Irish Maternity Indicator System

NATIONAL REPORT 2014

HSE Clinical Programme in

Obstetrics and Gynaecology

March 2016

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

OBSTETRICS AND GYNAECOLOGY

Preface

We are pleased to introduce and warmly welcome the first Irish Maternity Indicator System (IMIS) national report. There is a rich history of data collection in the maternity services in Ireland; the IMIS is the first innovation to harness and standardise data collection and analysis for maternity services nationally. This report demonstrates measurement, analysis, and comparison of maternity activities and clinical outcomes nationally in 2014.

Using data that are routinely submitted by each maternity unit, this report marks the beginning of what I hope will become an annual national account of activity and outcomes of maternity care in Ireland. The report allows clinicians, senior management, and healthcare professionals to compare activity and clinical outcomes over time within hospitals. It facilitates comparison between hospitals both nationally and within Hospital Groups and allows activity and the clinical outcomes to be interpreted in an appropriate context.

Even though IMIS is a newborn to our system, the development of this report has already led to improvements in data collection processes and the quality of data gathered in hospitals. We encourage clinicians to take ownership of their own hospital data such that the IMIS becomes embedded in the day-to-day practice of staff in maternity units.

We acknowledge the excellent work of all involved in developing and implementing the Irish Maternity Indicator System and in particular the expertise of the HSE Clinical Programme IN Obstetrics and Gynaecology led by Professor Michael Turner, Dr Léan McMahon and Mr Martin McNicholl. The HSE is committed to supporting maternity services by producing robust and clinically meaningful information in a timely manner. We expect that the publication of this report will provide reassurance for the general public, maternity staff, and those with wider interests in the maternity services that our hospitals continue to provide safe, high quality care for mothers and their babies. It is our intention to sustain and develop this work further in the future.

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Acknowledgements

We thank everyone who has supported the development of the IMIS to date, including members of the Advisory Subgroup and QA Officers/teams in the 19 maternity units. It is our hope that the IMIS will be used to drive improvements in clinical care and hospital management.

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OBSTETRICS AND GYNAECOLOGY

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Introduction

Overview

Assessment of quality of care in maternity services requires formal systems of measurement and regular review of activities in hospitals, as well as analysis and interpretation of the findings. The HSE Clinical Programme in Obstetrics and Gynaecology (CPOG) developed the Irish Maternity Indicator System in 2014 as a new system of measuring and interpreting activities in maternity services.

The objective of the IMIS is to bring consistency to the measurement and interpretation of maternity services nationally: a reliable system of measurement and interpretation can highlight cases for investigation and signal potential problems. This report aims to demonstrate the benefits of the IMIS for clinicians and senior managers.

The IMIS was developed in response to national recommendations by the HSE and the HIQA.[1] It also meets the requirements of a number of national reports, including the Report of the Chief Medical Officer on Perinatal Deaths (February 2013), the Safety Incident Management Policy (June 2014), and recommendations by Dr Peter Boylan (May 2015) (see Appendix A2). In addition, the IMIS informs and provides data for the Maternity Patient Safety Statement (March 2016) and the IMIS is designed to align with the forthcoming national Maternal and Newborn Clinical Management System (MN-CMS), which is scheduled to be operational in all maternity units by 2018.

This first national report is based on annual data for 2014. It identifies variation between maternity units, particularly in rates of maternal and in-utero transfers, EPAU first visits, obstetric emergencies, and non-spontaneous deliveries. It is important to note that, while the first year of implementation may not be wholly accurate, the findings should encourage further investigation of data quality and integrity, as well as the practice management reasons for variations.

IMIS design and data collection

The IMIS (previously called QA1) was developed by the CPOG and reviewed by relevant clinicians, obstetricians, midwives, and senior managers. It contains 30 indicators across five domains: Hospital activities, neonatal metrics, laboratory metrics, obstetric metrics, and deliveries. Standardised definitions were applied to all indicators so that maternity units can reliably assess their performance over time and can benchmark their performance against national rates.

The indicators are designed as a suite of measures, intended to operate in conjunction with one another and not on an individual basis. They were selected for (relative) ease of collection in all maternity units, irrespective of size, levels of activity, or possession of IT

1 HSE National Incident Management Team Investigation of Incident 50278 from time of patient's self-referral to hospital on 21 October 2012 to patient's death on 28 October 2012. HIQA Investigation into the safety, quality and standards of services provided by the Health Service Executive to patients, including pregnant women, at risk of clinical deterioration, including those provided in University Hospital Galway, and as reflected in the care and treatment provided to Savita Halappanavar, 7 October 2013.

systems.[2] They may be changed in future, following consultation with staff in the maternity units and other relevant bodies.

The IMIS was introduced in maternity units in 2014, initially as a paper-based system and subsequently a customised Microsoft Excel data collection and monthly reporting system was introduced. The data are collected and reviewed monthly within hospitals. Annual data are sent to the HSE for their review.

The IMIS is not intended to replace other data collection systems in hospitals, such as the Hospital In-Patient Enquiry (HIPE) system, which collects hospital- and patient-level data based on hospital discharges. The HIPE is not recommended to be used for completion of the IMIS monthly report.

Governance and implementation guidelines

The CPOG devised governance and implementation guidelines for the IMIS at local (hospital) and national levels. The IMIS is designed for within-hospital use: the data are collected by hospital staff and reviewed by hospital senior managers. In all 19 maternity units, a QA Officer was nominated from among the existing staff. The QA Officer liaises with the CPOG and is responsible for data gathering and reporting to hospital senior managers on a monthly basis. Hospital senior managers are responsible for analysing monthly reports. Should concerns arise from the IMIS results, these should be discussed with clinical staff and, if appropriate, reported to the Hospital Board or equivalent. After hospital-level investigation of the data has taken place, serious concerns that are identified should be reported to the HSE.

Cumulated annual data for the full calendar year should be sent to the HSE and a copy of the data sent to the CPOG. There is an additional level of governance at the level of Hospital Groups that has yet to be designed and agreed.

IMIS 2014 National Report

This report was compiled by the CPOG, with contributions from QA Officers in the 19 maternity units. The main body of the report displays results for the IMIS indicators on funnel charts. The analysis presents rates derived from raw data; there was no risk adjustment to take account of demographic, clinical risk, case mix, or previous obstetric complications.[3]

Interpret with caution all indicators, particularly those with small numbers.

Preliminary analysis was conducted on data from maternity units in June 2015. The data were revised where necessary and reanalysed in November 2015. There are gaps where hospitals did not return data or where data were unavailable during the first year of implementation.

Explanatory notes are provided where they are considered useful for interpretation of the indicators. These notes are based on research and literature, expert clinical judgment, and consultation with QA Officers and senior managers in the maternity units.

Appendix A1 provides longitudinal trends for selected indicators based on data from the National Perinatal Reporting System (NPRS) and the Hospital In-Patient Enquiry (HIPE) (2008-13), as well as IMIS 2014. Appendix A2 contains national recommendations that led to the development of the IMIS, as well as other national recommendations relating to quality improvement in the maternity services. Appendix A3 provides a description of the data and methods of analysis used to compile this report.

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2 The IMIS initiative adopted a pragmatic approach to data collection to facilitate all maternity units, including those with IT systems and those that are not yet computerised and depend primarily on manual recording systems.

3 Examples of potential risk factors include: Maternal age, ethnicity, deprivation quintile, previous caesarean section, gestational age, birthweight, pre-existing hypertension, pre-existing diabetes, gestational diabetes, BMI, smoking.

IMIS form

(previously QA1)

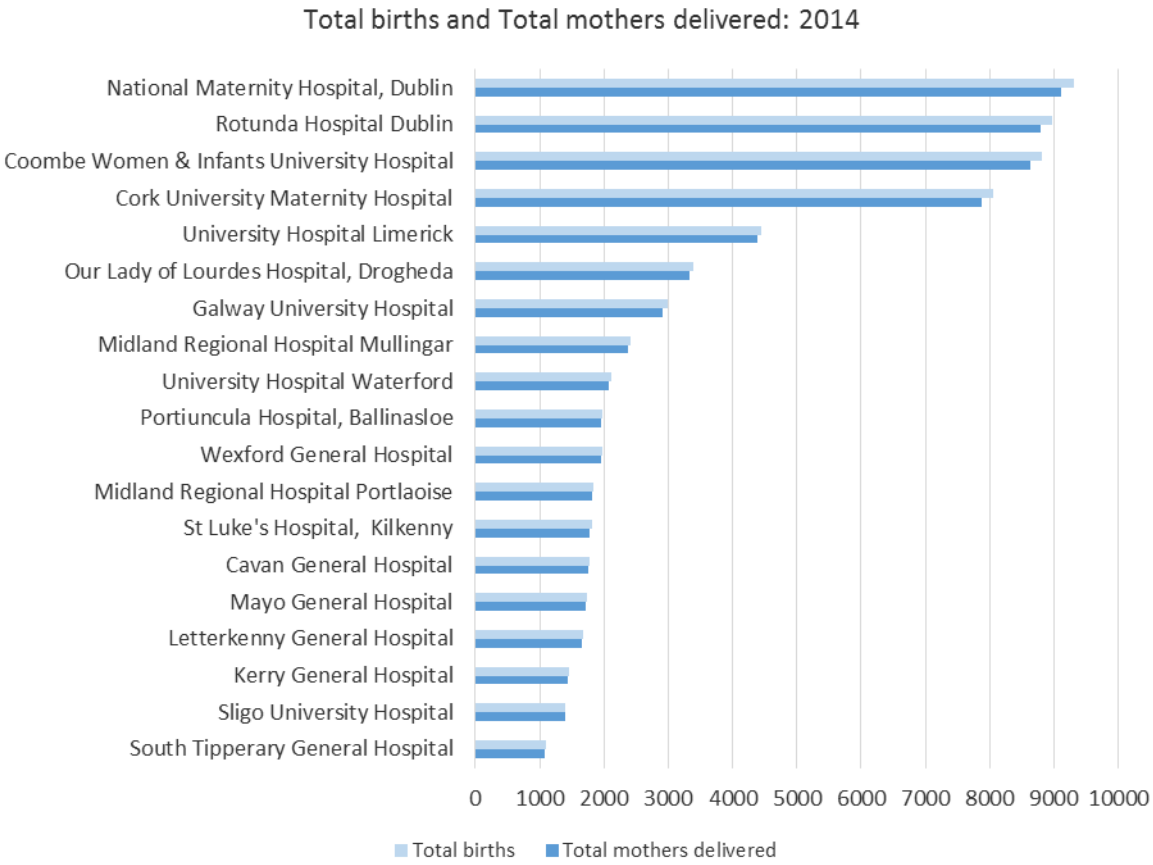
		2013		2014	
		Month	Year-to-date	Month	Year-to-date
HOSPITAL ACTIVITIES					
1.	Mothers delivered ≥ 500g (n)				
2.	Multiple births (n)				
3.	Total nulliparas (n)				
4.	Total multiparas (n)				
5.	EPAU First visit (n)				
6.	Maternal transfers (ICU/HDU) (n)				
7.	Maternal deaths (n)				
8.	Total births ≥ 500g (n)				
9.	Perinatal death – Total (n)				
10.	Perinatal death ≥ 2.5kg without a congenital anomaly (n)				
NEONATAL METRICS					
11.	Neonatal encephalopathy (n)				
12.	Brachial plexus injury (n)				
13.	Whole body neonatal cooling (n)				
14.	In-utero transfers – admitted (n)				
15.	In-utero transfers – sent out (n)				
LABORATORY METRICS					
16.	Maternal bacteraemia (n)				
17.	Neonatal bacteraemia (n)				
18.	Obstetric blood transfusions (n)				
OBSTETRIC METRICS					
19.	Ectopic pregnancy (n)				
20.	Eclampsia (n)				
21.	Uterine rupture (n)				
22.	Peripartum hysterectomy (n)				
23.	Pulmonary embolism (n)				
24.	Perineal tears (3rd / 4th degree) (n)				
25.	Postpartum neuropathy (n)				
DELIVERY METRICS					
26.	General Anaesthetic for Caesarean Section (n)				
27.	Labour epidural (n)				
28.	Instrumental deliveries (total) (OVD) (n)				
	28a. Instrumental deliveries (OVD) for nulliparas (n)				
	28b. Instrumental deliveries (OVD) for multiparas (n)				
29.	Inductions of labour (total) (n)				
	29a. Inductions of labour for nulliparas (n)				
	29b. Inductions of labour for multiparas (n)				
30.	Caesarean sections (total) (n)				
	30a. Caesarean sections for nulliparas (n)				
	30b. Caesarean sections for multiparas (n)				

Hospital Activities

Indicators #1 and #8: Total births and Total mothers delivered

Definitions

Total births: Number of live births and stillbirths weighing greater than or equal to 500g.
Total mothers delivered: Number of women delivering a baby weighing 500g or more.



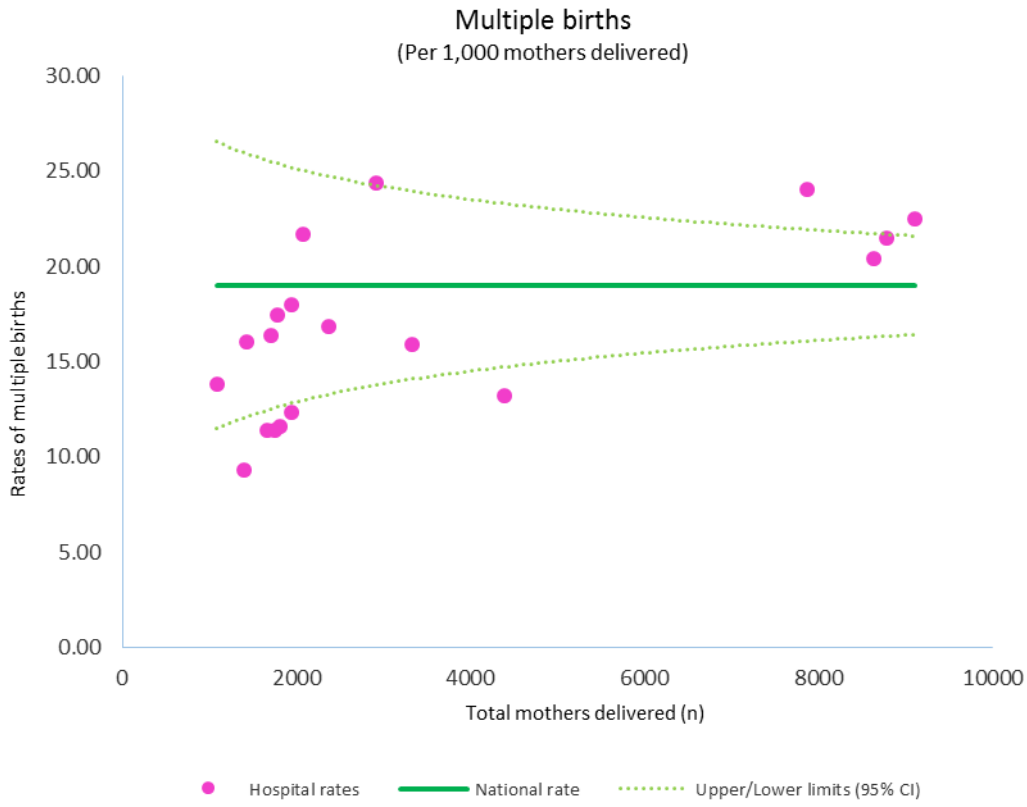
	Total births	Total mothers delivered
All 19 maternity units (n)	67,263	65,987
Mean per hospital (S.D.)	3,540 (2,820)	3,473 (2,754)

Notes:

1. Larger hospitals have higher rates of multiple deliveries.
2. There has been a downward trend nationally in the number of live births in Ireland from 71,986 in 2009 to 69,267 in 2013, which equates to a drop in live birth rate from 16.7 to 15.0 per 1,000 population (National Perinatal Reporting System (NPRS) Annual Report 2013) (see Appendix A1).

Indicator #2: Multiple births

Definition Number of mothers delivered multiple births (not the number of babies delivered by mothers with multiple pregnancies); a multiple birth results when more than one baby is born from a single pregnancy.



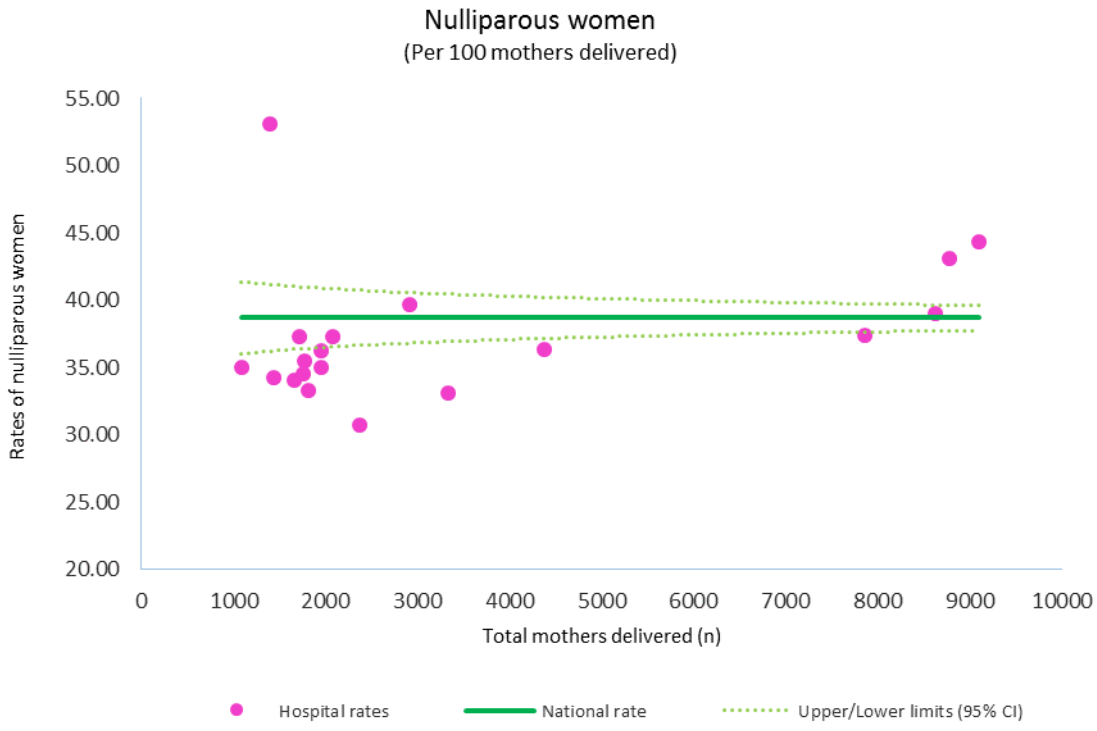
Total mothers delivered* (n)	65,987
Multiple births (n)	1,255
National rate (per 1,000 mothers delivered)	19.02
95% CI	[17.98-20.06]

*Based on data from 19 maternity units

Note:
Six units display incidence of multiple births above the national average; five of these have an IVF unit or clinic. Multiple births may require more complex management (e.g., increased incidence of premature births and low birth weights, increase in mortality and morbidity for both mother and babies), which may lead to increased service demands.

