Irish Maternity Indicator System

IMIS National Report 2015

HSE Clinical Programme in Obstetrics and Gynaecology

August 2016

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

OBSTETRICS AND GYNAECOLOGY

Contents

Introduction

This second annual report of the Irish Maternity Indicator System (IMIS) provides national results for 30 metrics from all public maternity units and hospitals for January – December 2015.[1] The data from 2014 are also provided for comparison and reflect the latest available data for that year.[2] *[See Appendix 2 for the IMIS data collection form; the data and methods of analysis are described in Appendix 5.]*

Senior Managers in hospitals are now using IMIS on a monthly basis to monitor and manage their hospital activities. In the past year, staff at the maternity hospitals have been taking measures to improve the quality of their data and their data collection and reporting processes. Further, based on the improved data, measures have also been taken at maternity units to improve the quality of care delivered.

During the year, HSE Acute Hospitals Division decided to use the IMIS data to populate the Maternity Patient Safety Statement, which was recommended in the report of the Chief Medical Officer into the maternity services in Midland Regional Hospital, Portlaoise (see Appendix 4).

We continue to develop and maintain relationships with Quality Assurance (QA) Officers at all of the units. During 2015, we organised and facilitated two workshops where the QA Officers attended to share their experiences of IMIS and learn about new developments. The enthusiasm and collaboration from this group for the IMIS has been instrumental to its successful implementation.

This 2015 national report has now been published within nine months of the year ending, deeming it to be the most current national report of its nature; next year, we plan to publish the 2016 report within the second quarter of 2017.

Also in 2017, following a review of the IMIS in collaboration with staff in the maternity units, we plan to refine the definitions of the existing metrics and extend the range of metrics.

We thank everyone who has contributed to the success of the IMIS (for acknowledgements, see Appendix 1).

Dr Léan McMahon, IMIS Project Manager

Martin McNicholl, Programme Manager, Clinical Programme for Obstetrics and Gynaecology

Professor Michael Turner, Clinical Lead, Clinical Programme for Obstetrics and Gynaecology

1 Data for 2015 are based on complete data from all 19 maternity units, unless indicated otherwise.

2 Data for 2014 are based on complete data from 19 units (unless stated otherwise); the 2014 data were revised in 2016 in accordance with hospitals' data records.

