 18 | Level 2 bed in adult ICU or ICU.HDU, same hospital | 3 | Infected retained products of conception |
| 20 | Theatre for emergency surgery, same hospital | 33 | Infected retained products of conception |
| 20 | Obstetric area, same hospital | 0 | HELLP syndrome |
| 24 | Theatre for emergency surgery, same hospital | 0 | Haemorrhage post termination (following intrauterine death) |
| Not recorded | Theatre for scheduled surgery, same hospital | 0 | Haemorrhage post termination |
| Not recorded | Theatre for emergency surgery, same hospital | 1 | Instrumental damage to uterus, ovaries or fallopian tubes |

Outcome (for fetus/baby) of recent pregnancy is shown in Figure 13. The number of live births from recent pregnancy is shown in Figure 14.

Figure 13

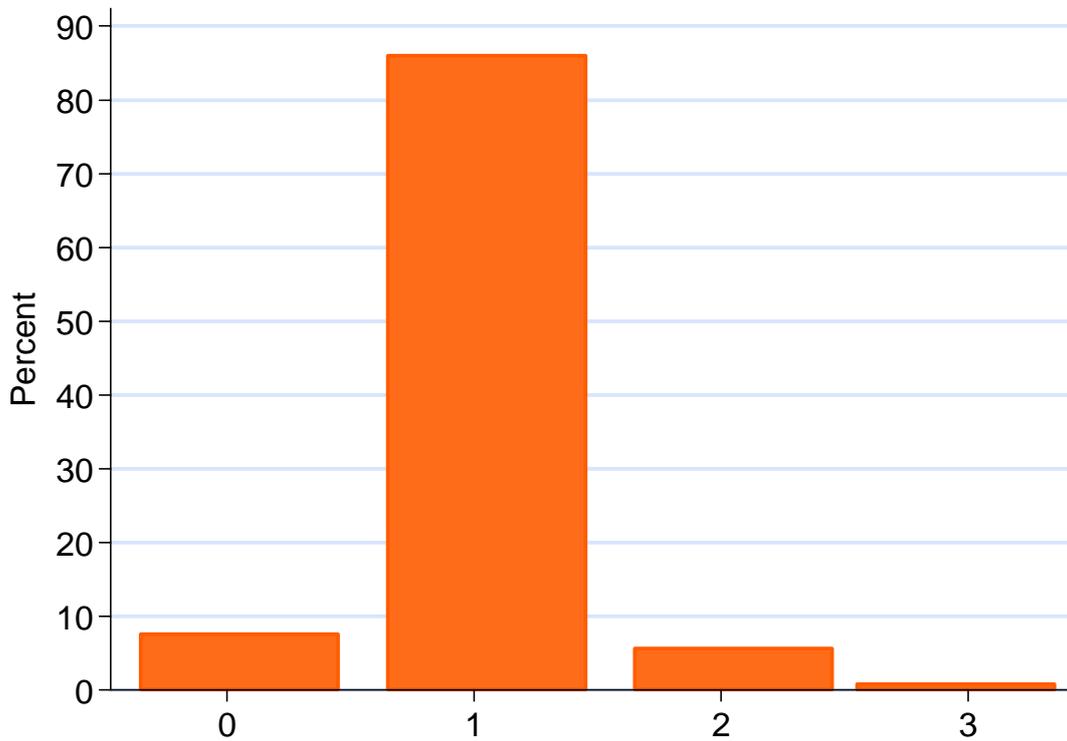
Outcome (for fetus/baby) of recent pregnancy for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



Excluding 5 (1.2%) recently pregnant female admissions that were missing the information to report the outcome of the recent pregnancy.

Figure 14

Number of live births from recent pregnancy for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