Indicator #3: Nulliparas

Definition Deliveries ≥500g to women who have never had a previous pregnancy resulting in a live birth or stillbirth.



Total mothers delivered* (n)	65,987
Total nulliparas (n)	25,539
National rate (per 100 mothers delivered)	38.70%
95% CI	[38.33-39.07]

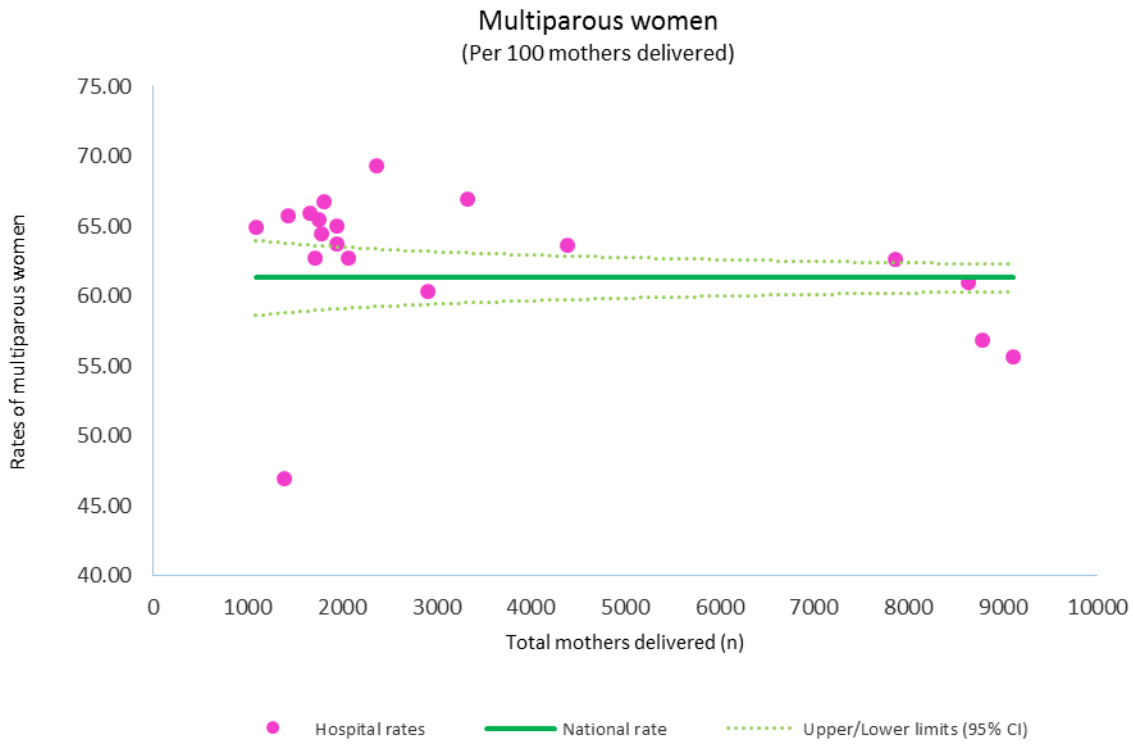
*Based on data from 19 maternity units

Note:

Research shows nulliparas tend to be at greater risk than other women of adverse birth outcomes. Hence, staff resources required to care for first-time mothers tend to be greater than those required to care for women who have previously delivered babies. The proportion of nulliparas attending a maternity unit is an important demographic trend for future planning.

Indicator #4: Multiparas

Definition Deliveries ≥500g to women who have had at least one previous pregnancy resulting in a live birth or stillbirth.



Total mothers delivered* (n)	65,987
Total multiparas (n)	40,448
National rate (per 100 mothers delivered)	61.30%
95% CI	[60.93-61.67]

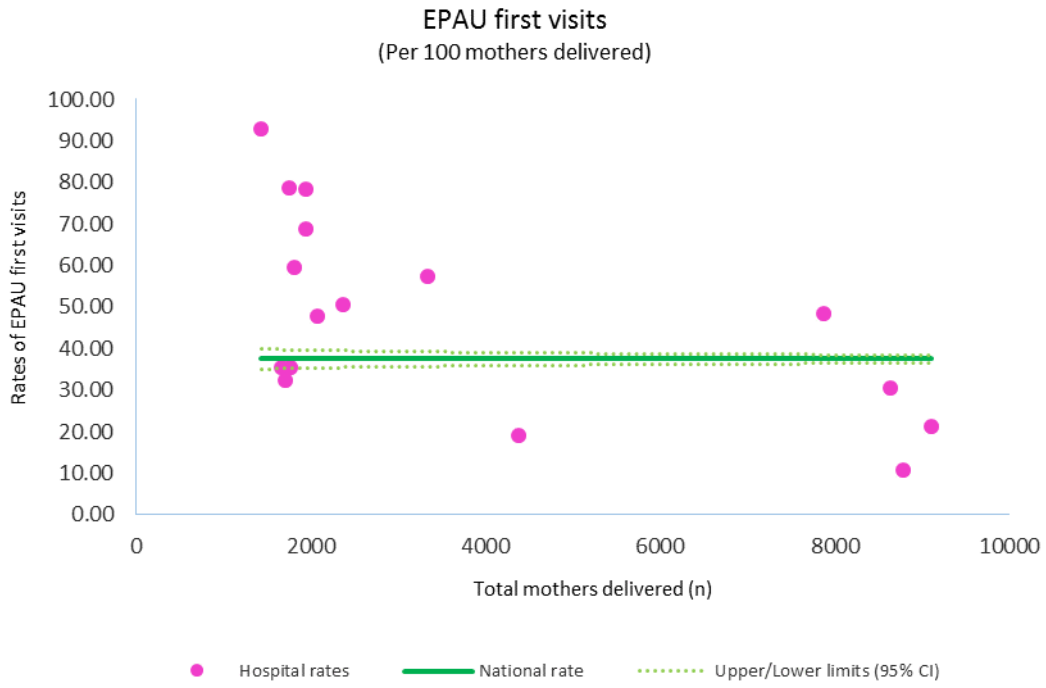
*Based on data from 19 maternity units

Note:

The funnel charts for multiparas and nulliparas (previous page) are mirror images of each another.

Indicator #5: EPAU first visits

Definition Number of first visits to the Early Pregnancy Assessment Unit (EPAU).



Total mothers delivered* (n)	60,595
EPAU first visits (n)	22,697
National rate (per 100 mothers delivered)	37.46%
95% CI	[37.07-37.84]

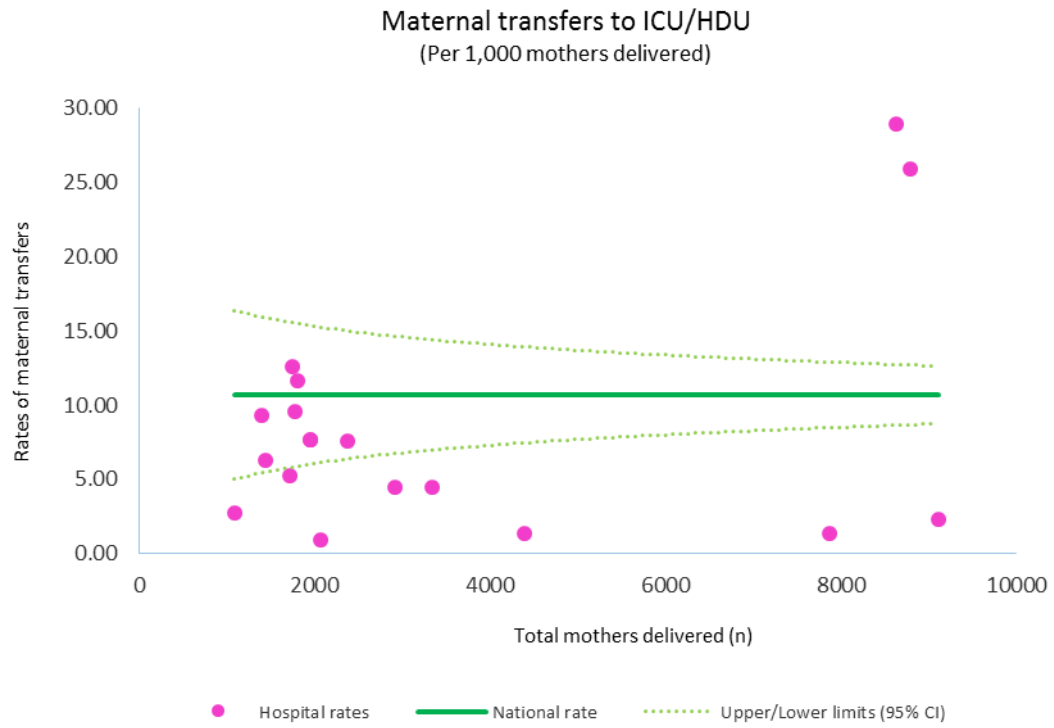
*Based on data from 16 maternity units

Note:

There is extreme variation, or 'over-dispersion', in the indicator (i.e., all maternity units lie beyond the 95% thresholds). We recommend investigating the methodological reasons for the variation: as this indicator is being collected for the first time, it may not be measuring the same clinical activity in all maternity units.

Indicator #6: Maternal transfers to ICU/HDU

Definition Mothers transferred for critical care to ICU or HDU either within the hospital OR to another hospital/unit (ICU is a Level 3 critical care unit; HDU is a Level 2 critical care unit; many regional hospitals have a mixed ICU/HDU unit).



Total mothers delivered* (n)	64,322
Maternal transfers (ICU/HDU) (n)	688
National rate (per 1,000 mothers delivered)	10.70
95% CI	[9.90-11.49]

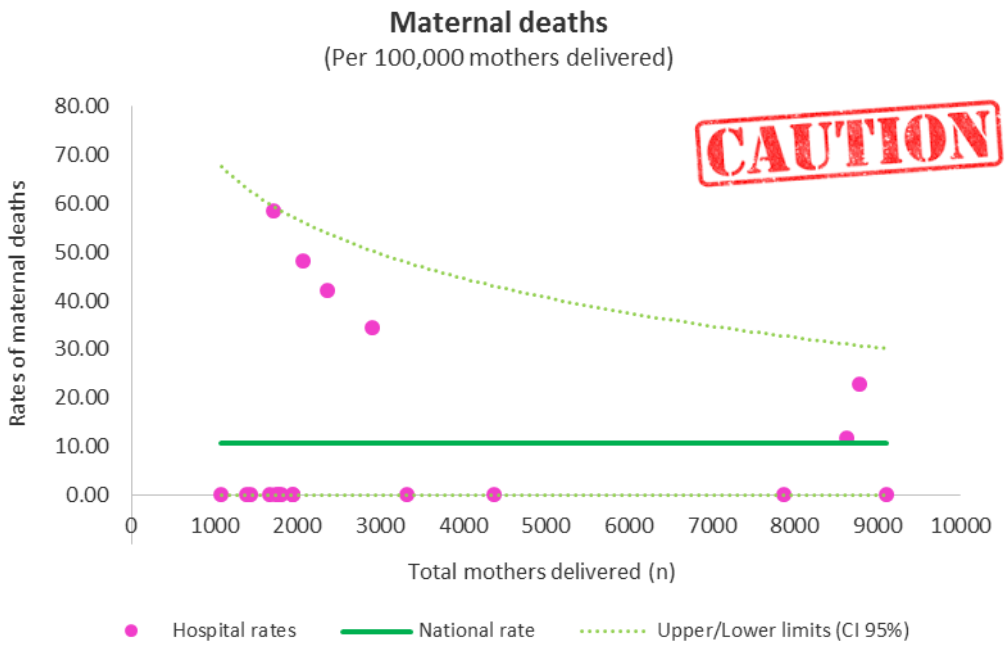
*Based on data from 18 maternity units

Note:

The high level of variation in the funnel chart reflects the variation across maternity units in how they use their HDU areas. For example, some units use their labour ward or theatre recovery areas as short-stay HDU type areas, some units admit patients with pre-eclampsia to their HDU, while others treat pre-eclampsia at ward level.

Indicator #7: Maternal deaths

Definition Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its mangement but not from accidental or incidental causes.



Total mothers delivered* (n)	65,987
Maternal deaths (in hospital) (n)	7
National rate (per 100,000 mothers delivered)	10.61
95% CI	[2.75-18.47]

*Based on data from 19 maternity units

Notes:

A. Interpret this funnel chart with caution, due to the small values.

B. The number of maternal deaths reported in IMIS 2014 was substantially lower than other data sources indicate. This is principally because maternity units only recorded maternal deaths that occurred *in hospital*, not after discharge.

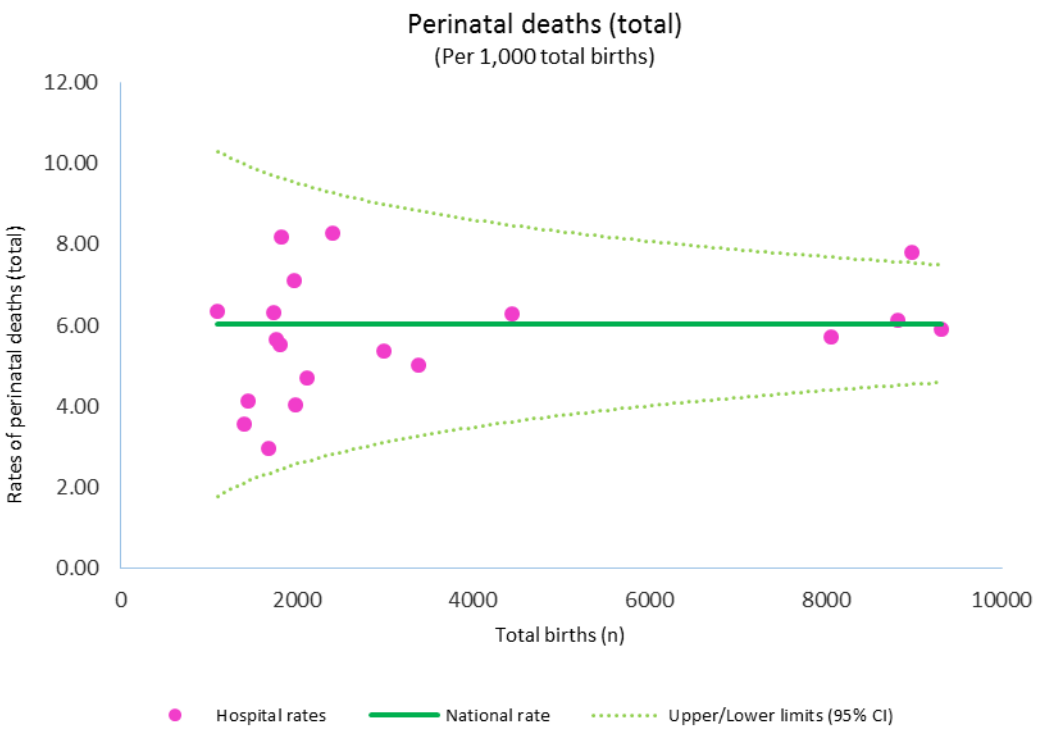
C. The IMIS definition of maternal death is the same as the WHO definition and similar to the MDE Ireland definition. The time-frame of the definition is currently under discussion internationally, reflecting the growing trend for collecting data on maternal death up to one year after delivery, miscarriage, or abortion.

D. In general, the number of maternal deaths in Ireland remains relatively low by international comparison. Thus, while lessons can be learnt from management of individual cases, maternal death may not be a robust indicator to assess quality of clinical care in a single maternity unit. Annual rates of maternal death should be treated with extreme caution.

Indicator #9: Perinatal deaths (total)

Definition

Total number of perinatal deaths includes stillbirths and early neonatal deaths (stillbirth refers to death of a fetus weighing ≥500g, irrespective of duration of pregnancy; early neonatal death extends from delivery to six completed days, inclusive, or during the first seven days of life). The measure of perinatal deaths (total) is not adjusted to exclude congenital anomalies.



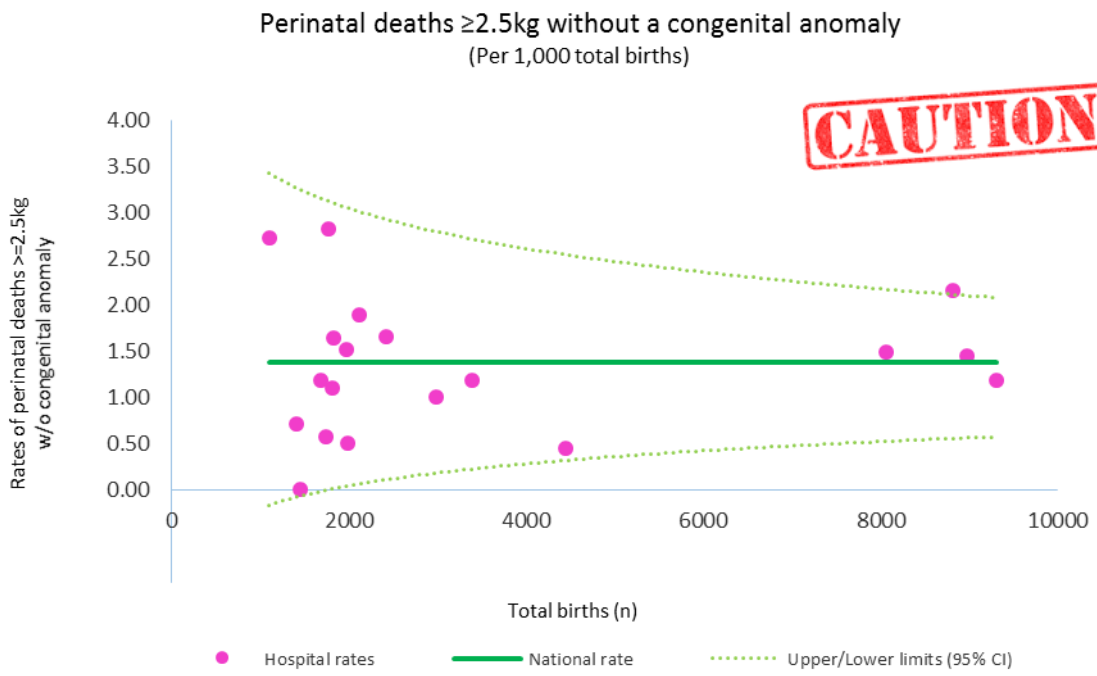
Total births* (n)	67,263
Perinatal deaths (total) (n)	407
National rate (per 1,000 total births)	6.05
95% CI	[5.46-6.64]

*Based on data from 19 maternity units

Note:
Maternity units include in their figures of perinatal deaths babies that are transferred in utero from other units and die in their hospital. Annual rates of perinatal death should be interpreted with caution.