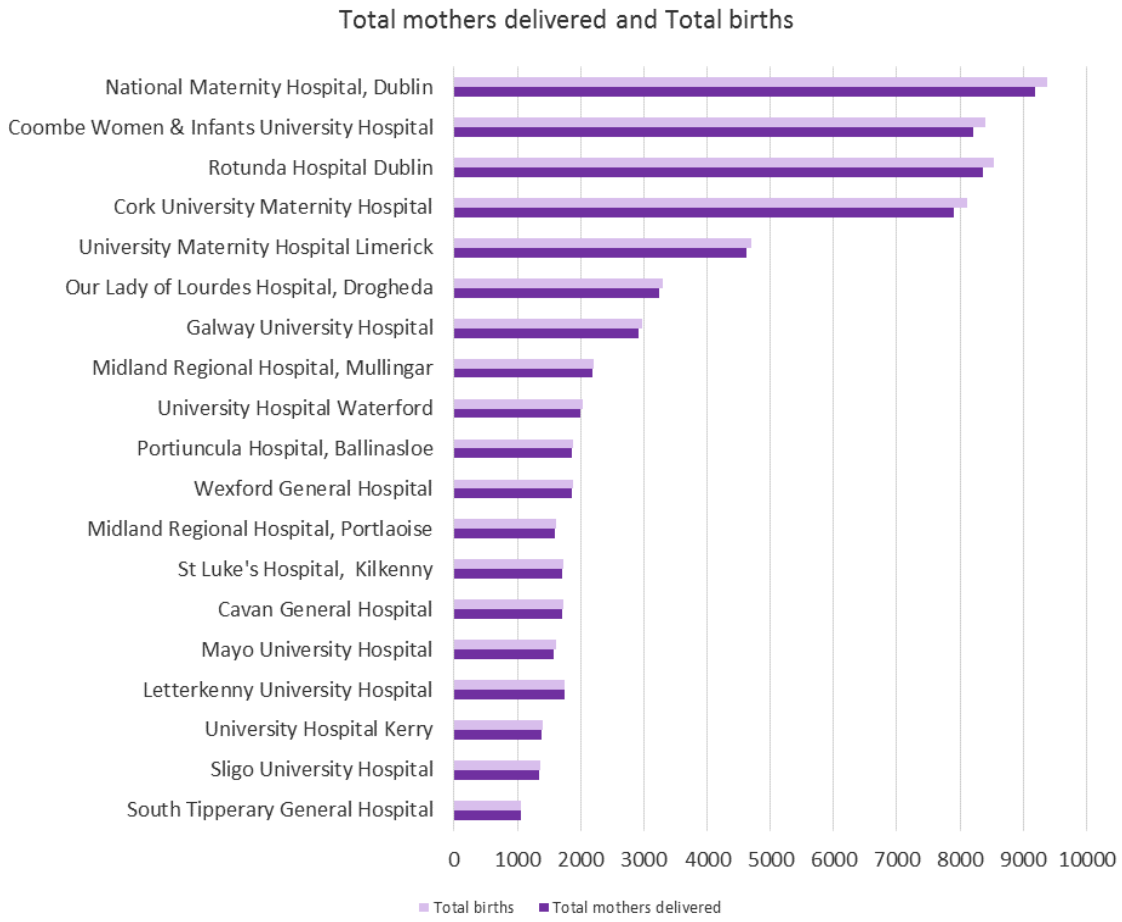
Hospital Management Activities

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

Definitions

Total mothers delivered: Number of women delivering a baby weighing 500g or more.

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



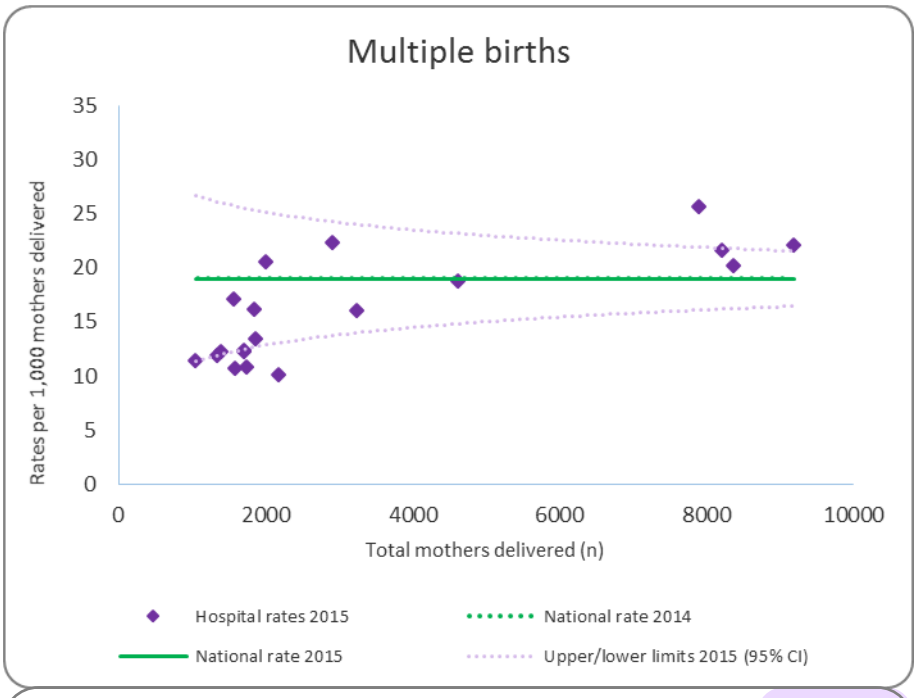
	Total mothers delivered			Total births		
	2014 (n)	2015 (n)	*Change*	2014 (n)	2015 (n)	*Change*
All maternity units	65,987	64,435	*↓1,552 (-2.4%)*	67,263	65,680	*↓1,583 (-2.4%)*
Mean per hospital	3,473	3,391	*↓82 (2.4%)*	3,540	3,457	*↓83 (-2.4%)*

Notes:

1. Larger hospitals have higher rates of multiple deliveries, as shown by the larger gaps between births and mothers delivered.
2. The IMIS data show a continuation of the downward trend nationally in the number of live births in Ireland in recent years. Latest national statistics from the National Perinatal Reporting System (NPRS) indicate the numbers of total births has fallen from 76,023 in 2009 to 67,610 in 2014, which equates to a drop in live birth rate from 16.7 to 14.6 per 1,000 population (NPRS Annual Report 2014).

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.