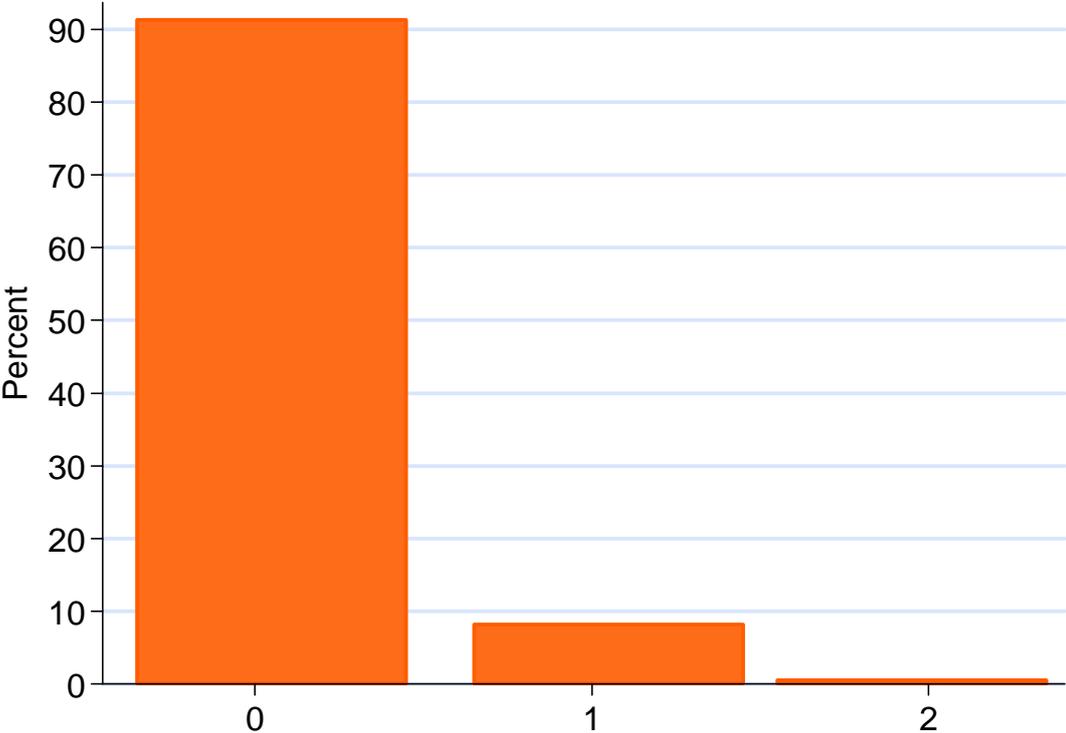
Excluding 11 (2.6%) recently pregnant female admissions that were missing the number of live births from the recent pregnancy.

The number of stillbirths from recent pregnancy is shown in Figure 15 and the number of babies in a neonatal intensive care unit (NICU) following recent pregnancy is shown in Figure 16.

The number of babies in NICU following recent pregnancy for live births only split by term (gestation 37 weeks or more) and preterm (gestation less than 37 weeks) are shown in Figure 17.

Figure 15

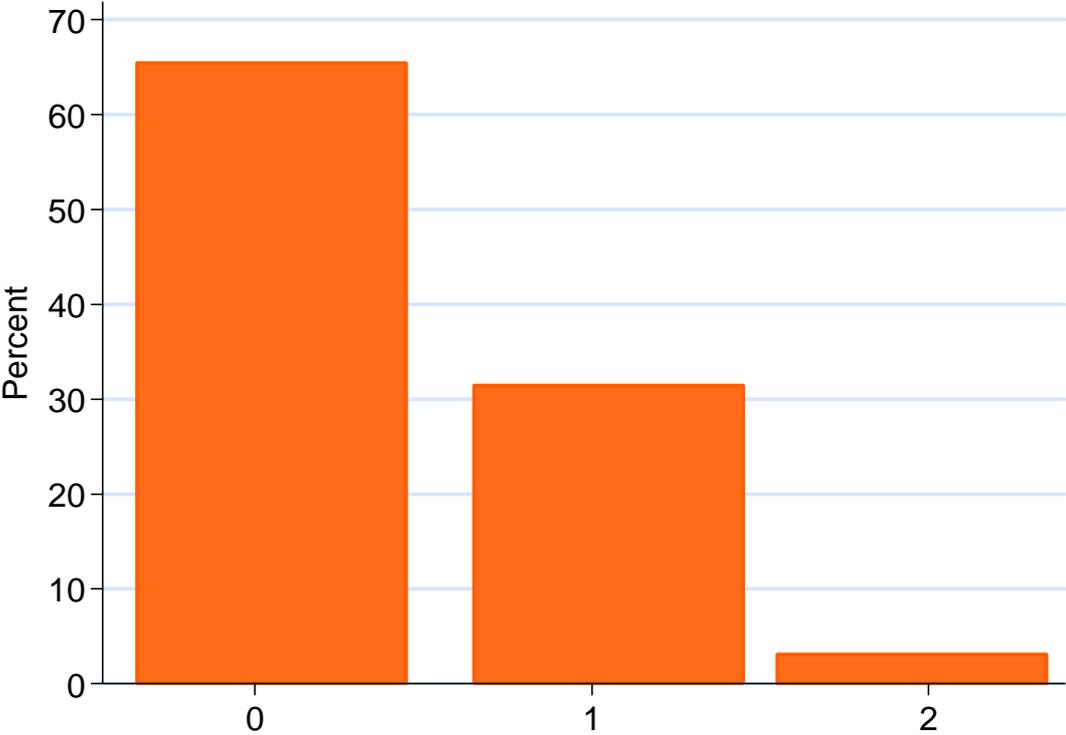
Number of stillbirths from recent pregnancy for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