Indicator #10: Perinatal deaths ≥2.5kg without a congenital anomaly

Definition Number of perinatal deaths weighing 2.5kg or more, without physiological or structural abnormalities that develop at or before birth and are present at the time of birth.



Total births* (n)	67,263
Perinatal deaths ≥2.5kg without a congenital anomaly (n)	93
National rate (per 1,000 total births)	1.38
95% CI	[1.10-1.66]

*Based on data from 19 maternity units

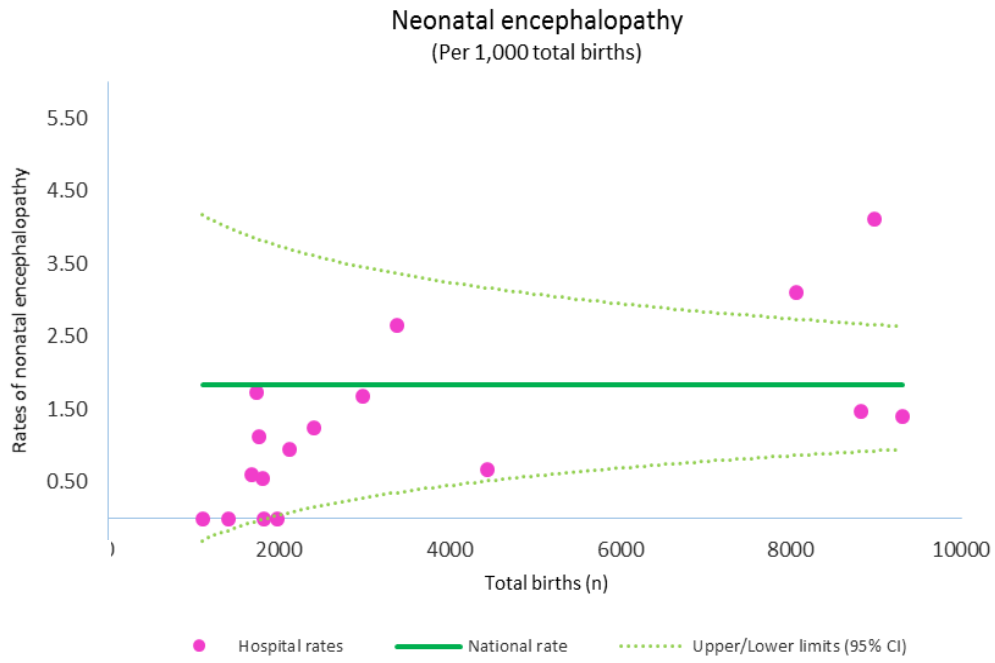
Note:
Maternity units include in their figures of perinatal deaths babies that are transferred in utero from other units and die in their hospital. Annual rates of perinatal deaths ≥2.5kg without a congenital anomaly should be interpreted with caution.

Neonatal Metrics

Indicator #11: Neonatal encephalopathy

Definition

All infants ≥35 weeks gestation who, during the first week of life, have either seizures alone or signs of neonatal encephalopathy, which is defined in clinical findings in three or more of the following domains: Level of consciousness, spontaneous activity when awake or aroused, posture, tone, primitive reflexes, automonic system. (Note: Neonatal encephalopathy embraces Hypoxic Ischaemic encephalopathy (HIE), which is the most common cause of neonatal encephalopathy (but not all encephalopathy has a hypoxic ischaemic aetiology).)



Total births* (n)	63,826
Neonatal encephalopathy (n)	117
National rate (per total births)	1.83
95% CI	[1.50-2.16]

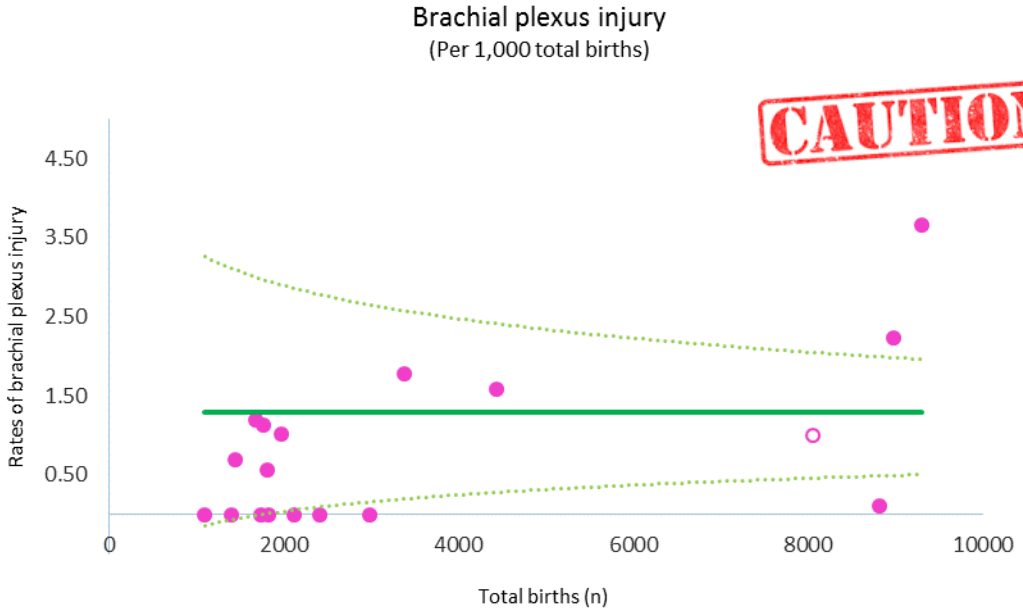
*Based on data from 17 maternity units

Note:

Five hospitals have above-average incidence of neonatal encephalopathy. Four of these are the larger maternity units in Dublin and Cork. It is likely that the indicator is influenced by in utero transfers to these larger hospitals (see indicators #14 and #15).

Indicator #12: Brachial plexus injury

Definition Number of obstetric brachial plexus injuries, either transient or permanent, diagnosed during the birth episode.



Total births* (n)	65,280
Brachial plexus injury (n)	84
National rate (per 1,000 total births)	1.29
95% CI	[1.01-1.56]

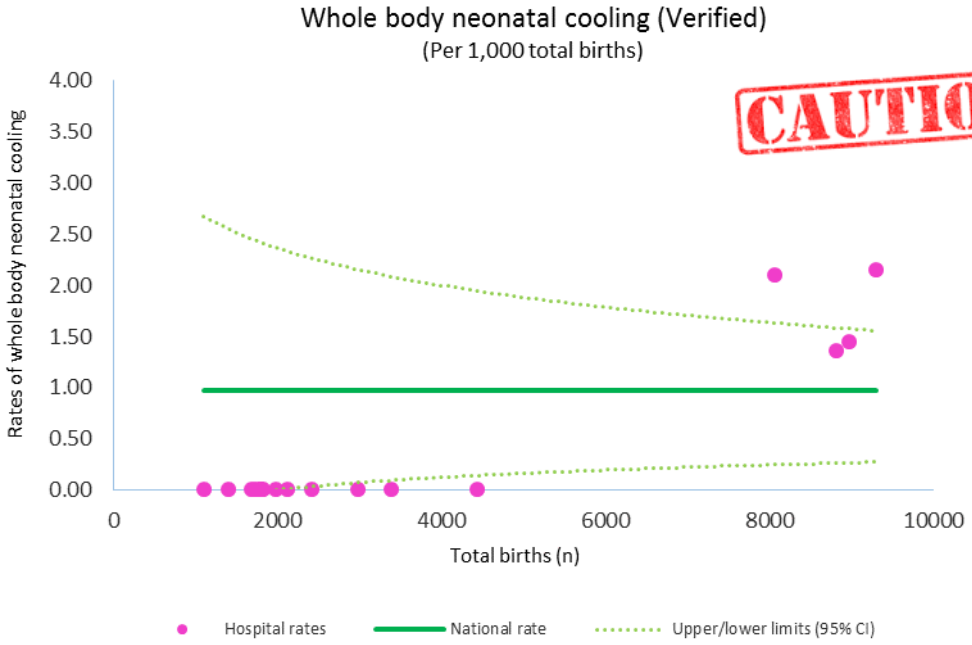
*Based on data from 18 maternity units units (including one estimated value)

Notes:

This indicator has not previously been recorded or reported nationally. Several units, including one of the larger units, only provided half-yearly data for brachial plexus injury. It is not possible at present to comment on the proportion of 'transient' vs 'permanent' diagnoses.

Indicator #13: Whole body neonatal cooling

Definition Treatment for Hypoxic Ischemic Encephalopathy. Eligible infants: Term infants (≥37 weeks) admitted at <6 hours of age to NICU with Birth Asphyxia or Depression. Include hospitals' own cases and those transferred in from other units.



Total births* (n)	63,826
Whole body neonatal cooling (n)	62
National rates (per 1,000 total births)	0.97
95% CI	[0.73-1.21]

*Based on data from 17 maternity units

Notes:

A. Whole body neonatal cooling is only performed in the four large maternity hospitals in Dublin and Cork. The introduction of the IMIS uncovered the fact that neonatal cooling was being counted in hospitals that begin the procedure (passive cooling) before transferring the infant to a larger unit *and* in the hospital to which the baby was transferred. We corrected the data, as far as possible, given the resource restraints of the CPOG. We recommend the definition of whole body neonatal cooling should be revised.

B. Neonatal cooling is a preventive therapy and is not an 'adverse outcome'. The introduction of a 24/7 National Neonatal Transport Programme facilitates the transport of neonates from smaller maternity hospitals to the four large hospitals. It is likely that the number of neonates cooled will increase in the future as the NNTP service develops and, importantly, if the threshold for treatment is lowered.

Indicator #14: In-utero transfers admitted

Definition Number of women with fetus in utero admitted into the hospital after being transferred from another hospital *in the fetal interest*.

Total mothers delivered* (n)	65,987
In-utero transfers admitted (n)	356
National rate (per 1,000 mothers delivered)	5.40
95% CI	[4.84-5.95]

*Based on data from 19 maternity units (including one estimated value)

Notes:

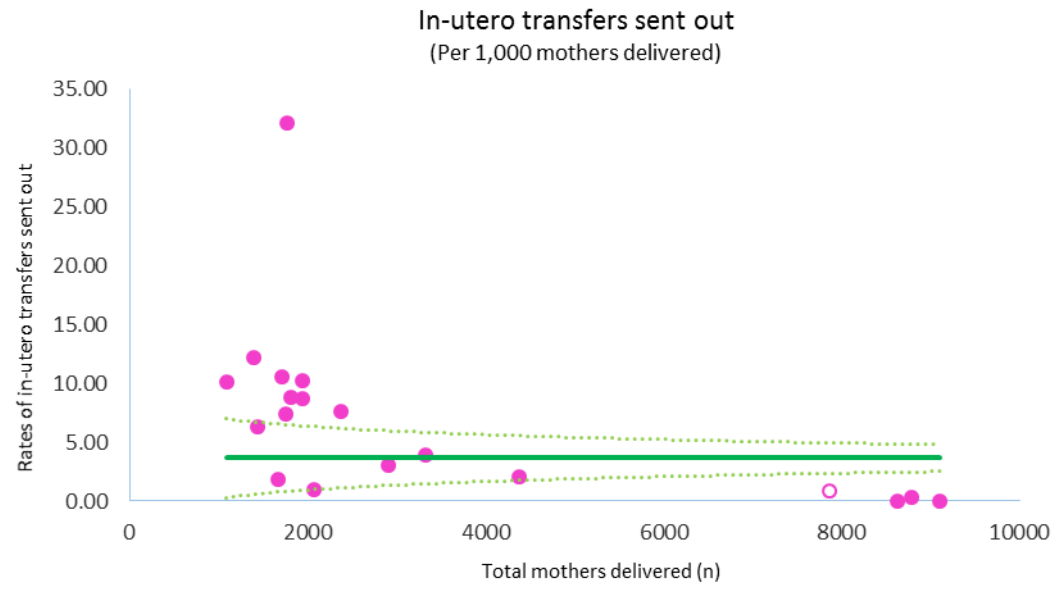
A. The three maternity hospitals in Dublin report highest rates of in-utero transfers admitted. These hospitals have neonatal intensive care units and receive transfers from maternity units all around the country.

B. One mid-sized hospital in the South-east has an above average rate of in-utero transfers admitted. It is the practice for this hospital to admit women from the other units in the South-east – see note on following page.

C. One of the large maternity hospitals provided half-yearly data on in-utero transfers admitted. The funnel chart above contains an estimate of the annual number of in-utero transfers in this hospital.

Indicator #15: In-utero transfers sent out

Definition Number of women with fetus in utero transferred out of the hospital to another hospital *in the fetal interest.*



Total mothers delivered* (n)	65,987
In-utero transfers sent out (n)	241
National rate (per 1,000 mothers delivered)	3.65
95% CI	[3.19-4.11]

*Based on data from 19 maternity units (including one estimated value)

Note:

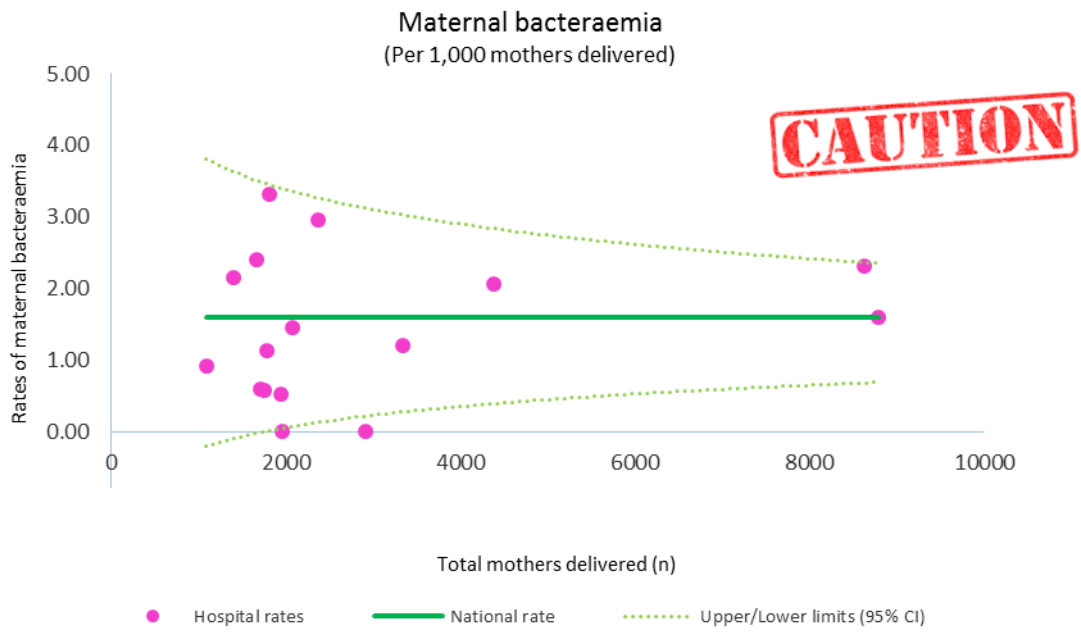
The rates of in-utero transfers sent out and admitted (previous page) are largely reflections of each other; the notes on the previous page apply.

Laboratory Metrics

Indicator #16: Maternal bacteraemia

Definition

Diagnosis of bacteraemia is based on laboratory definition only and does not include clinical indications. Diagnosis of bacteraemia is based on ONE positive blood culture for a recognised bacterial pathogen (e.g. *Staphylococcus aureus, Escherichia coli*). Cases of blood culture contamination (e.g. skin contaminants) should be excluded (ECDC 2012: 47). Cases should be defined as 'maternal' if the positive blood culture is taken at any time during pregnancy or within 42 days of the end of pregnancy.



Total mothers delivered* (n)	47,578
Maternal bacteraemia (n)	76
National rate (per 1,000 mothers delivered)	1.60
95% CI	[1.24-1.96]

*Based on data from 16 maternity units

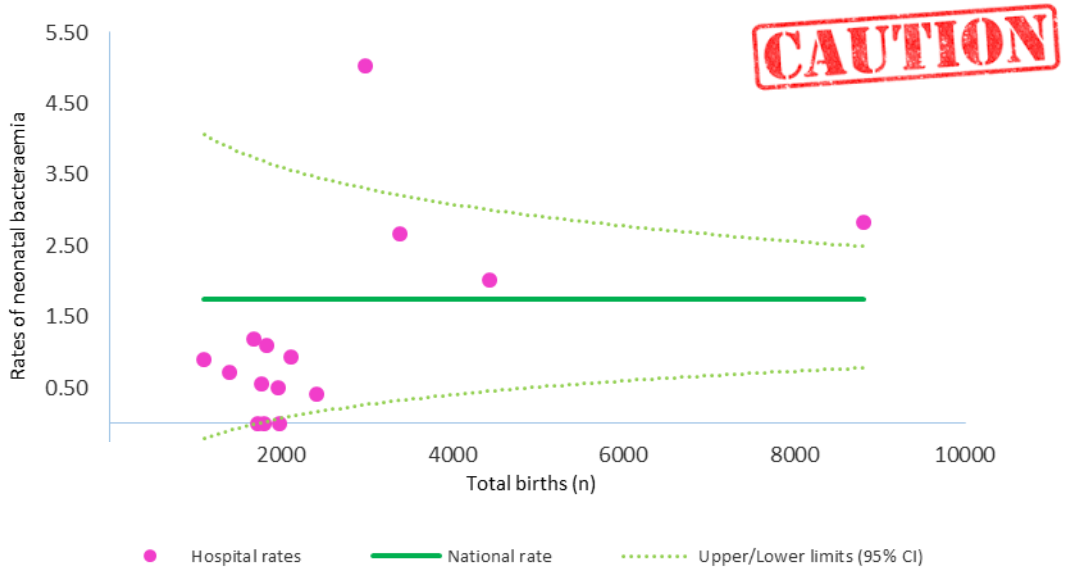
Note:

One of the challenges in designing the IMIS was to agree with Laboratory staff in the hospitals a definition of maternal bacteraemia, particularly in the larger hospitals. The number of missing cases in this indicator is indicative of lack of consensus about the definition at the time of completing the IMIS.

Indicator #17: Neonatal bacteraemia

Definition

Diagnosis of bacteraemia is based on laboratory definition only and does not include clinical indications. Diagnosis of bacteraemia is based on ONE positive blood culture for a recognised bacterial pathogen (e.g. *Staphylococcus aureus, Escherichia coli*). Cases of blood culture contamination (e.g. skin contaminants) should be excluded (ECDC 2012: 47). Cases should be defined as neonatal if the positive blood culture is taken at any time during the neonatal period.