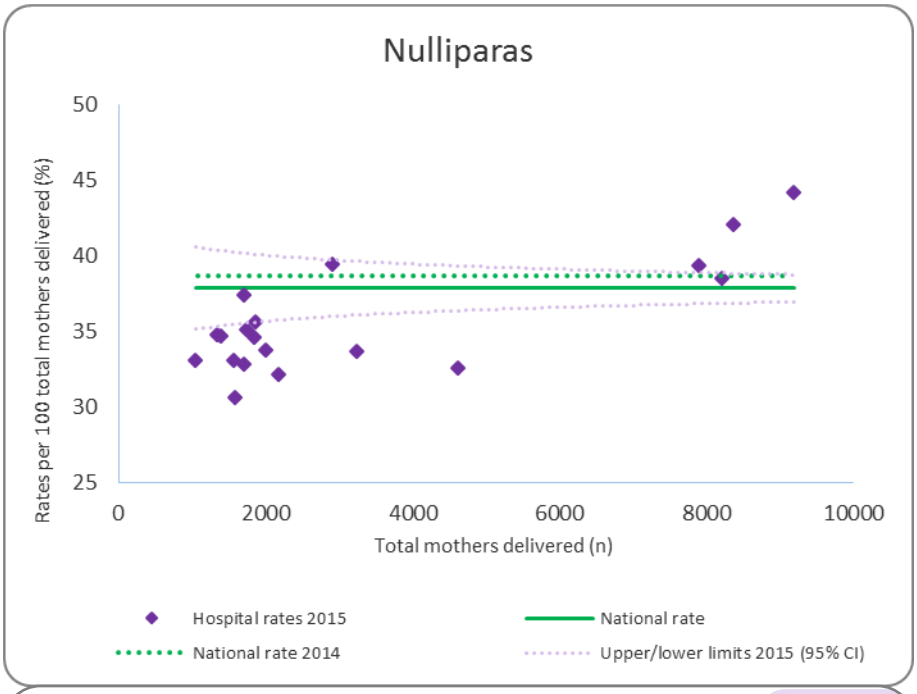
	2014	2015
Total mothers delivered (n)	65,987	64,435
Multiple births (n)	1,255	1,225
National rates (per 1,000 mothers delivered)	19.0	19.0
95% CI	18.0–20.1	18.0-20.1

Note:

Six units display incidence of multiple births above the national average – five of these units have associated assisted reproduction units. Multiple births may require more complex management (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.



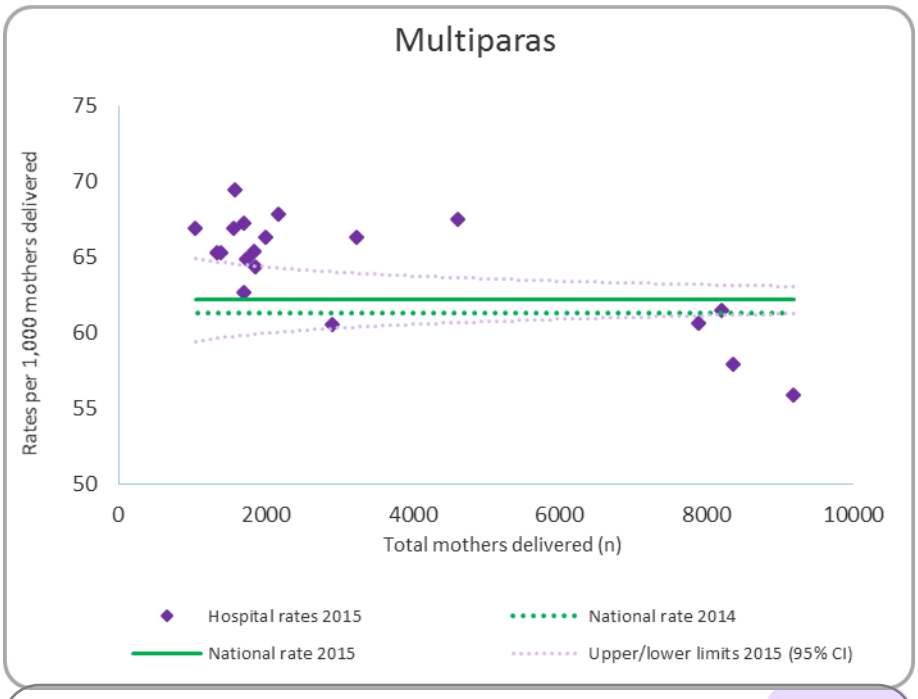
	2014	2015
Total mothers delivered (n)	65,987	64,435
Total nulliparas (n)	25,539	24,389
National rates (per 100 mothers delivered)	38.7%	37.9%
95% CI	38.3-39.1	37.5-38.2

Note:

Research shows nulliparas tend to be at greater risk of adverse birth outcomes compared with other pregnant women. 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. The IMIS 2015 data indicates above-average rates of nulliparas in the large maternity hospitals.