Excluding 14 (3.3%) recently pregnant female admissions that were missing the number of stillbirths from recent pregnancy.

Figure 16

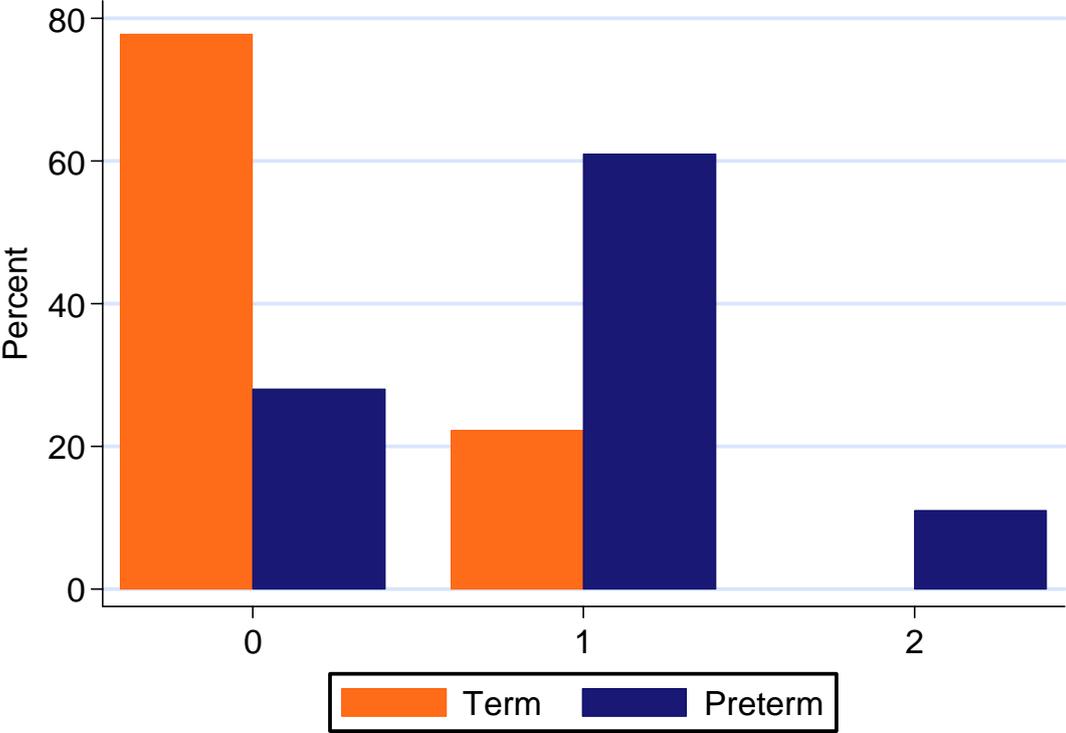
Number of babies in NICU following recent pregnancy for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



Excluding 12 (2.9%) recently pregnant female admissions that were missing the number of babies in NICU following recent pregnancy.

Figure 17

Number of babies in NICU following recent pregnancy for live births only split by term (gestation 37 weeks or more) and preterm (gestation less than 37 weeks) for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