Total births* (n)	39,458
Neonatal bacteraemia (n)	69
National rate (per 1,000 total births)	1.75
95% CI	[1.34-2.16]

*Based on data from 15 maternity units

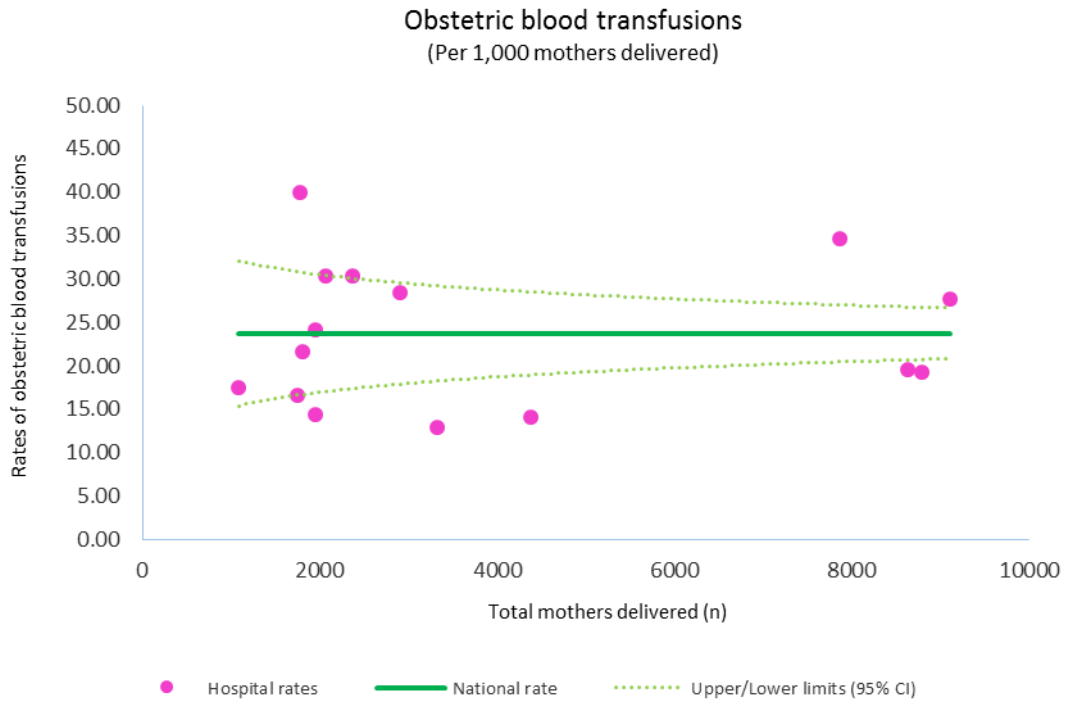
Note:

One of the challenges in designing the IMIS was to agree with Laboratory staff in hospitals a definition of neonatal bacteraemia, particularly in the larger hospitals. The number of missing cases in this indicator is indicative of lack of consensus about the definition at the time of completing the IMIS.

Indicator #18: Obstetric blood transfusions

Definition

Obstetric blood transfusions are defined as the number of obstetric patients who receive one or more units of blood components/products (including red cells, plasma, platelets, etc.), not including clotting factors or recombinant products. Obstetric is defined as from the time of diagnosis of pregnancy (based on a positive pregnancy test).



Total mothers delivered* (n)	59,787
Obstetric blood transfusions (n)	1,419
National rate (per 1,000 mothers delivered)	23.73
95% CI	[22.51-24.95]

*Based on data from 15 maternity units

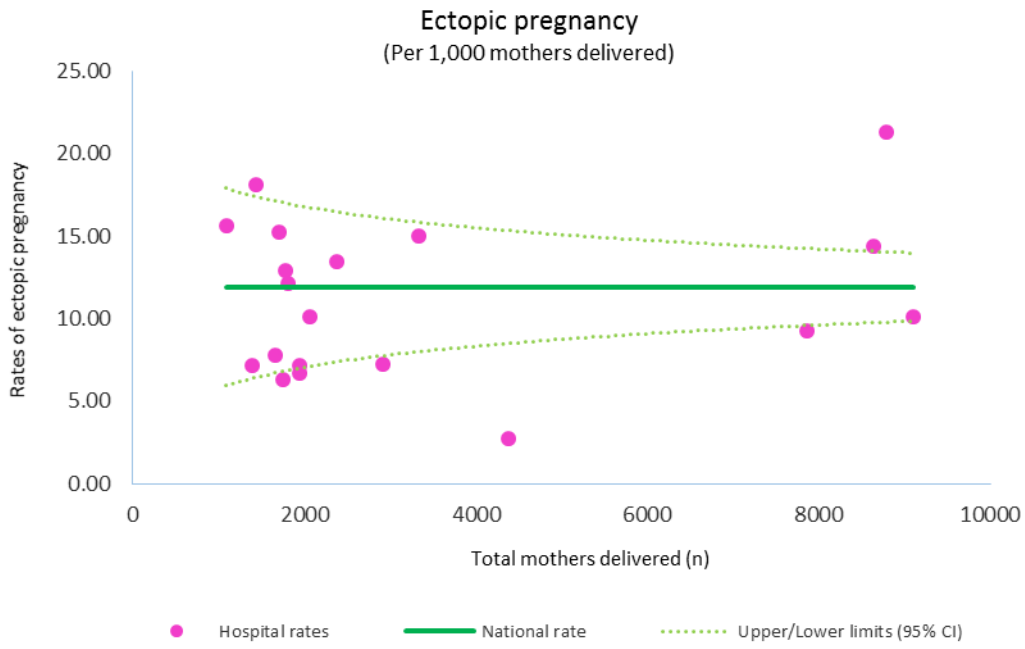
Note:

Obstetric blood transfusion was chosen as an indicator in preference to postpartum haemorrhage because of greater reliability of defining, measuring, and recording transfusions, in contrast with inconsistencies nationally in the definition and measurement of postpartum haemorrhage.

Obstetric Metrics

Indicator #19: Ectopic pregnancy

Definition Number of women diagnosed with an ectopic pregnancy, including abdominal pregnancy, tubal pregnancy, ovarian pregnancy, and other/unspecified pregnancy.



Total mothers delivered* (n)	65,987
Ectopic pregnancy (n)	787
National rate (per 1,000 mothers delivered)	11.93
95% CI	[11.10-12.75]

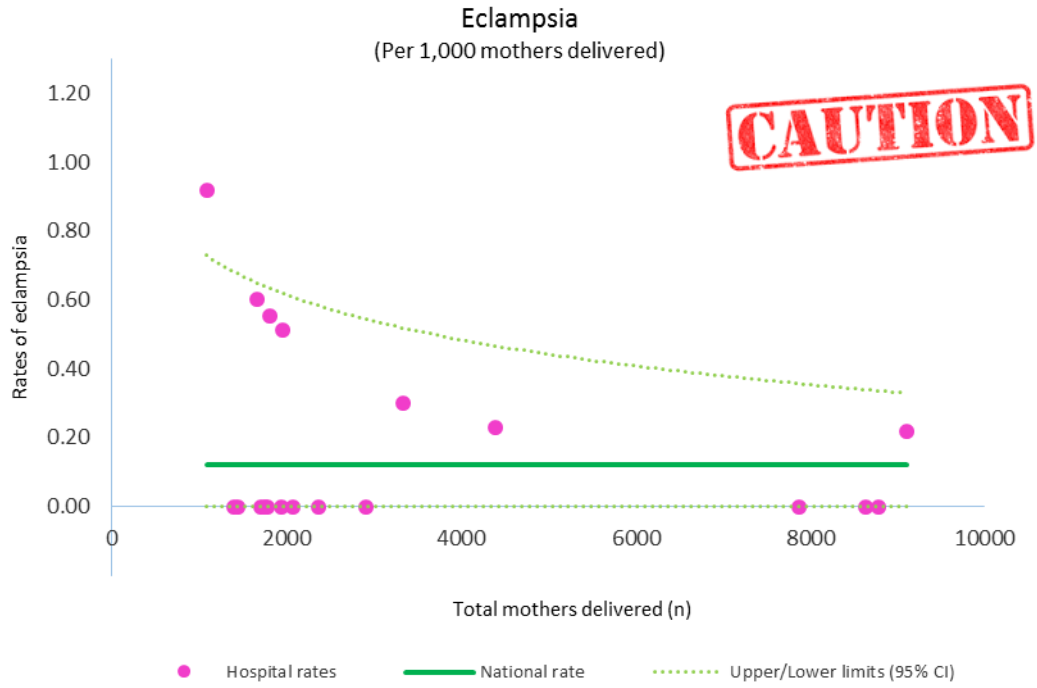
*Based on data from 19 maternity units

Note:

Several maternity units were relying on the HIPE system for collection of numbers of ectopic pregnancies, which was found to be unreliable for this indicator because it does not capture outpatient diagnosis and medical treatment of ectopic pregnancy. This anomaly came to light with the introduction of the IMIS.

Indicator #20: Eclampsia

Definition Number of women diagnosed with eclampsia during any antenatal hospital event or at delivery, including eclampsia in pregnancy, in labour, in the puerperium, and eclampsia unspecified as to time period. Does not include severe pre-eclampsia.



Total mothers delivered* (n)	65,987
Eclampsia (n)	8
National rate (per 1,000 mothers delivered)	0.12
95% CI	[0.04-0.21]

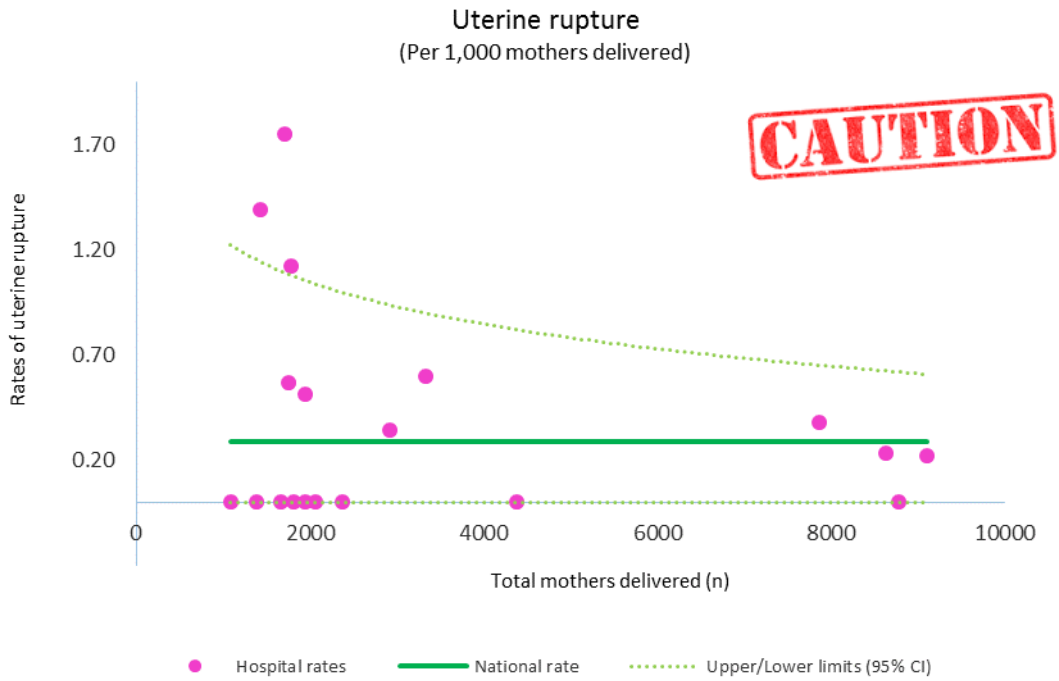
*Based on data from 19 maternity units

Note:

Indicators that are based on serious obstetric events with, typically, very small values, should be treated with extreme caution (note, the outlier on the above chart represents one diagnosis of eclampsia).

Indicator #21: Uterine rupture

Definition Total number of ruptures of uterus before onset of labour or during labour, including cases that may not be diagnosed until after delivery.



Total mothers delivered* (n)	65,987
Uterine rupture (n)	19
National rate (per 1,000 mothers delivered)	0.29
95% CI	[0.16-0.42]

*Based on data from 19 maternity units

Notes:

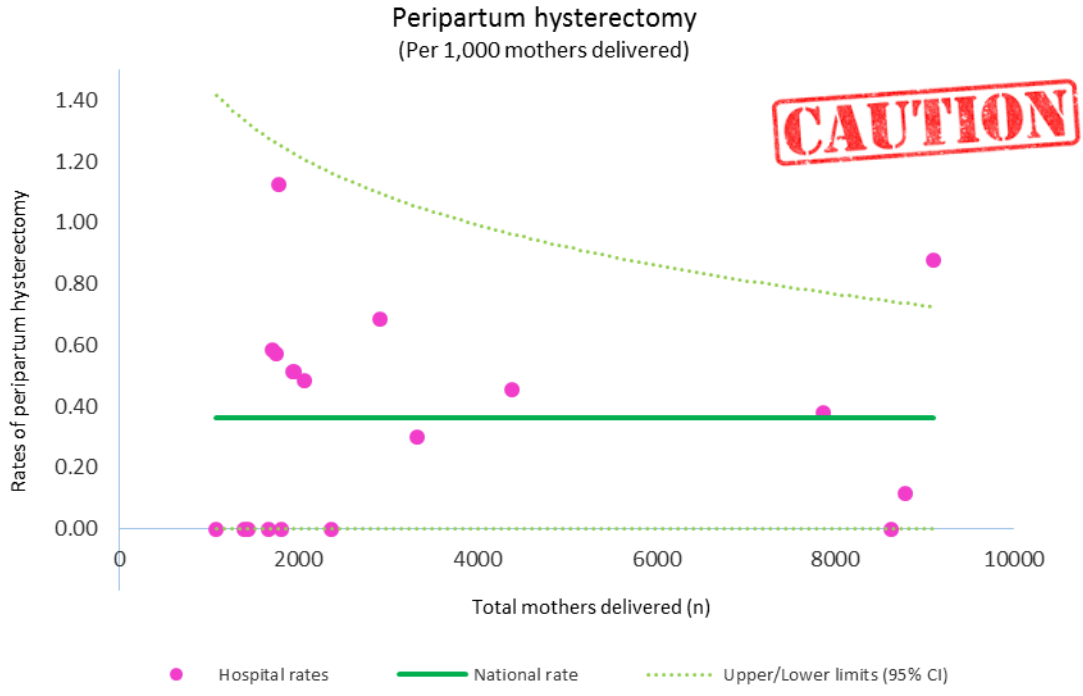
A. There are two types of uterine rupture: Complete rupture involves the full thickness of the uterine wall, while incomplete rupture/dehiscence occurs when the visceral peritoneum remains intact. For clinical audit, coding of uterine rupture should be restricted to complete rupture. The IMIS definition will be amended to specify this distinction.

B. Hospital incidence of uterine rupture is rare; thus, annual rates of rupture should be interpreted with caution.

C. The main risk factor for uterine rupture is previous caesarean section. Research has shown that for women with previous caesarean section, the risk of uterine rupture is substantially higher after trial of labour than at repeat elective caesarean section. Induction of labour (using prostaglandins) is associated with the highest risk of uterine rupture.

Indicator #22: Peripartum hysterectomy

Definition Number of hysterectomy procedures completed during the birth episode of care, usually following a caesarean section, including hysterectomies performed during pregnancy and/or procedures within seven completed days after delivery.



Total mothers delivered* (n)	65,987
Peripartum hysterectomy (n)	24
National rate (per 1,000 mothers delivered)	0.36
95% CI	[0.22-0.51]

*Based on data from 19 maternity units

Notes:

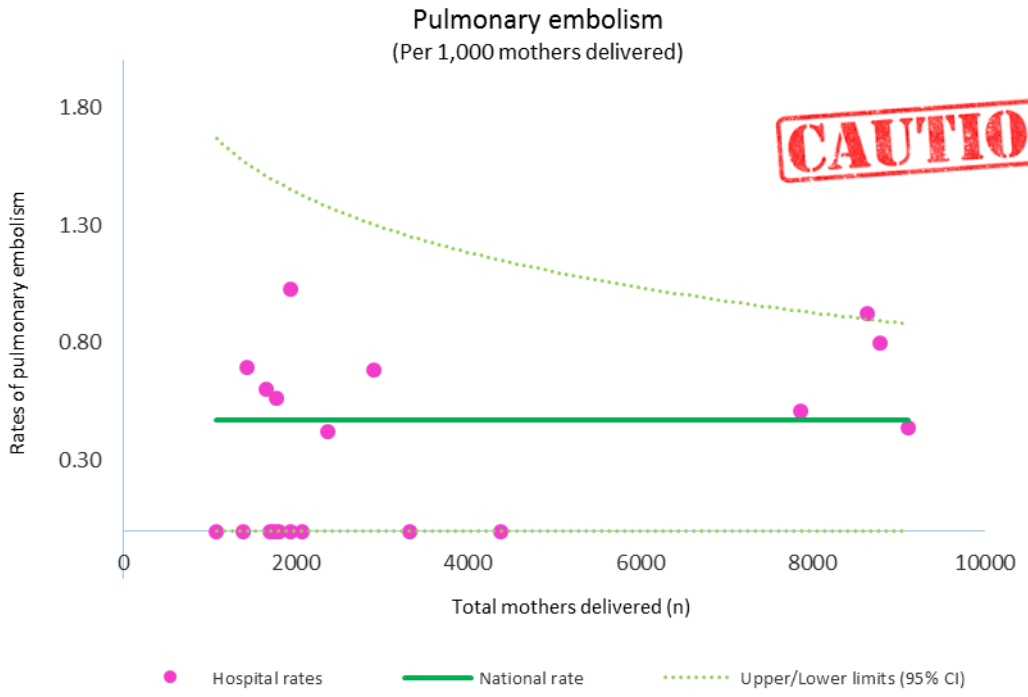
A. Peripartum hysterectomy, usually performed in emergency situations, is rare in modern obstetrics, but it is a life-saving procedure in cases of severe haemorrhage.

B. Nationally, there has been a downward trend in recent years of peripartum hysterectomy for uterine atony and an upward trend of peripartum hysterectomy for pathological placental bed localisation; there may be an association with increasing caesarean section rate.

C. Incidence of peripartum hysterectomy is rare and annual rates should be interpreted with caution.

Indicator #23: Pulmonary embolism

Definition Includes pulmonary emboli in pregnancy and/or the puerperium and excludes embolism complicating abortion or ectopic or molar pregnancy.