Indicator #4: Multiparas

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



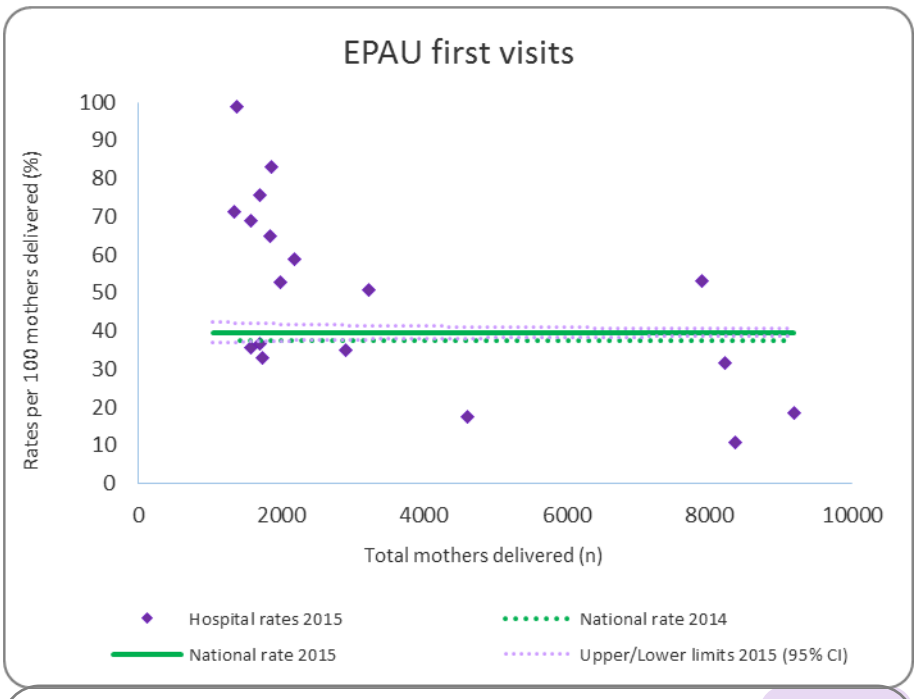
	2014	2015
Total mothers delivered (n)	65,987	64,435
Total multiparas (n)	40,448	40,046
National rates (per 100 mothers delivered)	61.3%	62.2%
95% CI	60.9-61.7	61.8-62.5

Note:

The funnel charts for multiparas and nulliparas (previous page) are mirror images of one another. Further analysis of the data is required in order to determine whether the increase in the ratio of nulliparas to multiparas in the larger academic hospitals is due to socio-demographic changes locally or due to nulliparas exercising personal choices in the hospital they attend.

Indicator #5: EPAU first visits

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



	2014†	2015*
Total mothers delivered (n)	60,595	64,435
EPAU first visits (n)	22,697	25,556
National rates (per 100 mothers delivered)	37.5%	39.7%
95% CI	37.1-37.8	39.3-40.0