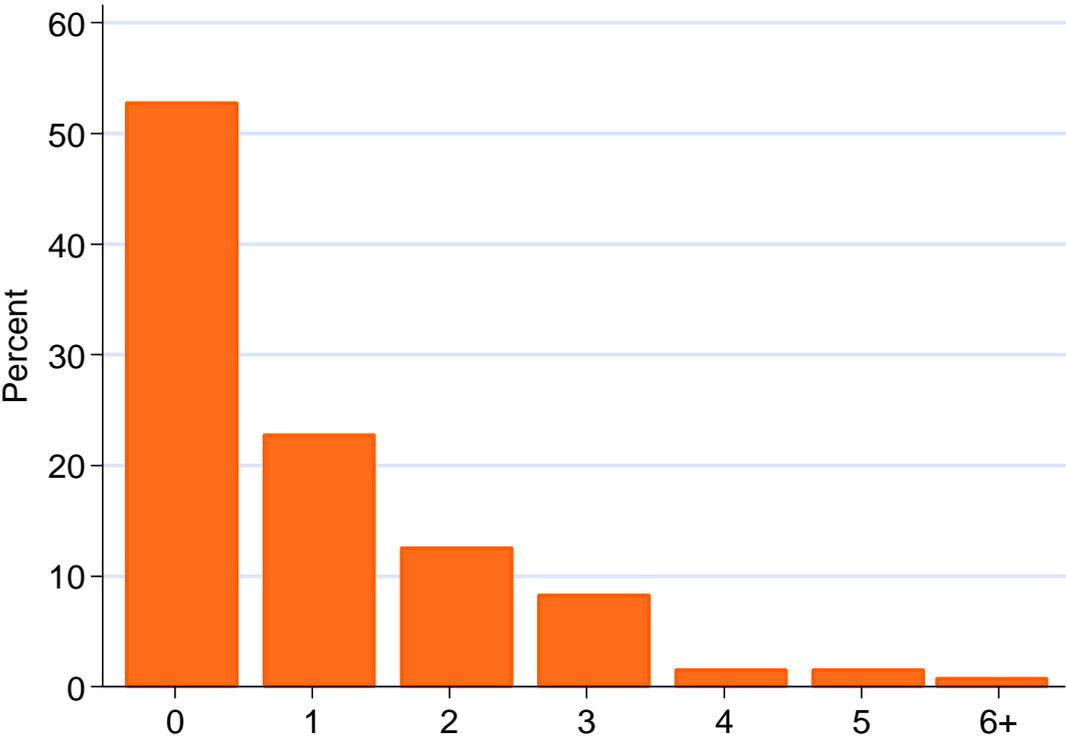
10 (2.4%) recently pregnant female admissions were missing data on molar pregnancy associated with the recent pregnancy. Of those with data, none had a molar pregnancy associated with the recent pregnancy.

5 (1.4%) recently pregnant female admissions were missing data on hysterectomy at/since delivery of recent pregnancy. Of those with data, 56 admissions (15.5%) had a hysterectomy at/since delivery of recent pregnancy.

The number of live births (babies) or stillbirths from previous pregnancies is shown in Figure 18 and the number of previous Caesarean sections (excluding most recent pregnancy) is shown in Figure 19.

Figure 18

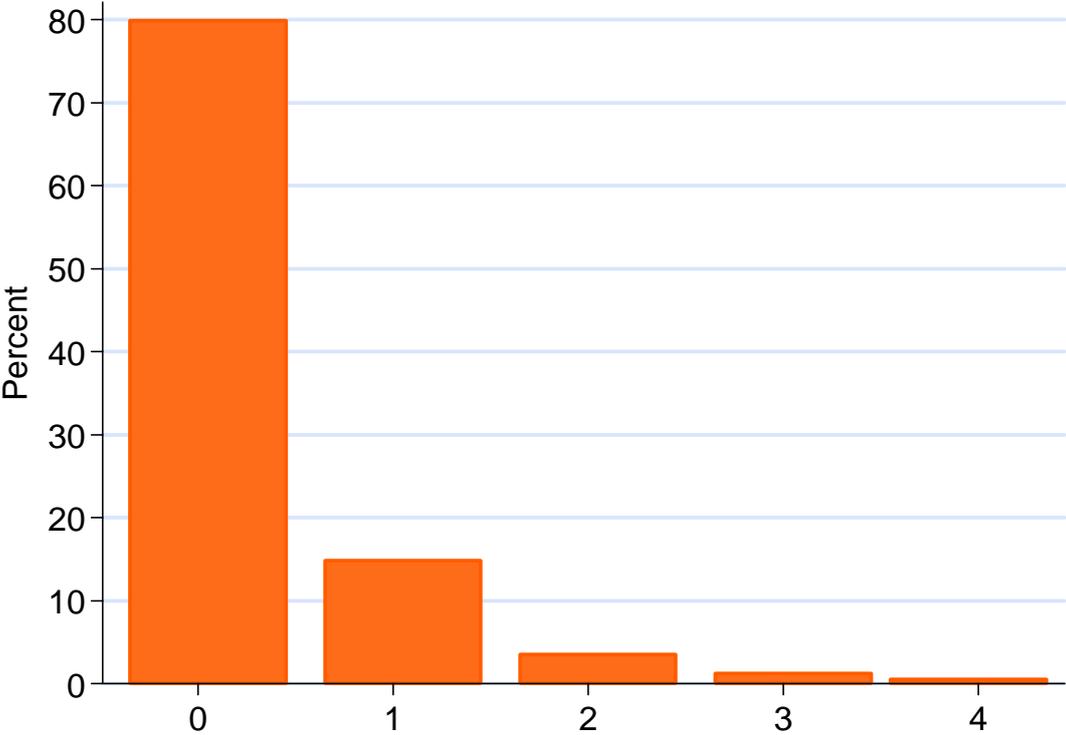
Number of live births (babies) or stillbirths from previous pregnancies for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