Total mothers delivered* (n)	65,987
Pulmonary embolism (n)	31
National rate (per 1,000 mothers delivered)	0.47
95% CI	[0.30-0.64]

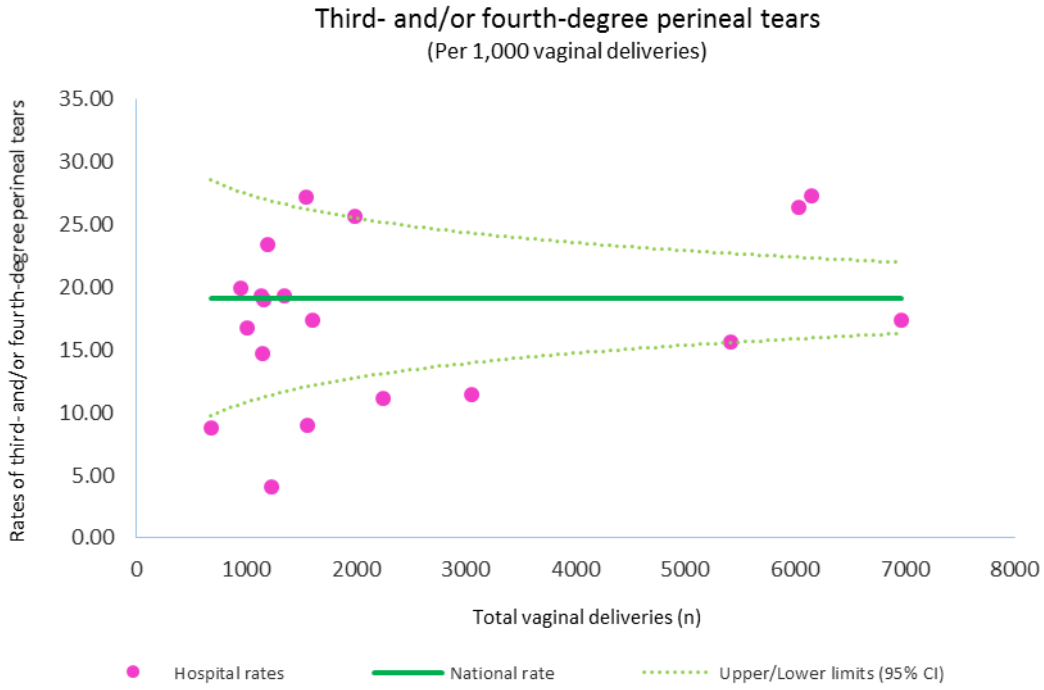
*Based on data from 19 maternity units

Note:

Pulmonary embolism is a leading cause of maternity mortality in developed countries. It is hoped that the number of cases nationally will decrease in response to implementing the National Clinical Guideline, Venous Thromboprophylaxis in Pregnancy (2013). Annual rates of PE should be interpreted with caution.

Indicator #24: Perineal tears

Definition Total numbers of third-degree and fourth-degree perineal lacerations, or tears in the vaginal tissue, perineal skin, and perineal muscles that extend into the anal sphincter and/or go through the anal sphincter and the tissue underneath it.



Total vaginal deliveries* (n)	46,437
Perineal tears (n)	891
National rate (per 1,000 vaginal deliveries)	19.19
95% CI	[17.94-20.44]

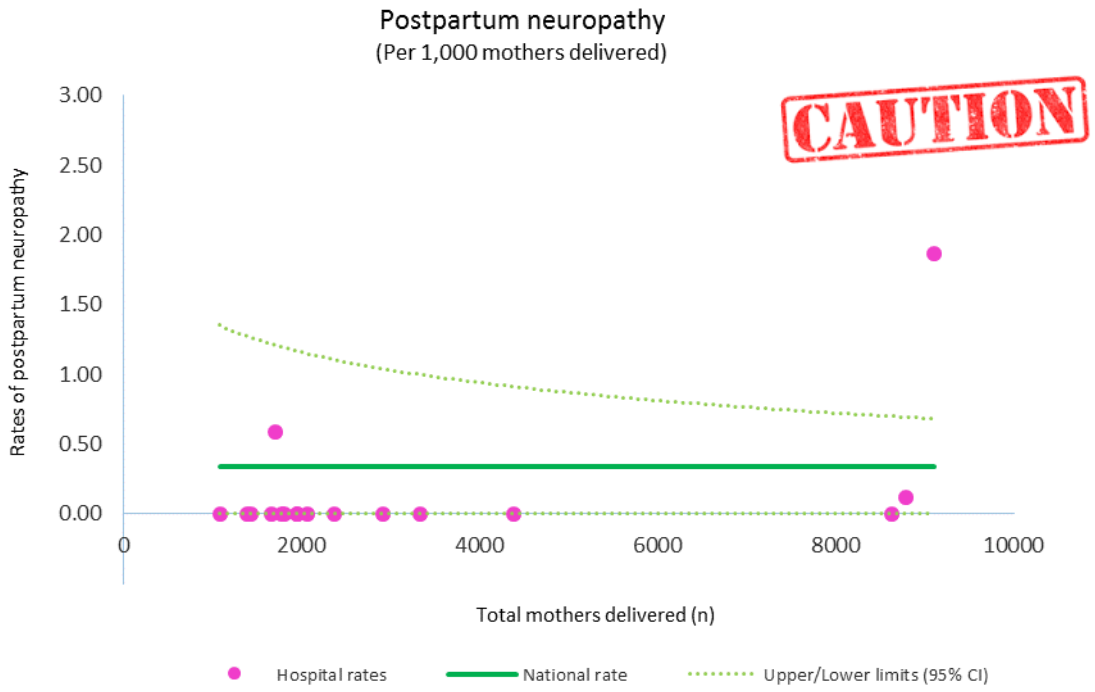
*Based on data from 19 maternity units

Note:

In recent years, rates of perineal tears have been increasing worldwide. Common risk factors include occiptoposterior position during delivery, primigravida, high birth weight, instrumental delivery, and the presence of shoulder dystocia. Conversely, induction of labour, use of medio-lateral episiotomy, epidural analgesia, and instrumental delivery of occipitoanterior position have been found to reduce the risk of severe perineal tears.

Indicator #25: Postpartum neuropathy

Definition Persistent (24-48 hours) partial lower limb or body weakness or numbness causing patient distress or loss of function. Related terms include postpartum palsy or lesion of femoral nerve.



Total mothers delivered* (n)	56,367
Postpartum neuropathy (n)	19
National rate (per 1,000 mothers delivered)	0.34
95% CI	[0.19-0.49]

*Based on data from 17 maternity units

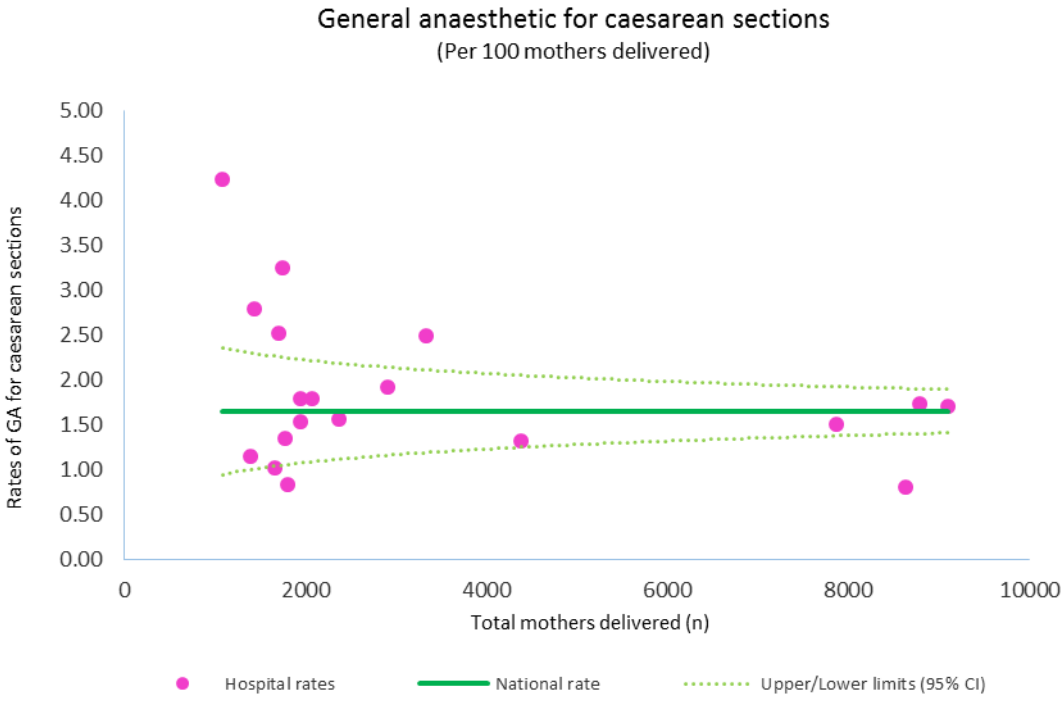
Note:

The IMIS marks is the first time postpartum neuropathy has been recorded in Ireland, which may account for the small numbers reported. To our knowledge, there are no international data collected on postpartum neuropathy. However, while relatively rare, postpartum neuropathy may be a valuable indicator of neurological injury to mothers.

Delivery Metrics

Indicator #26: General anaesthetic for Caesarean sections

Definition Total number of Caesarean section procedures that were administered a general anaesthetic (GA), including primary GA and conversion to GA from regional anaesthetic (epidural or spinal).



Total mothers delivered* (n)	65,987
General anaesthetic for caesarean sections (n)	1,090
National rate (%)	1.65%
95% CI	[1.55-1.75]

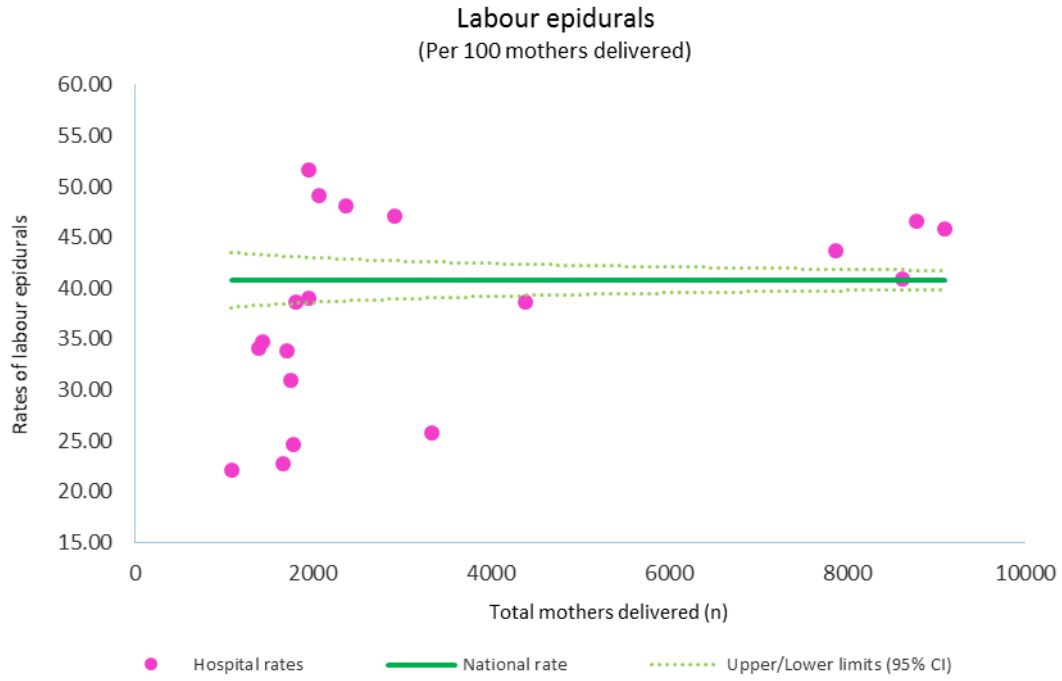
*Based on data from 19 maternity units

Note:

The risks associated with general anaesthetic during caesarean section delivery can be life-threatening. This procedure has declined enormously with increasing awareness of the associated dangers for both mother and baby. Regional (spinal or epidural) anaesthetic is usually the preferred option *(Rollins M, Lucero J. (2012) Overview of anesthetic considerations for Cesarean delivery. Br Med Bull 101(1): 105-25.)* Consequently, the funnel chart above is best interpreted in conjunction with the chart on Labour epidurals on the following page. However, general anaesthesia is often used in patients who have bleeding disorders or who require immediate delivery and may be used during caesarean sections when regional anaesthesia is insufficient.

Indicator #27: Labour epidurals

Definition Number of labour epidurals administered, including neuraxial block during labour and neuraxial block during labour and delivery procedure.



Total mothers delivered* (n)	65,987
Labour epidurals (n)	26,941
National rate (%)	40.83%
95% CI	[40.45–41.20]

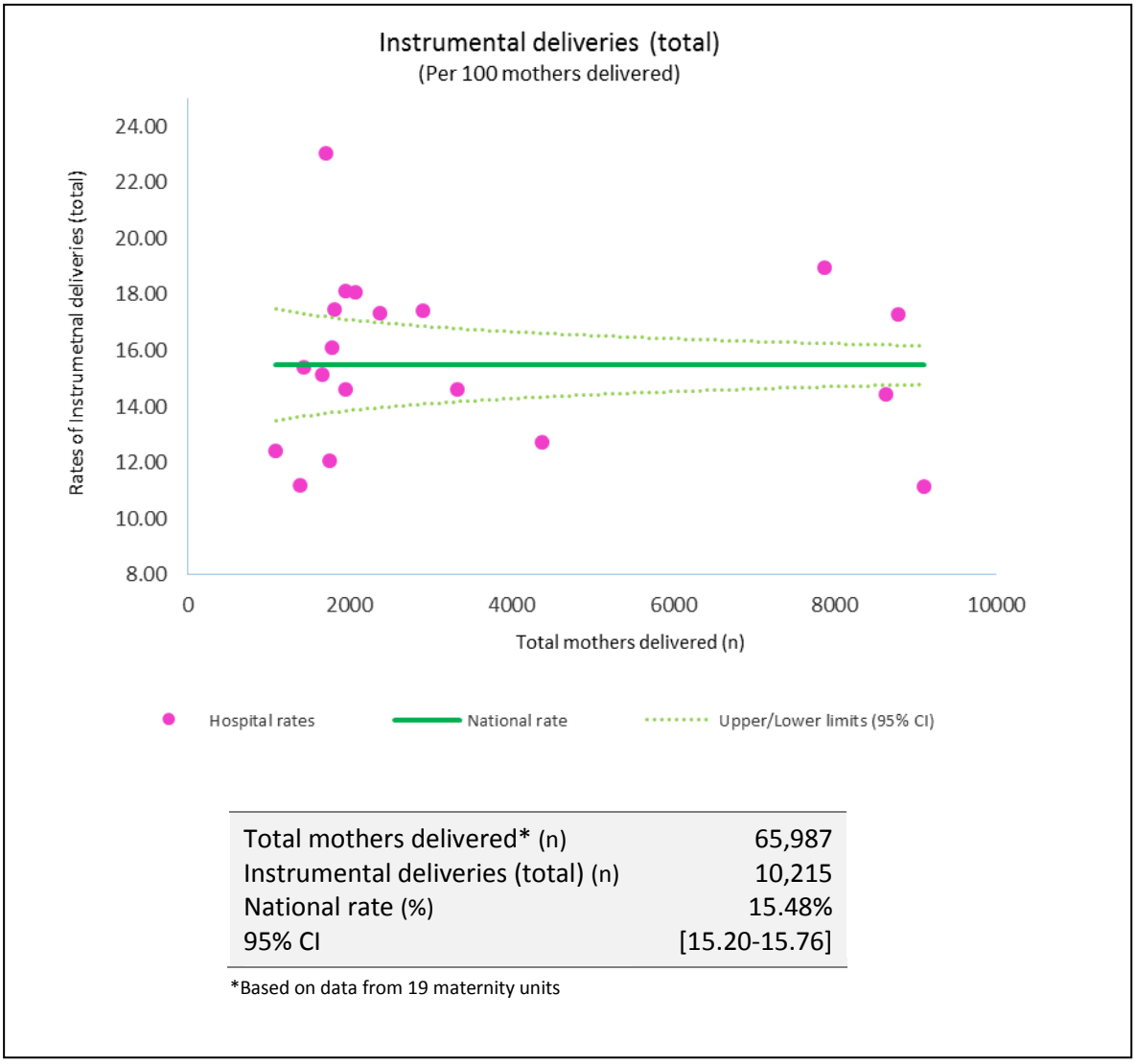
*Based on data from 19 maternity units

Note:

There is a high level of over-dispersion in the funnel chart (i.e., most of the maternity units lie beyond the 95% thresholds), which may suggest the indicator is not measuring the same clinical activity in all maternity units. In addition, the results may be affected by the use of 'Total mothers delivered' as a proxy measure of 'Total labours'. It would be useful to investigate the reasons for the variance.

Indicator #28: Instrumental deliveries (total)

Definition Includes forceps delivery and vacuum extraction, assisted breech delivery with forceps to after-coming head and Breech extraction with forceps to after-coming head. Excludes failed forceps and failed vacuum extraction. (Also called Operative Vaginal Delivery (OVD).)