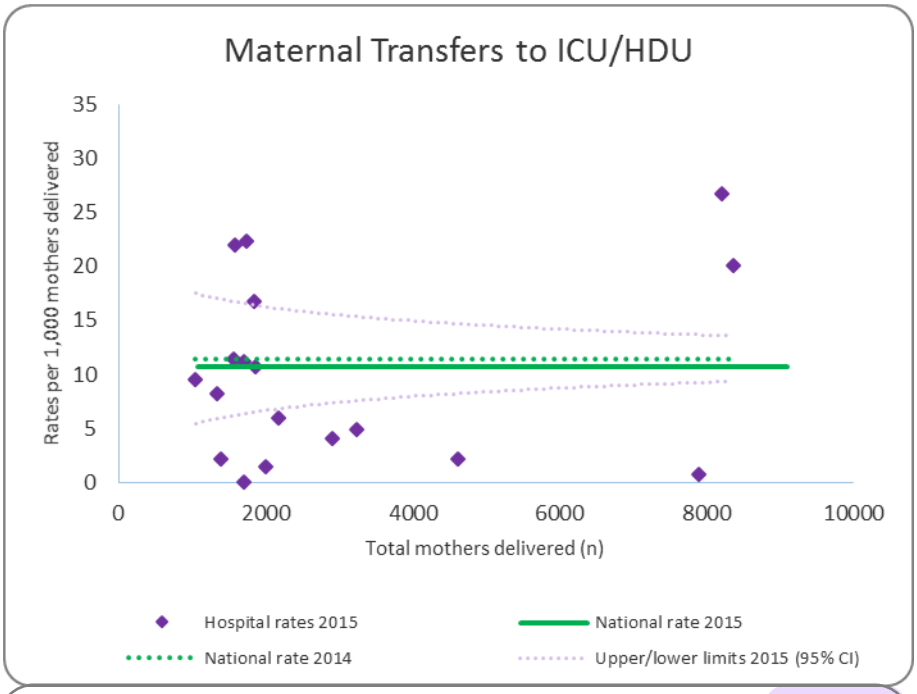
†Based on complete data from 16 units (figures were revised in 2016). ***Based on complete** data for 2015 from 18 units.

Note:

There is extreme variation, or 'over-dispersion', in the measurement of EPAU first visits (i.e., all maternity units lie beyond the 95% thresholds). This indicator may not be measuring the same type of clinical activity in all maternity units, for example, the data from some units include both first visits and return visits to the EPAU. We recommend hospitals investigate their clinical care pathways and the methodological reasons underlying the apparent variation in the indicator.

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).



	2014†	2015*
Total mothers delivered (n)	55,216	55,249
Maternal transfers (ICU/HDU) (n)	667	634
National rates (per 1,000 mothers delivered)	12.1	11.5
95% CI	11.2-13.0	10.6-12.4

†Based on complete data from 17 units (revised in 2016). ***Based on complete** data for 2015 from 18 units.

Note:

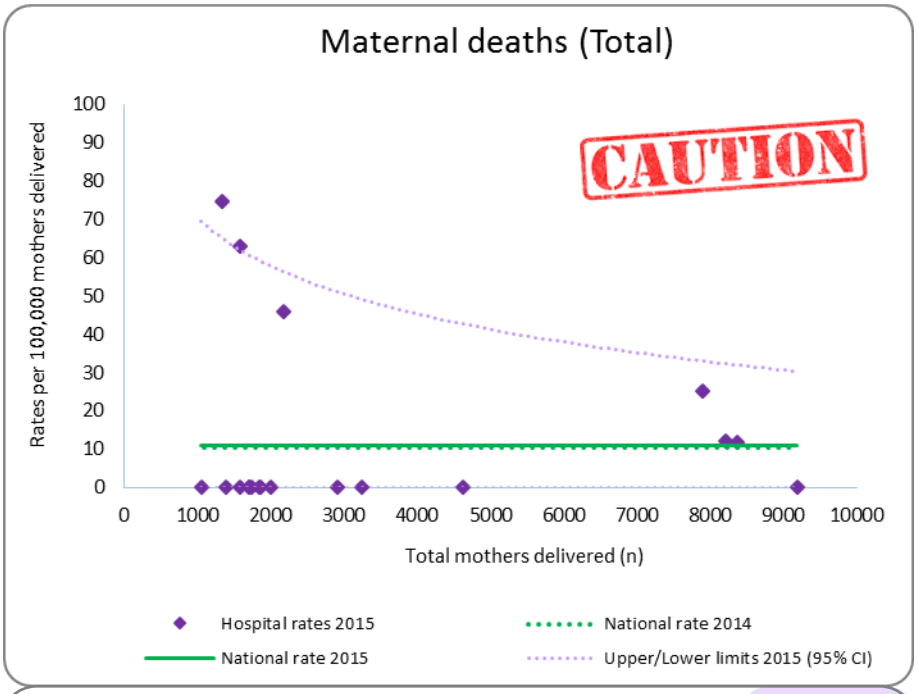
The high level of variation in the chart reflects the variation across maternity units in whether or not they have HDU areas and how they use their ICU/HDU areas. For example, some units use their labour ward or theatre recovery areas as short-stay HDU type areas, some units admit patients with pre-eclampsia to their HDU, while others treat pre-eclampsia at ward level.