Excluding 18 (4.3%) recently pregnant female admissions that were missing the number of live births from previous pregnancies.

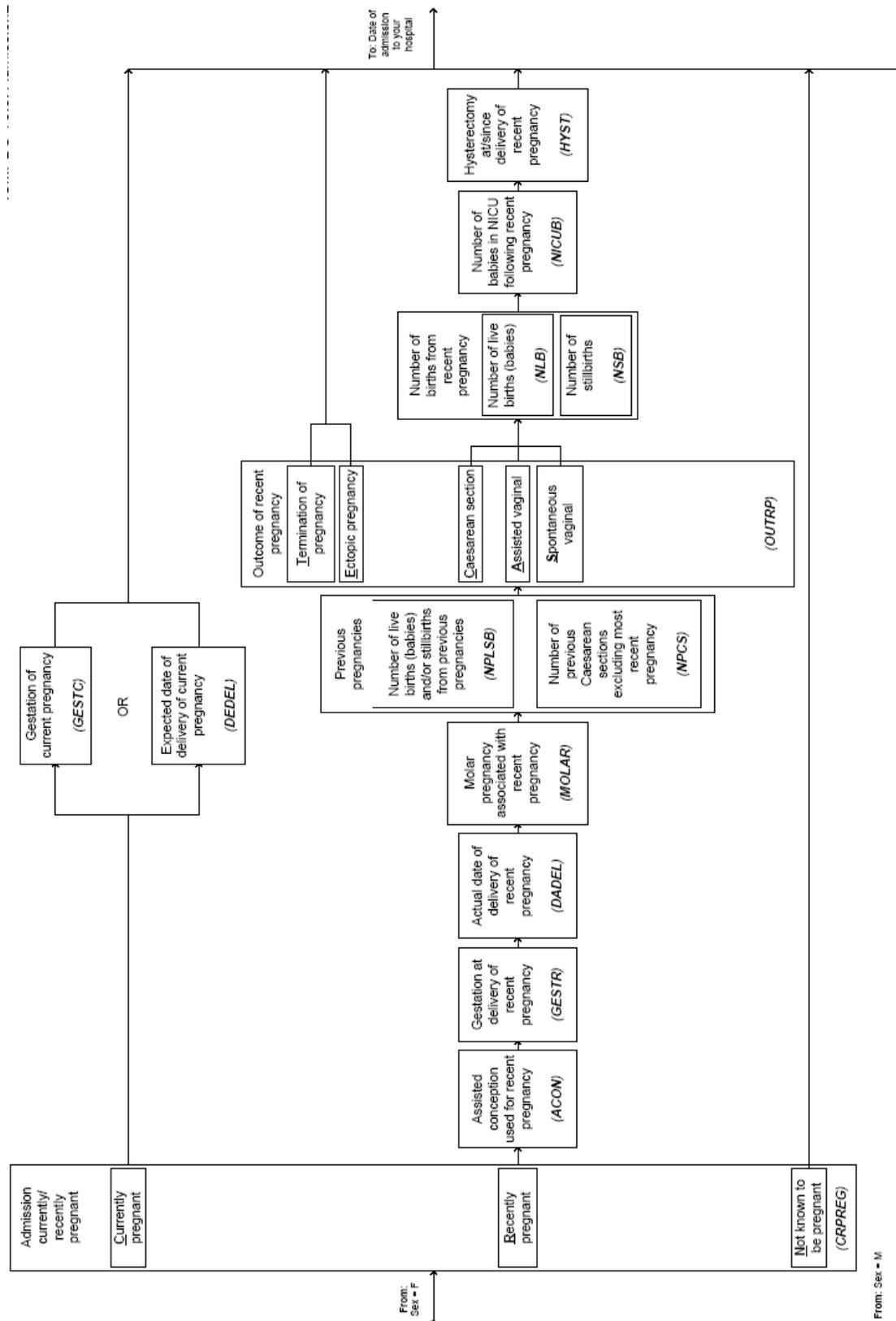
Figure 19

Number of previous Caesarean sections (excluding most recent pregnancy) for female admissions to critical care, aged 16-50 years, reported “recently pregnant” on admission to the critical care unit



Excluding 20 (4.8 %) recently pregnant female admissions that were missing the number of previous Caesarean sections.

6 Appendix 1: Flow diagrams and definitions of obstetric related fields



Admission currently/recently pregnant (CRPREG)

Field: Admission currently/recently pregnant

Number of data items: One
Options: Currently pregnant
Recently pregnant
Not known to be pregnant

Definition for collection:

- specifies whether the admission is currently or recently or not pregnant at admission to your unit
 - Currently pregnant is defined as any woman who is pregnant (including following fertility treatment or in whom a positive pregnancy test indicates woman was pregnant) at time of admission to your unit even if test done after admission
 - Recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
 - Not known to be pregnant is defined as any woman who is not pregnant or not known to be pregnant and includes any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) greater than 42 days before the date of admission to your unit (i.e. not Recently pregnant)
 - admission to your unit is defined as the physical admission and recording of that admission to a bed in your unit
-

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit.

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists..

Gestation of current pregnancy (GESTC)

Field: Gestation of current pregnancy

Number of data items: One
Units of measurement: Weeks

Definition for collection:

- specifies the duration of gestation of current pregnancy in completed weeks
 - gestation is defined as the number of weeks of pregnancy and is calculated from the last normal menstrual period
 - currently pregnant is defined as any woman who is known to be pregnant (including following fertility treatment) or in whom a pregnancy test is known to have been positive prior to or within the first 24 hours of admission to your unit
-

Justification

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Expected date of delivery of current pregnancy (DEDEL)

Field: Expected date of delivery of current pregnancy

Number of data items: One

Definition for collection:

- the expected date of delivery of current pregnancy