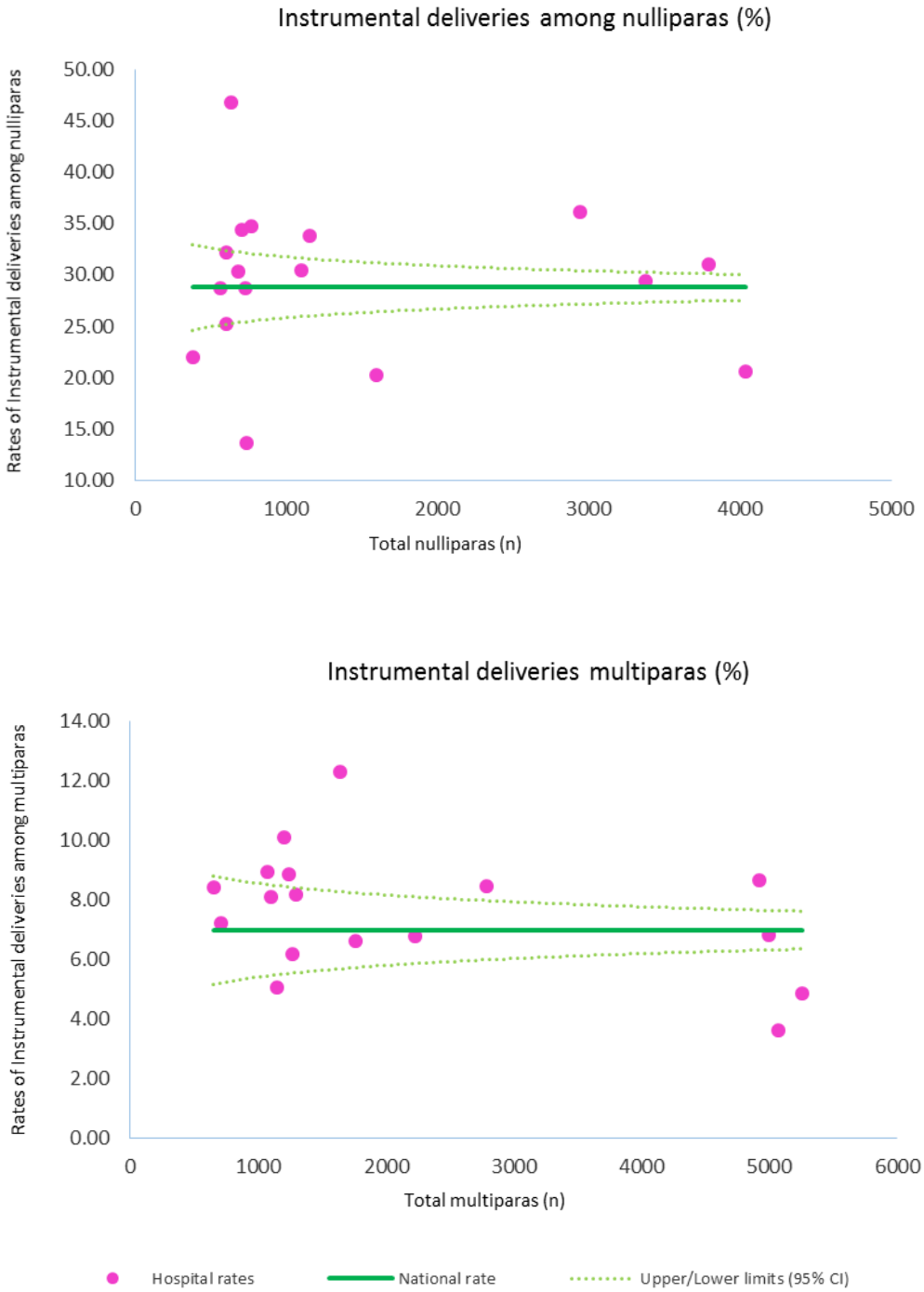


Total mothers delivered* (n)	65,987
Instrumental deliveries (total) (n)	10,215
National rate (%)	15.48%
95% CI	[15.20-15.76]

*Based on data from 19 maternity units

Instrumental deliveries among nulliparas (#28a) and multiparas (#28b)

(Definitions as before)

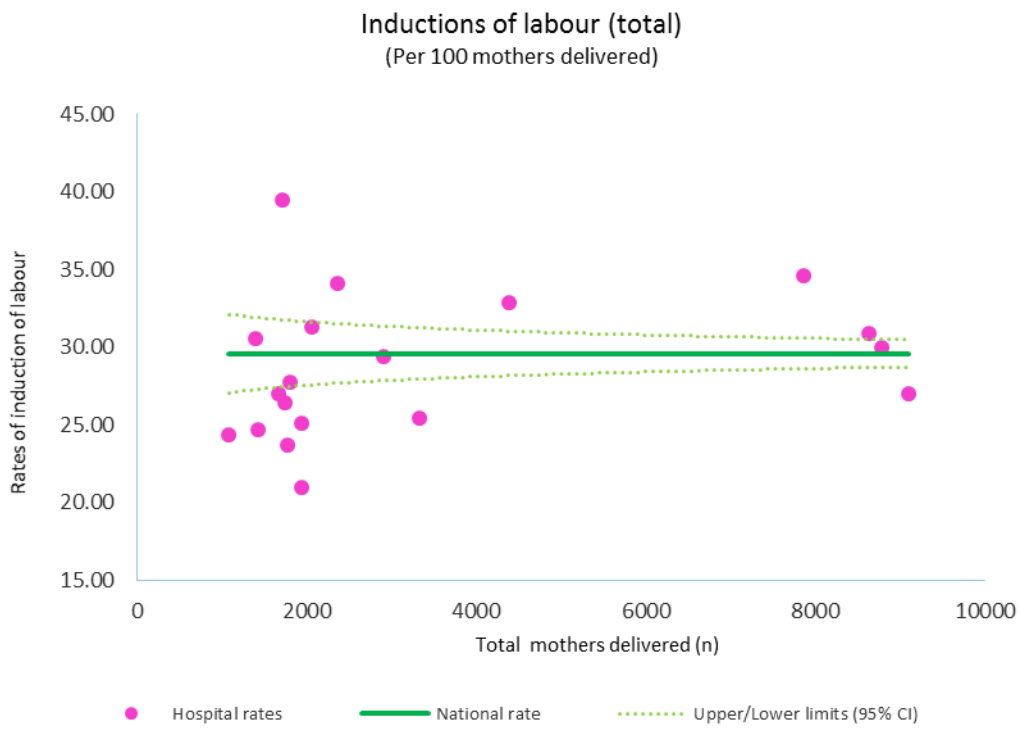


	Nulliparas	Multiparas
Totals* (n)	24,417	38,360
Instrumental deliveries (n)	7,031	2,677
National rates (%)	28.80%	6.98%
95% CI	[28.23-29.36]	[6.72-7.23]

*Based on data from 17 maternity units

Indicator #29: Inductions of labour (total)

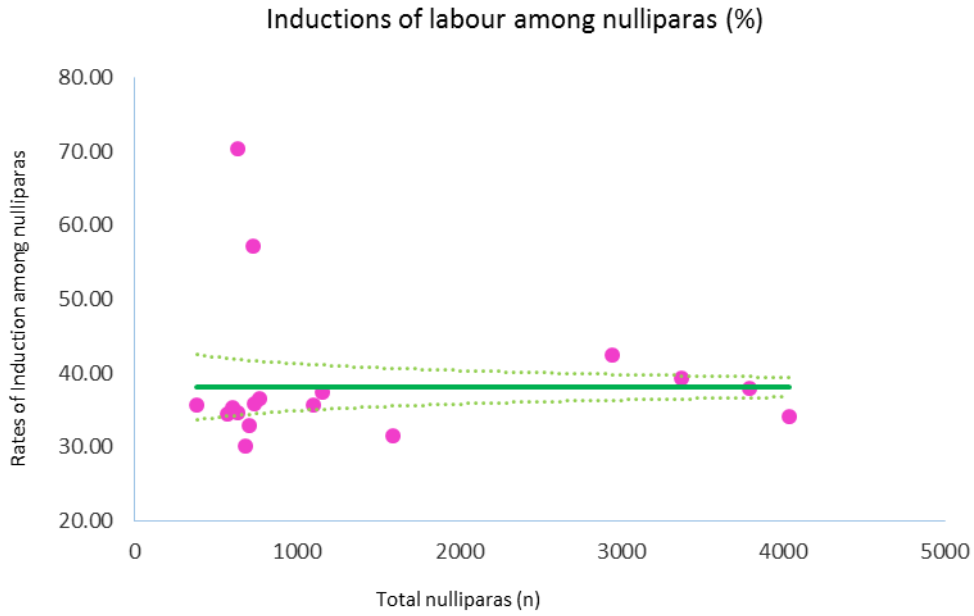
Definition Total number of women whose labour was induced, including medical induction of labour, oxytocin; medical induction of labour, prostaglandin; other medical induction of labour. Includes surgical induction of labour by artificial rupture of membranes; other surgical induction of labour; and synchronous medical and surgical induction of labour.

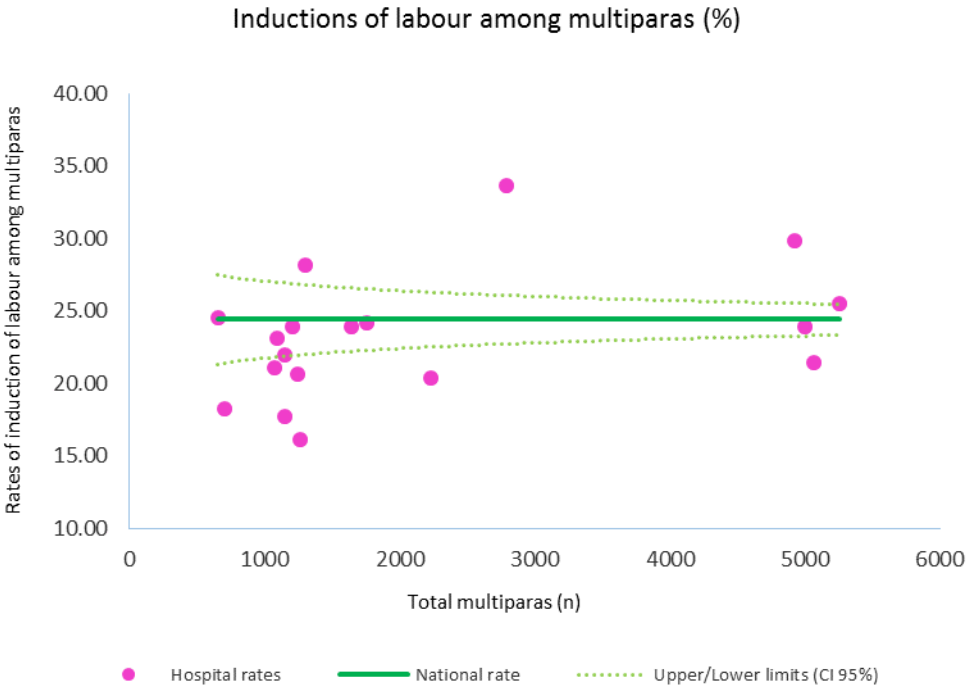


Total mothers delivered* (n)	65,987
Inductions of labour (total) (n)	19,531
National rate (%)	29.60%
95% CI	[29.25-29.95]

*Based on data from 19 maternity units

Inductions of labour among nulliparas (#29a) and multiparas (#29b) (Definitions as before)



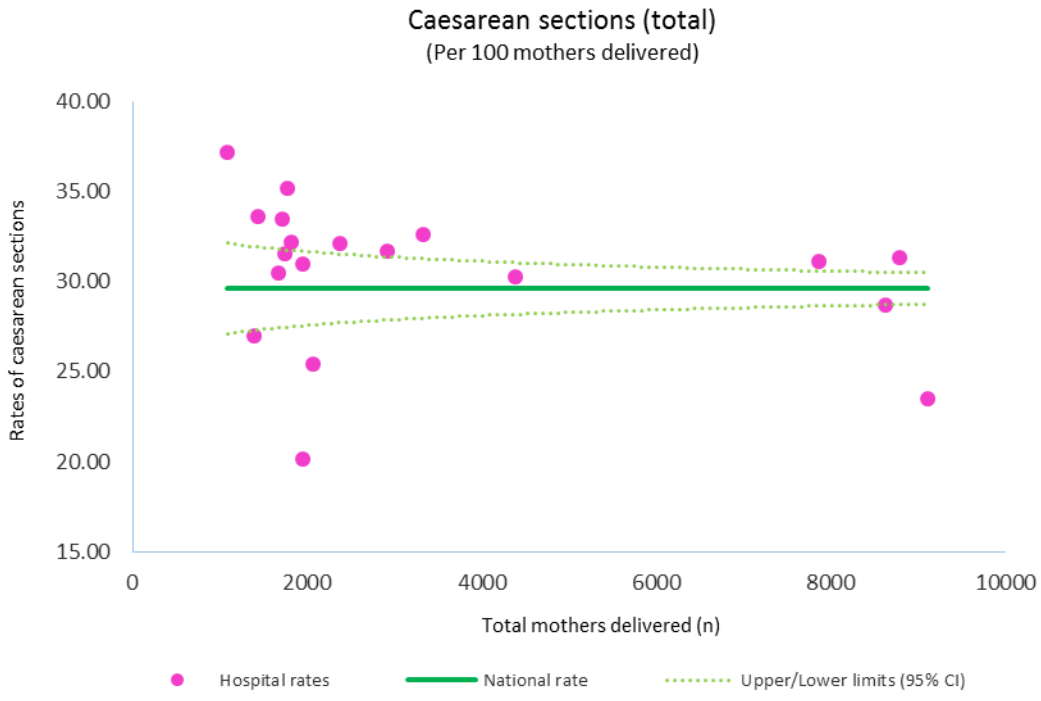


	Nulliparas	Multiparas
Totals* (n)	25,054	39,507
Inductions of labour (n)	9,536	9,643
National rates (%)	38.07%	24.41%
95% CI	[37.47-38.67]	[23.99-24.83]

*Based on data from 18 maternity units

Indicator #30: Caesarean sections (total)

Definition Total number of deliveries by caesarean section, including elective classical caesarean section, emergency classical caesarean section, elective lower segment caesarean section, and emergency lower segment caesarean section.



Total mothers delivered* (n)	65,987
Caesarean sections (total) (n)	19,550
National rate (%)	29.63%
95% CI	[29.28-29.98]

*Based on data from 19 maternity units

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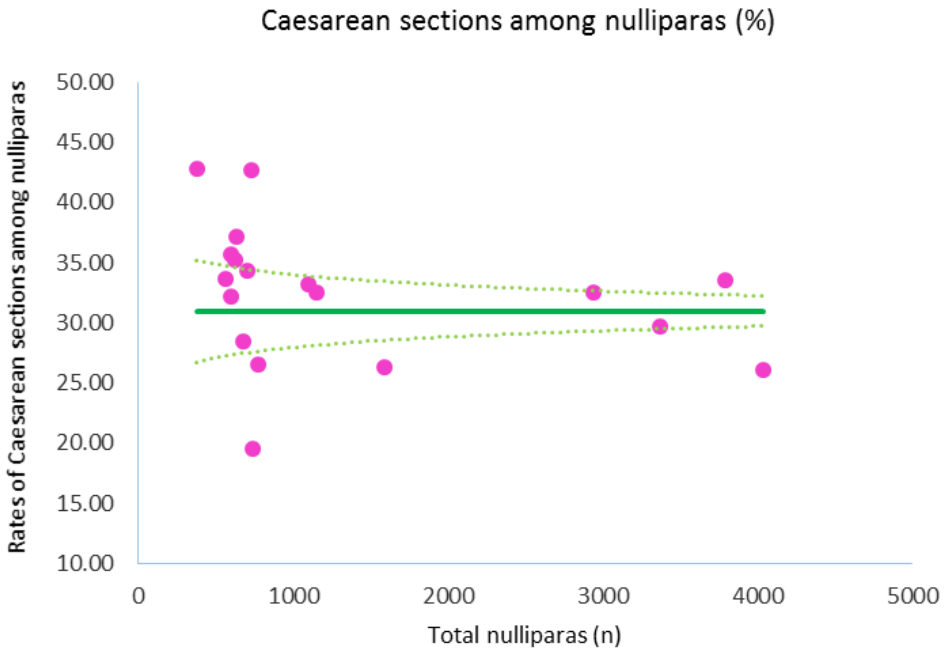
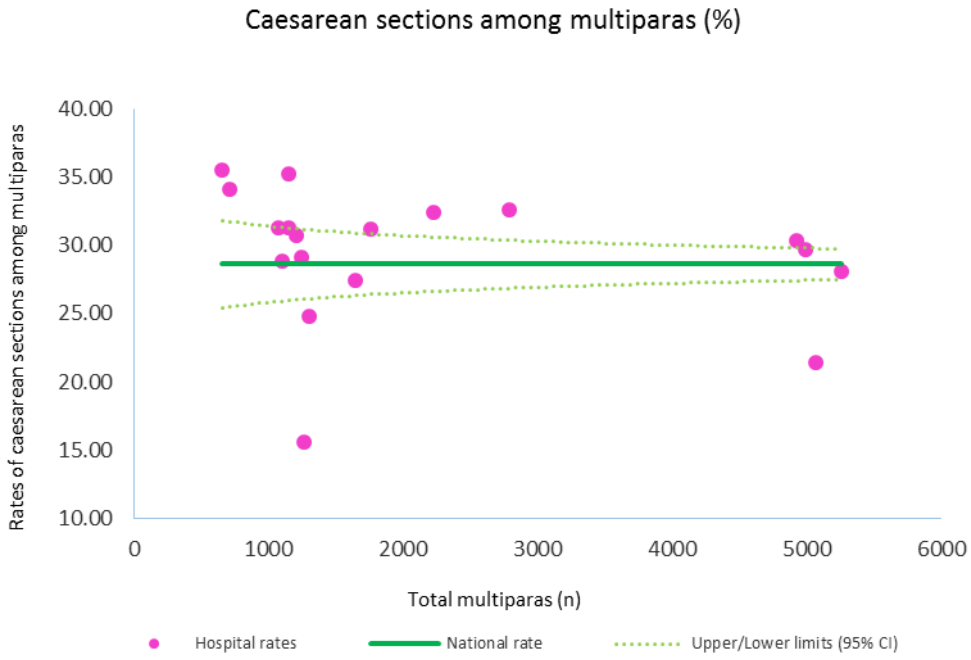
Note:
Like other countries, the proportion of women undergoing caesarean section deliveries is increasing. There are many possible reasons for these increases, including reductions in the risk of caesarean delivery, increasing litigation, increases in first births among older women, and the rise in multiple births resulting from assisted reproduction. Also like other countries, there is wide variation in rates of caesarean section deliveries between hospitals. We recommend that maternity units analyse their caesarean section rates using the Robson Ten Groups Classification.

Caesarean sections among nulliparas (#30a) and multiparas (#30b)
(Definitions as before)





	Nulliparas	Multiparas
Totals* (n)	25,054	39,507
Caesarean sections (n)	7,763	11,305
National rates (%)	30.99%	28.62%
95% CI	[30.42-31.57]	[28.17-29.06]

*Based on data from 18 maternity units

Summary

The IMIS is a standardised data collection and review system for all maternity units. It was introduced in 2014 and is currently routinely implemented in all 19 maternity units. Data are collected within hospitals on a monthly basis and are submitted to the hospital senior managers for monthly review. Annual data for 2014 were submitted to the HSE and copied to the National Clinical Programme for Obstetrics and Gynaecology.

This is the first IMIS national report. One of the most valuable outcomes of the introduction of the IMIS to date is the relative speed of adoption: Within the first year of implementation, IMIS has become embedded in hospital processes and staff are steadily becoming more proficient with data collection and data review.

The overall objective of the IMIS is to bring consistency and reliability to the collection of data on activities and outcomes in maternity services nationally for hospital managers and healthcare decision-makers in order to facilitate the development of new quality assurance initiatives. The specific aims of the IMIS are:

- To specify a standard range of activities and outcomes for data collection by all 19 maternity units;
- To cultivate consistent hospital practices of regular data collection, review, and monitoring;
- To identify and explain variations in maternity care;
- To signal potential problems and to highlight cases for investigation;
- To provide assurance for staff and patients in maternity services.