It is important to note that smaller maternity units do not usually have a designated HDU, but instead usually provide high dependency care (i.e., Level 2 care, which involves invasive monitoring/intervention) in the Delivery Suite or on the Labour ward as required. Hospitals may autonomously decide whether to record Level 2 care provision in this IMIS metric and/or restrict this metric to transfers to ICU only.

This metric applies to maternal transfers to ICU and/or HDU, irrespective of gestation, i.e. it may include transfers from early pregnancy to post-national readmissions.

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 incidenal causes.



	2014	2015
Total mothers delivered (n)	65,987	64,435
Maternal deaths (in hospital) (n)	7	7
National rates (per 100,000 mothers delivered)	10.61	10.86
95% CI	2.75-18.47	0.00-18.91

Notes:

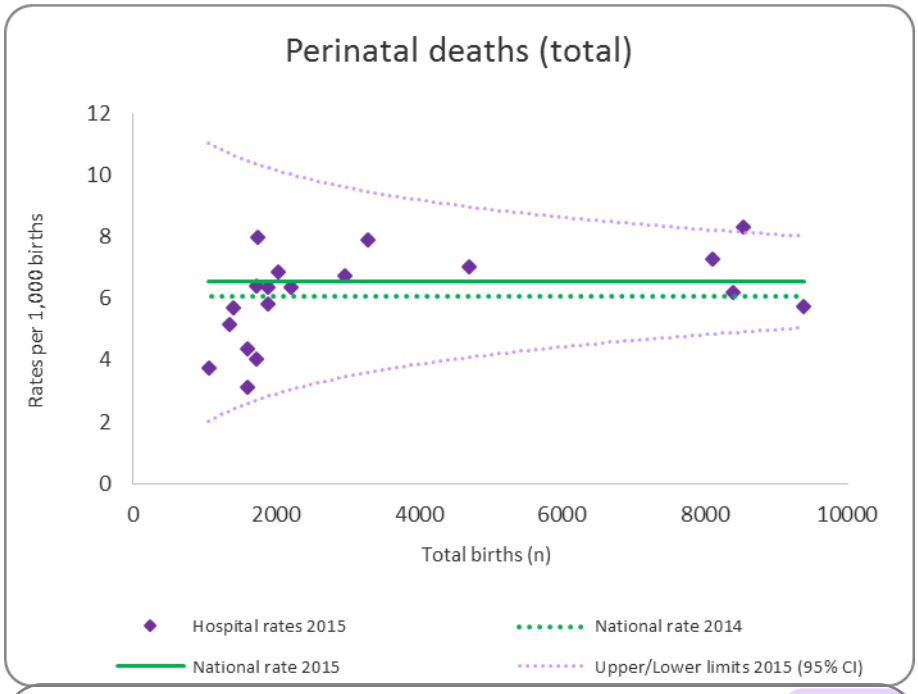
Interpret maternal deaths with caution due to the small values; the outliers report one maternal death. The number of maternal deaths reported in IMIS is lower than other data sources indicate. This is principally because maternity units only recorded maternal deaths that occurred in hospital, not elsewhere.

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.

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 in a single year is not a robust indicator to assess quality of clinical care in a maternity unit.

Indicator #9: Perinatal deaths (total)

Definition Total number of 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 death is not adjusted to exclude congenital anomalies.