 - if estimated date of delivery from antenatal clinic is available, based on last normal menstrual period or sonography, use this estimate
 - if estimated date of delivery is not available from antenatal clinic, calculate from last normal menstrual period
 - currently pregnant is defined as any woman who is known to be pregnant (including following fertility treatment) or in whom a pregnancy test is known to have been positive prior to or within the first 24 hours of admission to your unit
-

Justification

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Assisted conception used for recent pregnancy (ACON)

Field: Assisted conception used for recent pregnancy

Number of data items: One
Options: Yes
No
Unknown

Definition for collection:

- specifies whether recent pregnancy was assisted
 - assisted conception is defined as treatment to assist the admission in becoming pregnant - treatment includes any form of drug/chemical or physical intervention that has assisted fertilisation or embryo implantation
 - recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
-

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit.

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Gestation at delivery of recent pregnancy (GESTR)

Field: Gestation at delivery of recent pregnancy

Number of data items: One
Units of measurement: Weeks

Definition for collection:

- specifies the duration of gestation of recent pregnancy in completed weeks
 - gestation is defined as the number of weeks of pregnancy and is calculated from the last normal menstrual period
 - recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
-

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit.

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Actual date of delivery of recent pregnancy (DADEL)

Field: Actual date of delivery of recent pregnancy

Number of data items: One

Definition for collection:

- specifies the actual date of delivery of recent pregnancy
 - recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
-

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit..

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Molar pregnancy associated with recent pregnancy (MOLAR)

Field: Molar pregnancy associated with recent pregnancy

Number of data items: One
Options: Yes
No

Definition for collection:

- molar pregnancy is defined as trophoblastic disease – any proliferative disorder of the trophoblast and includes hydatidiform mole and choriocarcinoma
 - recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
-

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit..