In summary:

1) The IMIS is intended to drive improvements in clinical care and hospital management practices.
2) Maternity units should aim to enter complete data and ensure standardised definitions and coding practices are followed in order to improve consistency across all units (to this end, clinicians must take ownership of their own data in order to continually improve quality).
3) Further work is required to refine and develop the IMIS in order to create a more balanced, versatile, and comprehensive suite of perinatal indicators.
4) While this national report provides unadjusted rates, it provides explanatory notes to account for activities in particular maternity units.
5) We recommend that all analysis of clinical and obstetric data, especially where data have small values, should be treated with caution.
6) The IMIS is not intended to replace or substitute any existing national data systems (e.g. HIPE, NPRS), which are designed for different purposes and are not tailored to the development of maternity indicators for assessment of quality of care in maternity services.
7) Performance, or quality, indicators should be used as a basis for multidisciplinary teams to reflect on current practice.
8) The IMIS is designed to align with the forthcoming national Maternal and Newborn Clinical Management System (MN-CMS), which is scheduled to be operational in all maternity units by 2018.

Appendices

Appendix 1: National longitudinal trends, 2008-2014

This appendix provides national longitudinal information on selected IMIS indicators, based on national data from the National Perinatal Reporting System (NPRS) and Hospital In-Patient Enquiry (HIPE).[4] Data from IMIS 2014 are added in different colours to indicate indicative trends and to highlight differences between the data systems.

The NPRS provides national statistics on perinatal events based on approximately 70,000 birth records each year from 19 maternity units and all practicing self-employed community midwives. The NPRS data were obtained directly from the HSE. The NPRS data provided numbers of births, numbers of maternities/women delivered, parity (nulliparas and multiparas), numbers of vaginal deliveries, and numbers of perinatal deaths for all years from 2008 to 2013.

The HIPE is the health information system designed to collect medical and administrative data regarding discharges from and deaths in acute hospitals in the ROI, reporting on over 1.5 million records annually. The HIPE data were obtained from the HIPE Online Portal (HOP) software, with assistance from the Healthcare Pricing Office (www.hpo.ie). The HIPE data were used to assess the numbers of selected obstetric metrics and selected deliveries, which are contained in the 'Pregnancy, childbirth and the puerperium' category. The analysis is based on total numbers of discharges,[5] which were selected on the basis of 'All diagnoses' and 'All procedures' from 1 January to 31 December for each year from 2008-2013. The 'All diagnoses' report provides a count of all-listed diagnosis codes (including principal diagnosis and any additional diagnoses); it does not provide a count of discharges. The 'All procedures' report provides a count of the number of procedures (including principal and additional procedures) for discharges where a procedure was reported; it does not provide a count of discharges.

The data were extracted from the HIPE using the HOP Online Portal, with assistance from the Healthcare Pricing Office (HPO) and were analysed using MS Excel. National rates were calculated for all maternity units and hospital-level rates were calculated for each unit individually. Confidence limits were calculated using 95% confidence levels.

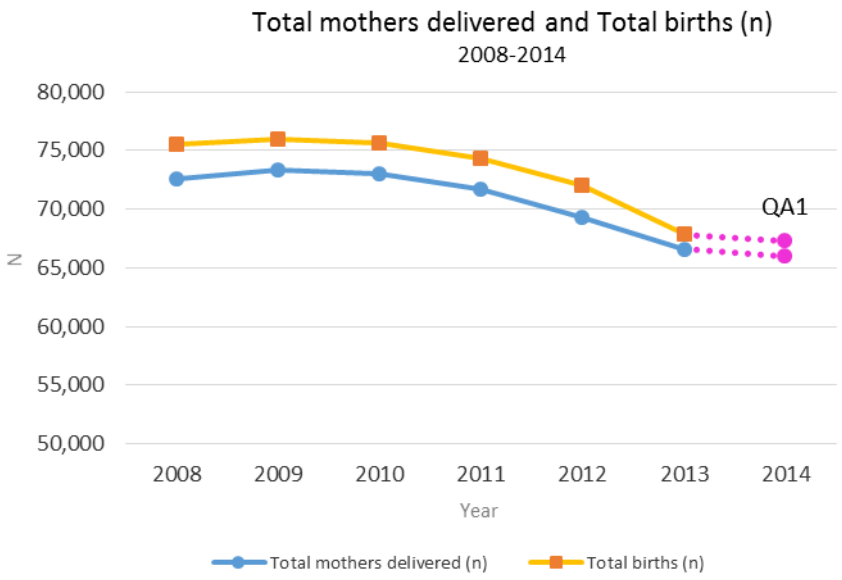
4 Data for 2008-2012 are based on the NPRS Annual Report 2013 and data for 2013 are based on unpublished data files. HIPE file sources: 2013_ASOF_0814_V20_CLOSE_ENC, 2012_ASOF_0614_V23_CLOSE_ENC; 2011_ASOF_0814_V25_CLOSE_ENC; 2010_ASOF_0814_V22_CLOSE_ENC; 2009_ASOF_0513_V22_CLOSE_ENC; 2008_ASOF_0812_V28_CLOSE_ENC.

5) Each HIPE discharge record represents one episode of care and patients may have been admitted to more than one hospital with the same or different diagnoses. In the absence of a unique patient identifier in HIPE, the unit of measurement is discharges and not patients. Discharges are coded using ICD-10-AM, the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification. The ICD-10-AM disease component is based on the World Health Organisation (WHO) ICD-10. ICD-10-AM is used in conjunction with the Australian Classification of Health Interventions (ACHI) and the Australian Coding Standard (ACS) to reflect an accurate health episode of care. Between 2005 and 2008 the 4th edition of this classification was used to code all discharges. From 1st January 2009, Ireland updated to the 6th Edition of ICD10-AM/ACHI/ACS to code all discharges.

1.1 Mothers delivered and Births

Total mothers delivered: Women delivering a baby weighing 500g or more

Total births: Number of live births and stillbirths weighing greater than or equal to 500g



	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013**	*2014*
Total mothers delivered (n)	72,574	73,373	73,032	71,705	69,263	66,574	65,987
Total births (n)	75,587	76,023	75,600	74,377	71,986	67,864	67,263

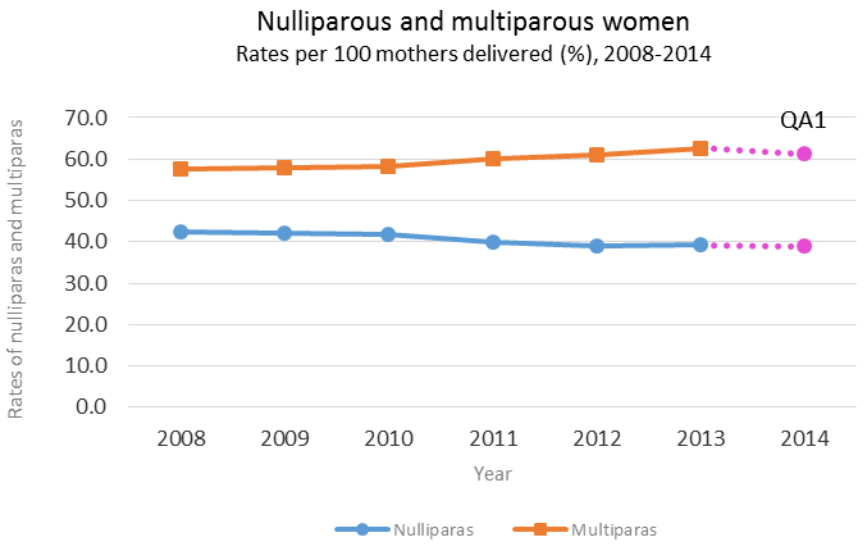
* National data based on NPRS Annual Report 2013 (December 2014).

† IMIS 2014 based on 19 maternity units.

1.2 Nulliparas and Multiparas

Nulliparas: Deliveries ≥500g to women who have never had a previous pregnancy resulting in a live birth or stillbirth.

Multiparas: Deliveries ≥500g to women who have had at least one previous pregnancy resulting in a live birth or stillbirth.



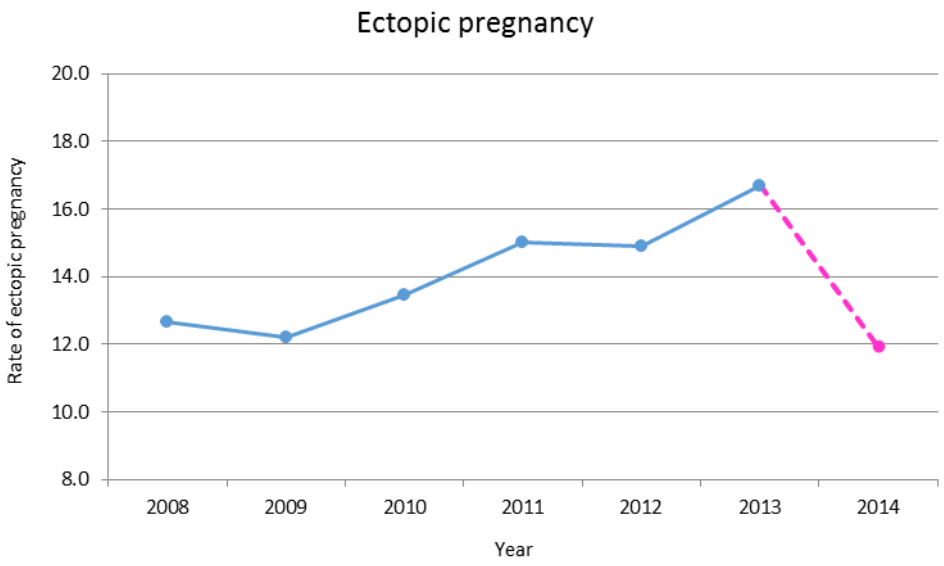
	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Nulliparas (%)	42.5	42.2	41.7	40.0	39.0	39.3	38.7
Multiparas (%)	57.5	57.8	58.3	60.0	61.0	62.6	61.3

* Rates of nulliparas and multiparas per 100 mothers delivered based on NPRS total maternities.

† IMIS 2014 based on 19 maternity units.

1.3 Ectopic pregnancy

Definition — Number of women diagnosed with an ectopic pregnancy, including abdominal pregnancy, tubal pregnancy, ovarian pregnancy, and other/ unspecified pregnancy.



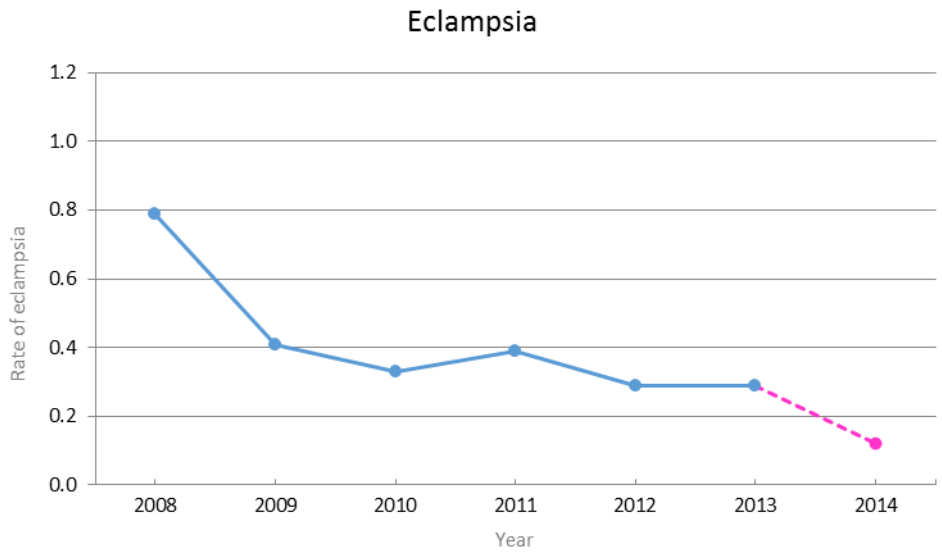
	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Rate of ectopic pregnancy per 1,000 mothers delivered	12.68	12.23	13.45	15.02	14.89	16.70	11.93

* Total mothers delivered based on NPRS total maternities; ectopic pregnancy extracted from the HIPE based on the following selection: All Diagnoses equal to ICD-10-AM O00 (including O00.0 (abdominal pregnancy), O00.1 (tubal pregnancy), O00.8 (other ectopic pregnancy), O00.9 (ectopic pregnancy unspecified)) (sources as before).

† IMIS 2014 based on 19 maternity units.

1.4 Eclampsia

Definition — Number of women diagnosed with eclampsia during any antenatal hospital event or at delivery, including eclampsia in pregnancy, in labour, in the puerperium, and eclampsia unspecified as to time period. Does not include severe pre-eclampsia.



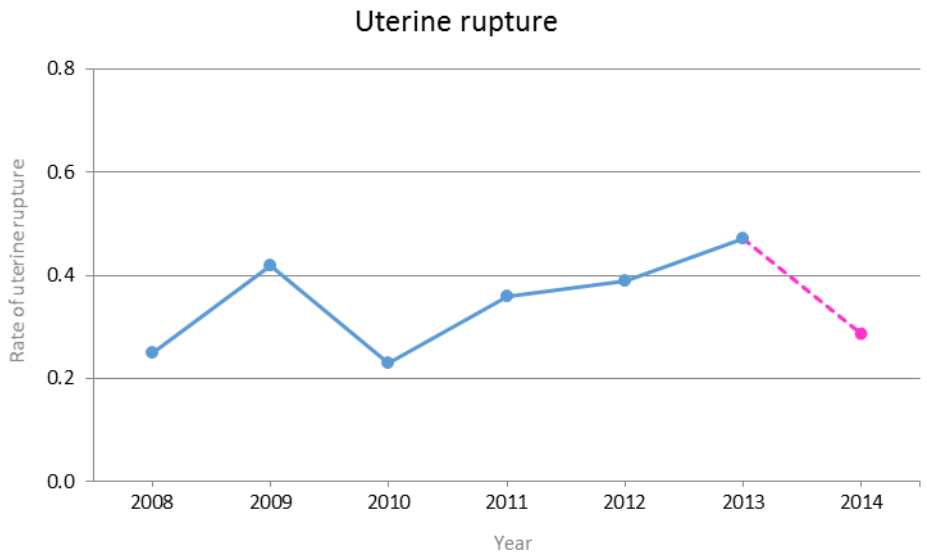
	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Rate of eclampsia per 1,000 mothers delivered	0.79	0.41	0.33	0.39	0.29	0.29	0.12

∗ Total mothers delivered based on NPRS total maternities; eclampsia extracted from the HIPE based on the following selection: All Diagnoses equal to ICD-10-AM O15.0 (eclampsia in pregnancy), O15.1 (in labour), O15.2 (in the puerperium), and O15.9 (eclampsia unspecified as to time period) (sources as before).

† IMIS based on 19 maternity units.

1.5 Uterine rupture

Definition — Total number of ruptures of uterus before onset of labour or during labour, including cases that may not be diagnosed until after delivery.



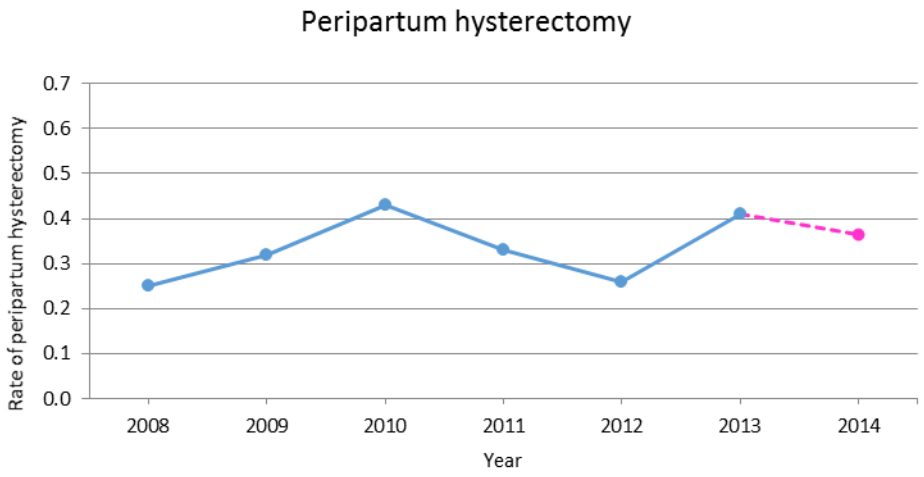
	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Rate of uterine rupture per 1,000 mothers delivered	0.25	0.42	0.23	0.36	0.39	0.47	0.29

*Total mothers delivered based on NPRS total maternities; uterine rupture extracted from the HIPE based on the following selection: All Diagnoses equal to Total number of ruptures of uterus before onset of labour or during labour, including cases that may not be diagnosed until after delivery (ICD-10-AM O71.0, O71.1).

† IMIS based on 19 maternity units.

1.6 Peripartum hysterectomy

Definition — Number of hysterectomy procedures completed during the birth episode of care, usually following a caesarean section, including hysterectomies performed during pregnancy and/or procedures within seven completed days after delivery.



	National perinatal data*						IMIS †
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Rate of peripartum hysterectomy per 1,000 mothers delivered	0.25	0.32	0.43	0.33	0.26	0.41	0.36

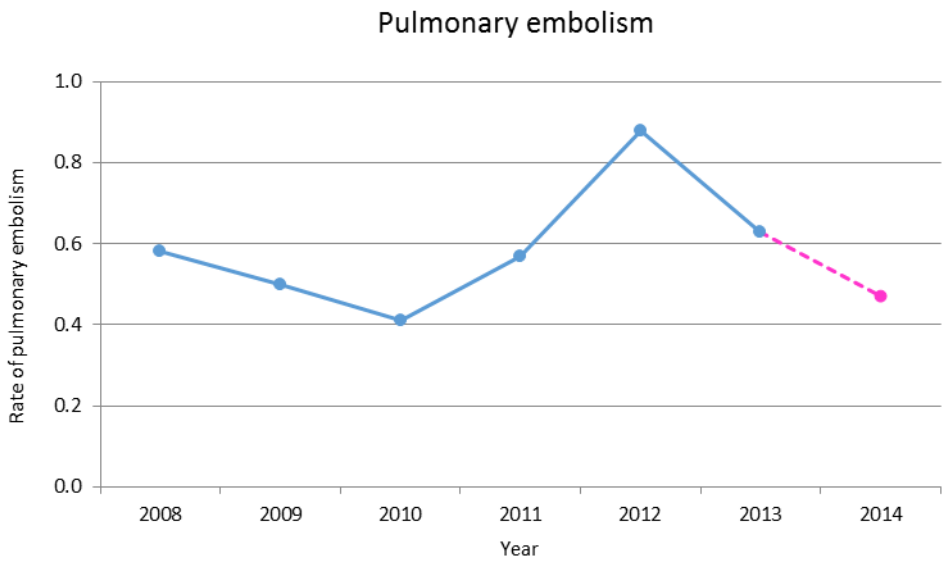
* Total mothers delivered based on NPRS total maternities.

*Peripartum hysterectomy extracted from the HIPE based on the following selection: All Diagnoses equal to Hysterectomy procedures completed during the birth episode of care, usually following a Caesarean Section, including hysterectomies performed during pregnancy and/or procedures within seven completed days after delivery (ACHI Procedure blocks 1268 and 1269) and All Diagnoses equal to z37 Outcome of delivery.

† IMIS based on 19 maternity units.

1.7 Pulmonary embolism

Definition — Includes pulmonary emboli in pregnancy and/or the puerperium and excludes embolism complicating abortion or ectopic or molar pregnancy.



	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Rate of pulmonary embolism per 1,000 mothers delivered	0.58	0.50	0.41	0.57	0.88	0.63	0.47

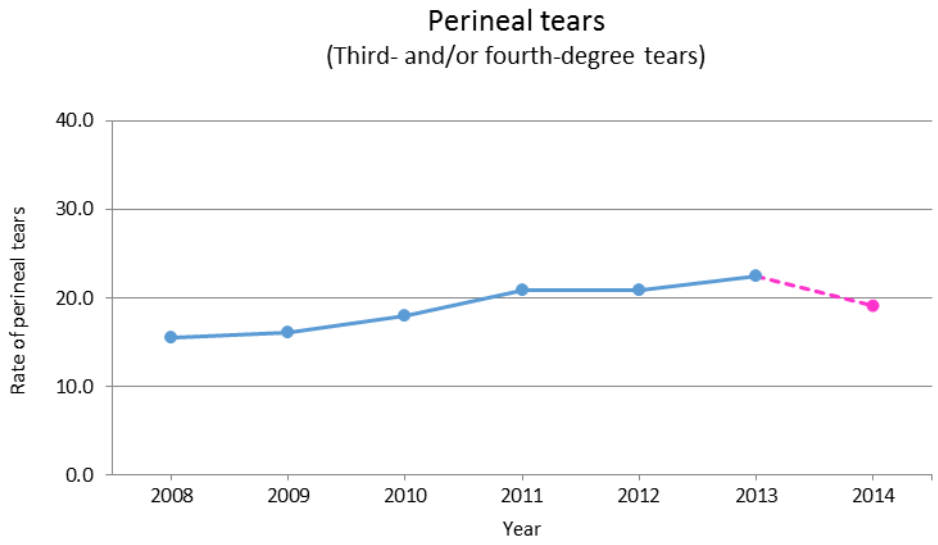
* Total mothers delivered based on NPRS total maternities.

* Pulmonary embolism extracted from the HIPE based on the following selection: Includes pulmonary emboli in pregnancy and/or the puerperium; excludes embolism complicating abortion or ectopic or molar pregnancy (ICD-10-AM O88.2).

† IMIS based on 19 maternity units.

1.8 Perineal tears (third-degree and/or fourth-degree)

Definition — Total numbers of third-degree and fourth-degree perineal lacerations, or tears in the vaginal tissue, perineal skin, and perineal muscles that extend into the anal sphincter and/or go through the anal sphincter and the tissue underneath it.



	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014**
Rate of perineal tears per 1,000 vaginal deliveries	15.52	16.06	18.01	20.95	20.92	22.48	19.19

* National figures for total vaginal deliveries nationally based on NPRS 2012/2013 (selection: All maternities less Caesarean sections).

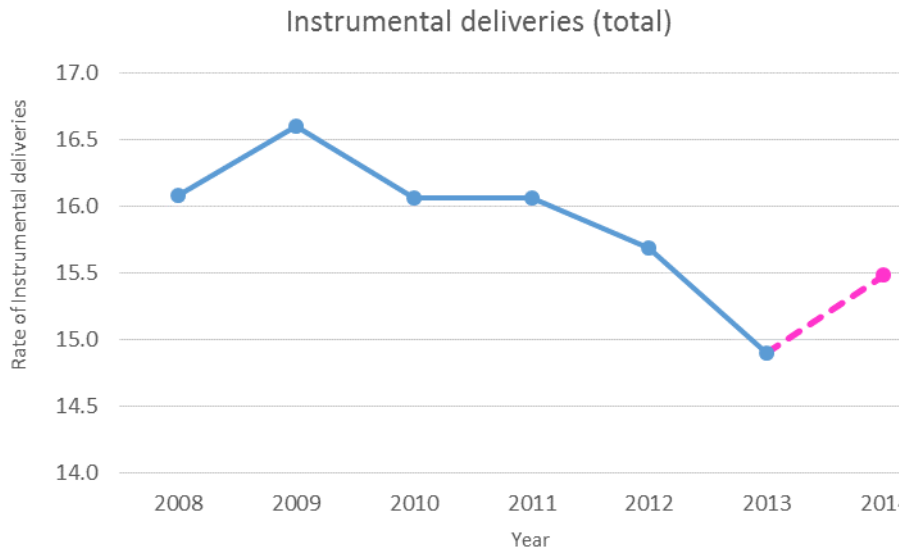
* National figures for perineal tears extracted from the HIPE, based on the following selection: All Diagnoses (ICD-10-AM) equal to O70.2 (3rd degree) and O70.3 (4th degree) (sources as before).

† IMIS based on 19 maternity units.

1.9 Instrumental deliveries

Definition

Includes forceps delivery and vacuum extraction, excluding failed forceps and failed vacuum extraction. Forceps delivery includes low forceps delivery, mid-cavity forceps delivery, high forceps delivery, forceps rotation of fetal head, and forceps rotation of fetal head with delivery. Also includes assisted breech delivery with forceps to after-coming head and Breech extraction with forceps to after-coming head. (Also called Operative Vaginal Deliveries (OVD).)



	National perinatal data*						IMIS †
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Rate of Instrumental deliveries per 100 mothers delivered (%)	16.08	16.6	16.06	16.06	15.69	14.90	15.47

* Total mothers delivered based on NPRS total maternities.

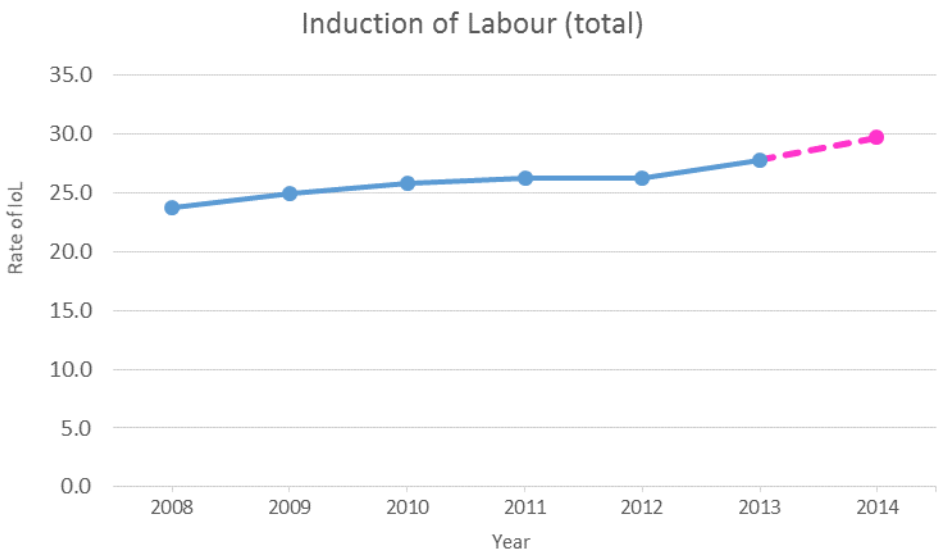
* Figures for OVD extracted from the HIPE based on the following selection: ACHI Procedure Block 1337 (includes codes 90468-00, 90468-01, 90468-02, 90468-03, 90468-04) and Procedure codes 90469-00, 90470-02, 90470-04.

† IMIS based on 19 maternity units.

1.10 Induction of labour

Definition

Including medical induction of labour, oxytocin; medical induction of labour, prostaglandin; other medical induction of labour. Includes surgical induction of labour by artificial rupture of membranes; other surgical induction of labour; and synchronous medical and surgical induction of labour.



	National perinatal data*						IMIS †
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Rate of induction of labour per 100 mothers delivered (%)	23.71	24.86	25.76	26.16	26.24	27.77	29.59

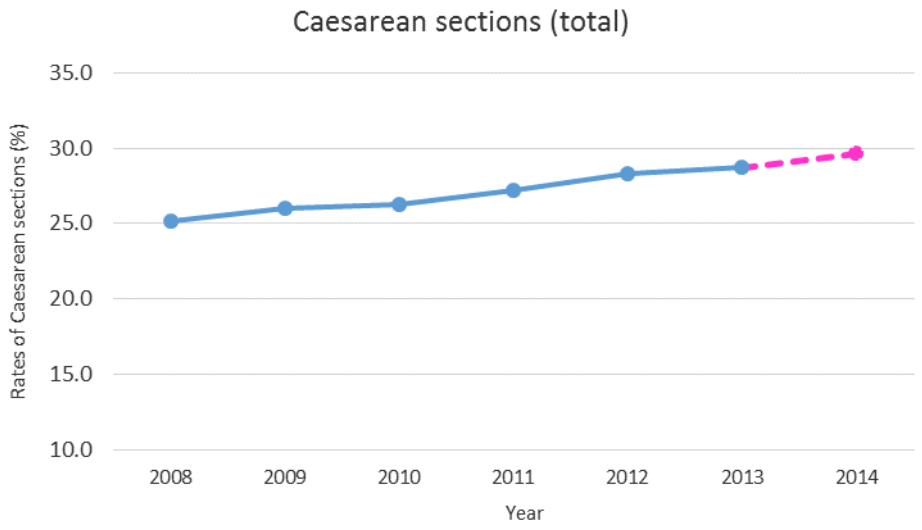
* Total mothers delivered based on NPRS total maternities.

* Figures for induction of labour extracted from the HIPE based on the following selection: ACHI Procedure Block 1334 (includes Procedure codes 90465-00, 90465-01, 90465-02, 90465-03, 0-465-04, 90465-05).

† IMIS based on 19 maternity units.

1.11 Caesarean sections

Definition — Deliveries by caesarean section, including elective classical caesarean section, emergency classical caesarean section, elective lower segment caesarean section, and emergency lower segment caesarean section.



	National perinatal data*						IMIS†
	2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014**
Rate of caesarean sections per 100 mothers delivered (%)	25.18	25.98	26.26	27.18	28.29	28.72	29.62

* Total mothers delivered based on NPRS total maternities.

* Figures for caesarean sections extracted from the HIPE based on the following selection: Procedure Block 1340.

† IMIS based on 19 maternity units.

Appendix 2: National Recommendations

There follows an outline of the relevant national recommendations and initiatives that have been produced since 2013, which align with and support safety of care in the maternity services and the IMIS.

1. **HSE NIMT Recommendations, Incidental factor 1 (June 2013)**

   'The review team recommends consideration of a National Quality Assurance Programme of Obstetrics and Gynaecology as an initial step to maintain confidence amongst patients/services users, staff, the public administrators and regulators and to put into place safety systems and interventions before a catastrophe happens. Monthly workloads, clinical outcomes, and adverse incidents should be monitored by using a dashboard to include green, amber and red signals to warn of the possibilities of impending problems.' (HSE, June 2013).

2. **HIQA National Recommendations (October 2013)**

   In October 2013, the HIQA produced national statutory recommendations, two of which refer directly to quality assurance in the maternity services.

   HIQA National Recommendation N16:

   'The HSE and key stakeholders should agree and implement effective arrangements for consistent, comprehensive national data collection for maternity services in order to provide assurance about the quality and safety of maternity services. This should include the development of an agreed and defined dataset and standardised data definitions to support performance monitoring, evaluation and management of key patient outcome and experience indicators.'

   HIQA National Recommendation N17:

   'The arrangements for collecting, reviewing and reporting maternal morbidity and mortality should be reviewed by the HSE to facilitate national and international benchmarking for improved learning and safety in the provision of maternity services. This should include a formal process for the implementation of recommendations of the Confidential Maternal Death Enquiries.' (HIQA, October 2013).

3. **HSE Midland Regional Hospital, Portlaoise, Report of Chief Medical Officer on Perinatal Deaths 2006-date:**

   In February 2014, Dr Tony Holohan, Chief Medical Officer, reported to the Minister for Health Dr James Reilly TD, about perinatal deaths in Portlaoise. The report contained a list of recommendations, several of which are relevant to quality and safety (and measurement) in the maternity services and which led to the development (by the HSE Acute Hospitals Division, the Obstetrics and Gynaecology Clinical Programme, the HSE Quality Assurance and Verification Division, and the HSE Quality Improvement Division) in May 2015 of the Maternity Patient Safety Statement (MPSS). The MPSS is a monthly statement on the quality of care in maternity units that uses selected IMIS indicators.

Theme IV recommendations:

- The HSE should issue a directive to all providers to require them to notify the director of quality and patient safety and HIQA of all 'never events' (R.21)
- The HSE should ensure that every maternity service (and later every health service provider) should be required to complete a Patient Safety Statement which is published and updated monthly (R.22) (see O.R.10)
- The Patient Safety Statement should be a requirement of hospital licensing (R.23) (see O.R.10)
- A National Patient Safety Surveillance system should be established by HIQA (R.24) (see O.R.8)

Overall recommendations:

- Every maternity service (and later every health service provider) be required to complete a Patient Safety Statement which is published and updated monthly (O.R.10)
- A National Patient Safety Surveillance system should be established by HIQA (O.R.11)

4. Safety Incident Management Policy (June 2014)

In June 2014, the HSE National Incident Management Team drafted the Safety Incident Management Policy, which was approved by Dr Philip Crowley, National Director Quality and Patient Safety, HSE. The purpose of the document is to set out the HSE policy for managing safety incidents across a range of areas, including surgical events, product or device events, patient protection events, care management events, environmental events, and criminal events. Several of the Serious Reportable Events (SRE) are relevant to maternity services.

5. Review by Dr Peter Boylan (June 2015)

A review of 28 maternity case notes by a clinical review team conducted by Dr Peter Boylan recommended that hospitals should implement a formal system of audit of pregnancy outcome.

> **Recommendation:** 'Each hospital in the State should implement a formal system of audit of pregnancy outcome classified according to the Ten Groups Classification as recently endorsed by the WHO. This audit should take place on a monthly basis and involve all relevant clinicians. Each hospital needs to supply relevant administrative support.
>
> 'Using data from individual maternity units an annual audit of Irish maternity services should be implemented without delay … Ongoing audit in this manner will allow a pattern of adverse outcomes to be identified in a timely fashion so that appropriate action can be taken.'

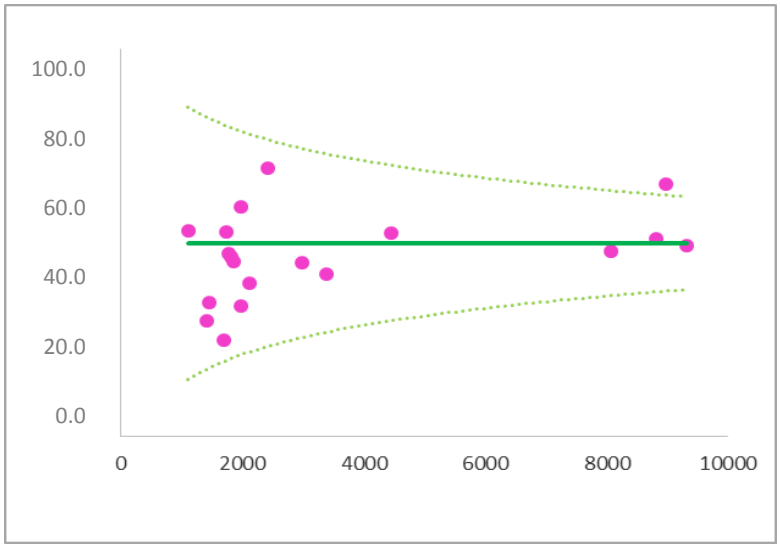
Appendix 3: Data and Methods

The data in the report are derived from IMIS 2014. The data were collected by QA Officers in each hospital on a monthly basis and the annual data were sent to the HSE and copied to the CPOG. The data were checked by the IMIS Project team and verified in conjunction with QA Officers and senior managers in the maternity units. The data were analysed and customised funnel plots created using MS Excel.

Funnel plots are a form of scatter plot in which observed area rates are plotted against area populations. Control limits are then overlaid on the scatter plot. The control limits represent the expected variation in rates assuming that the only source of variation is stochastic (i.e. include a random variable). The control limits are computed in a fashion very similar to confidence limits and exhibit the distinctive funnel shape as a result of smaller expected variability in larger populations.

Funnel plots are useful where observations for different hospitals are based on varying sample sizes. The funnel-shaped confidence limits indicate that, as sample sizes decrease, an observation must be further from the national average to be considered significantly different. The purpose of the charts is to enable each maternity unit to observe their position relative to the national benchmark and the upper and lower control limits.

Interpreting a funnel plot:



Each pink dot represents a maternity unit (19 in total).

The vertical axis measures the frequency of the outcome during 2014, usually expressed as a rate per 1,000 or as a percentage. The dots higher up are maternity units with a higher rate of the outcome.

The horizontal axis measures the number of total births or total maternities (or, in one case, total vaginal deliveries) during 2014. The dots further to the right are maternity units with more births/maternities.

The dark green horizontal line shows the national average rate.

The light green dotted curved lines constitute the funnel limits set at 95%. These limits define the rates that are within two standard deviations of the national average. One would expect only one in 20 hospitals to have a rate that is outside these limits if the observed variation was due to chance alone.

Caution is advised where small values are concerned.

Maternity units lying beyond the control limits on the funnel plots may require examination. However, since no statistical analysis has been conducted to take formal account of the multiple characteristics that are not shown in the funnel plot, in this report crossing a threshold may not indicate high or low quality of care. We recommend senior managers at maternity units should investigate the reasons for variations within their hospital before broader action is taken, especially since the IMIS only commenced in 2014 and this marks the first year of data collection and reporting.

Several funnel plots in this report show evidence of a phenomenon known as overdispersion (Spiegelhalter 2005).[6] Overdispersion is not an unusual phenomenon in health data and, in fact, can be useful in model specification (Birkmeyer 2001).[7] Overdispersion occurs when a greater level of variability is demonstrated than can be explained by chance and the existence of a few outlying units. Potential explanations for overdispersion are differences in data quality, lack/limitations of risk adjustment, and clinical uncertainty. Consequently, it would be premature to draw conclusions from the IMIS results alone about whether differences in the patterns of maternity care provision reflect differences in quality. Explanatory notes accompany the funnel charts, which are based on clinical expertise, research, and hospital management experiences.

6 Spiegelhalter DJ. (2005). Handling over-dispersion of performance indicators. *Qual Saf Health care 14*: 347–51.

7 Birkmeyer JD. (2001). Primer on geographic variation in health care. *Effective Clinical Practice 4*(5): 232-33.

Irish Maternity Indicator System (IMIS)

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

OBSTETRICS AND GYNAECOLOGY

HSE Clinical Programme in Obstetrics and Gynaecology

March 2016