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Outcome of recent pregnancy (OUTRP)

Field: Outcome of recent pregnancy

Number of data items: One
Options: Termination of pregnancy
Ectopic pregnancy
Caesarean section
Assisted vaginal
Spontaneous vaginal

Definition for collection:

- record the most invasive method for multiple live births (babies) and/or when multiple outcomes exist (most to least invasive - termination of pregnancy, ectopic pregnancy, Caesarean section, assisted vaginal and spontaneous vaginal) for the recent pregnancy
- recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
- Termination of pregnancy is defined as a pregnancy ended spontaneously (miscarriage – defined as delivery of a baby up to 24 weeks which, after complete separation from its mother, shows no signs of life) or by medical treatment – medical treatments include drugs (a medical termination) or surgery (a surgical termination)
- Ectopic pregnancy is defined as laparoscopic or open surgery where the fallopian tube containing the ectopic pregnancy was injected, surgically opened (salpingotomy) or surgically removed (salpingectomy)
- Caesarean section is defined as a live birth (baby) and/or a stillbirth being delivered by means of an operation through the abdomen on the mother's uterus (hysterotomy)
- Assisted vaginal is defined as a live birth (baby) and/or a stillbirth being delivered vaginally with the need of instruments – includes medical assistance using either a vacuum cup (ventouse) or using forceps
- Spontaneous vaginal is defined as a live birth (baby) and/or a stillbirth being delivered vaginally without the need of instruments except those required for episiotomy
- a live birth (baby) is defined as delivery of a baby which, after complete separation from its mother, shows any signs of life (there is no recognised gestation or weight qualifier in UK law on birth registration such that any

birth at any gestation or birth weight which fulfils this criteria should be registered as a live birth (baby))

- a stillbirth is defined as delivery of a baby at or after 24 weeks which, after complete separation from its mother, shows no signs of life
- in the case of pregnancies where multiple pregnancy reduction has occurred at an earlier gestation, the final outcome of the recent pregnancy is recorded

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit.

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Number of births from recent pregnancy (NLB/NSB)

Fields: Number of live births (babies)
 Number of stillbirths

Number of data items: Two
Units of measurement: None

Definition for collection:

- specifies the total number of births delivered (both live births (babies) and stillbirths) from recent pregnancy
 - a live birth (baby) is defined as delivery of a baby which, after complete separation from its mother, shows any signs of life (there is no recognised gestation or weight qualifier in UK law on birth registration such that any birth at any gestation or birth weight which fulfils this criteria should be registered as a live birth (baby))
 - a stillbirth is defined as delivery of a baby at or after 24 weeks' gestation which, after complete separation from its mother, shows no signs of life
 - do not count either miscarriage (defined as delivery of a baby up to 24 weeks which, after complete separation from its mother, shows no signs of life) or termination of pregnancy including multiple pregnancy reduction at any gestation as a stillbirth
 - recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
-

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit.

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Number of babies in NICU following recent pregnancy (NICUB)

Field: Number of babies in NICU following recent pregnancy

Number of data items: One
Units of measurement: None

Definition for collection:

- specifies the number of babies admitted to NICU (neonatal intensive care unit) within 24 hours following delivery of recent pregnancy
 - a NICU is a neonatal intensive care unit in any hospital
 - any formal admission to NICU is sufficient to be counted, however short the stay
-

Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit.

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

Hysterectomy at/since delivery of recent pregnancy (HYST)

Field: Hysterectomy at/since delivery of recent pregnancy

Number of data items: One
Options: Yes
No

Definition for collection:

- hysterectomy is defined as the surgical removal of the uterus at/since delivery of recent pregnancy
 - includes all hysterectomies (with or without removal of the ovaries); a hysterectomy may be total (uterus and cervix removed) or subtotal (uterus removed but cervix conserved)
 - excludes other operations (e.g. operations for bleeding) where the uterus is retained
 - recently pregnant is defined as any woman who has had a miscarriage, a termination of pregnancy, a stillbirth or a live birth (baby) within 42 days of the date of admission to your unit
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Justification

Provides important information on obstetric critical illness which is a rare event and only ascertainable through a large clinical audit.

This field is part of the collaboration with the Department of Health and the Joint Standing Committee of the Royal College of Anaesthetists and the Royal College of Obstetricians and Gynaecologists.

7 Appendix 2: Case Mix Programme and CCMDS definitions

- **Age** – time from date of birth to date of admission to the critical care unit.
- **ICNARC physiology score** – acute severity score developed using the Case Mix Programme Database².
- **APACHE II score** – acute severity score³.
- **Surgical status** – Surgical admissions are defined as those admissions to the adult, general critical care unit directly from theatre and recovery. Surgical admissions were divided into emergency or elective cases based on the NCEPOD (National Confidential Enquiry into Perioperative Deaths) classification. Admissions in the “emergency” or “urgent” categories were considered emergency surgical admissions and those in the “scheduled” or “elective” categories were considered elective surgical admissions. All other admissions were non-surgical.
- **Last non-transient location prior to admission to critical care** – the last non-transient location from which this admission was admitted directly to the critical care unit.
- **Destination following discharge from critical care** – the last non-transient location that the admission was discharge directly to from the critical care unit.

The options for the above two fields are:

- Ward – ward in the hospital;
 - Obstetric area – delivery suite, labour ward or obstetric ward in the hospital;
 - Other intermediate care area – CCU or other area in the hospital where the level of care is greater than the normal ward but is not an ICU or combined ICU/HDU or HDU;
 - Paediatric/neonatal ICU/HDU – paediatric or neonatal ICU or combined ICU/HDU or HDU in the hospital;
 - Level 3 bed in adult ICU or ICU/HDU – level 3 bed in either an adult ICU or a combined ICU/HDU in the hospital;
 - Level 2 bed in adult ICU or ICU/HDU – level 2 bed in either an adult ICU or a combined ICU/HDU in the hospital;
 - Adult HDU – adult HDU or equivalent step-up/step-down unit in the hospital;
 - Not in hospital – admitted to the unit from a location not in hospital.
- **Critical care unit mortality** – status of the admission at discharge from the critical care unit.
 - **Acute hospital mortality** – status of the admission at ultimate discharge from acute hospital.
 - **Readmissions within the same acute hospital stay** – admissions that have been readmitted to critical care at least once during their stay in acute hospital.
 - **Critical care unit length of stay** – the duration from the date and time of admission to the critical care unit to the date and time of discharge for those admissions discharged alive from the unit, the date and time of death for those admissions that died on the unit or the date and time of brainstem death for those admissions declared brainstem dead.

- **Total acute hospital length of stay** – the duration from the date of admission to acute hospital (prior to admission to critical care) to the date of discharge from acute hospital for those admissions that were discharged alive from acute hospital or the date of death within acute hospital for those admissions that died before discharge from acute hospital.

- **Level 3** – indicated by one or more of the following:
 - admissions receiving advanced respiratory monitoring and support due to an acute illness;
 - admissions receiving advanced cardiovascular monitoring and support due to an acute illness;
 - admissions receiving monitoring and support for two or more organ system dysfunctions (excluding gastrointestinal support) due to an acute illness;
 - admissions solely receiving basic respiratory monitoring and support and basic cardiovascular monitoring and support due to an acute illness only meet Level 2.

- **Level 2** – indicated by one or more of the following:
 - admissions receiving monitoring and support for one organ system dysfunction (excluding gastrointestinal support) due to an acute illness;
 - admissions solely receiving advanced respiratory monitoring and support due to an acute illness meet Level 3;
 - admissions solely receiving advanced cardiovascular monitoring and support due to an acute illness meet Level 3;
 - admissions solely receiving basic respiratory and basic cardiovascular monitoring and support due to an acute illness meet Level 2.
 - admissions receiving pre-surgical optimisation including invasive monitoring and treatment to improve organ system function;
 - admissions receiving extended post-surgical care either because of the procedure and/or the condition of the admission;
 - admissions stepping down to Level 2 from Level 3 care.

- **Level 1** – indicated by one or more of the following:
 - admission recently discharged from a higher level of care;
 - admissions receiving a greater degree of observation, monitoring, intervention(s), clinical input or advice than Level 0 care;
 - admissions receiving critical care outreach service support fulfilling the medium-score group, or higher, as defined by NICE Guidelines 50.

- **Level 0** – indicated by one or more of the following:
 - admissions in hospital and receiving normal ward care.

8 References

1. Harrison D, Penny J, Yentis S, Fayek S, Brady A. Case mix, outcome and activity for obstetric admissions to adult, general critical care units: a secondary analysis of the ICNARC Case Mix Programme Database. *Critical Care* 2005;**9**:S25-37.
2. Harrison DA, Parry GJ, Carpenter JR, Short A, Rowan K. A new risk prediction model for critical care: the Intensive Care National Audit & Research Centre (ICNARC) model. *Crit Care Med.* 2007;**35**:1091-8.
3. Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. *Crit Care Med.* 1985;**13**:818-29.