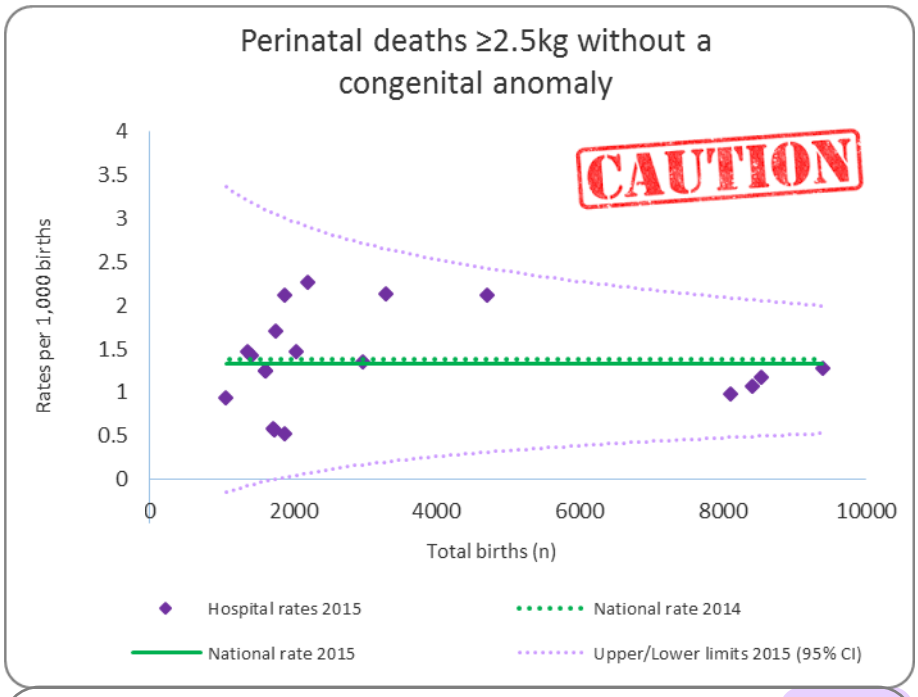


	2014	2015
Total births (n)	67,263	65,680
Perinatal deaths (total) (n)	407	429
National rates (per 1,000 total births)	6.1	6.5
95% CI	5.5-6.6	5.9-7.2

Note:
Annual rates of perinatal deaths 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.



	2014	2015
Total births (n)	67,263	65,680
Perinatal deaths ≥2.5kg, no congenital anomaly (n)	93	87
National rates (per 1,000 total births)	1.4	1.3
95% CI	1.1-1.7	1.1-1.6

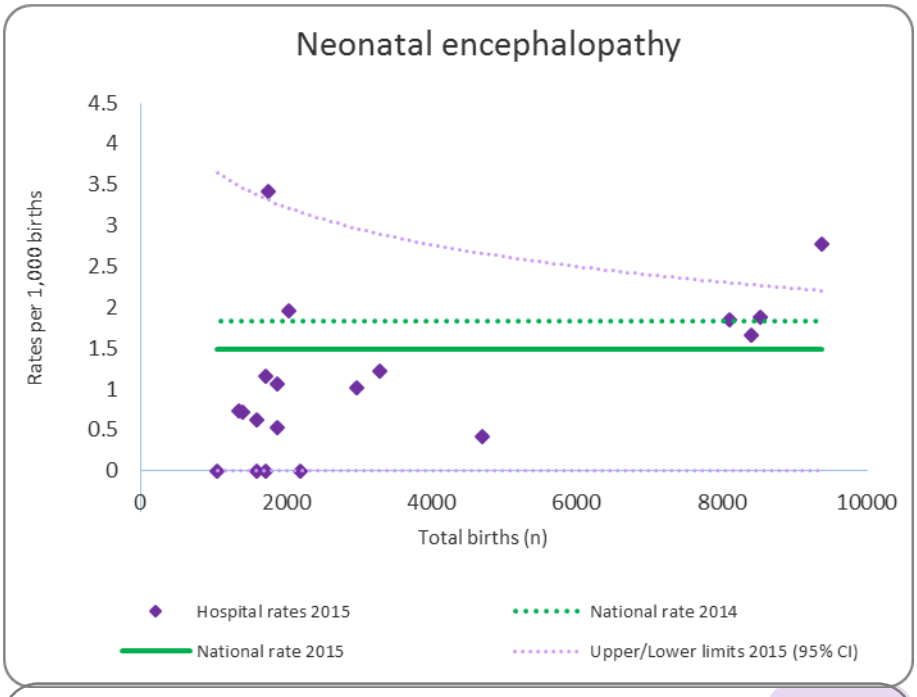
Note:

Rates of perinatal deaths ≥2.5kg without a congenital anomaly are usually considered a good indication of obstetric care. However, national rates of perinatal deaths ≥2.5kg without a congenital anomaly should be interpreted with caution because the numbers are low and may not be significant clinically or statistically.

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. Neonatal encephalopathy embraces Hypoxic Ischaemic Encephalopathy (HIE), which is the most common cause of neonatal encephalopathy; not all encephalopathies have a hypoxic ischaemic aetiology).



	2014†	2015*
Total births (n)	63,826	65,680
Neonatal encephalopathy (n)	117	98
National rates (per 1,000 births)	1.8	1.5
95% CI	1.5-2.2	1.2-1.8

†Based on complete data from 17 units (revised in 2016). ***Based on complete** data for 2015 from 18 units.

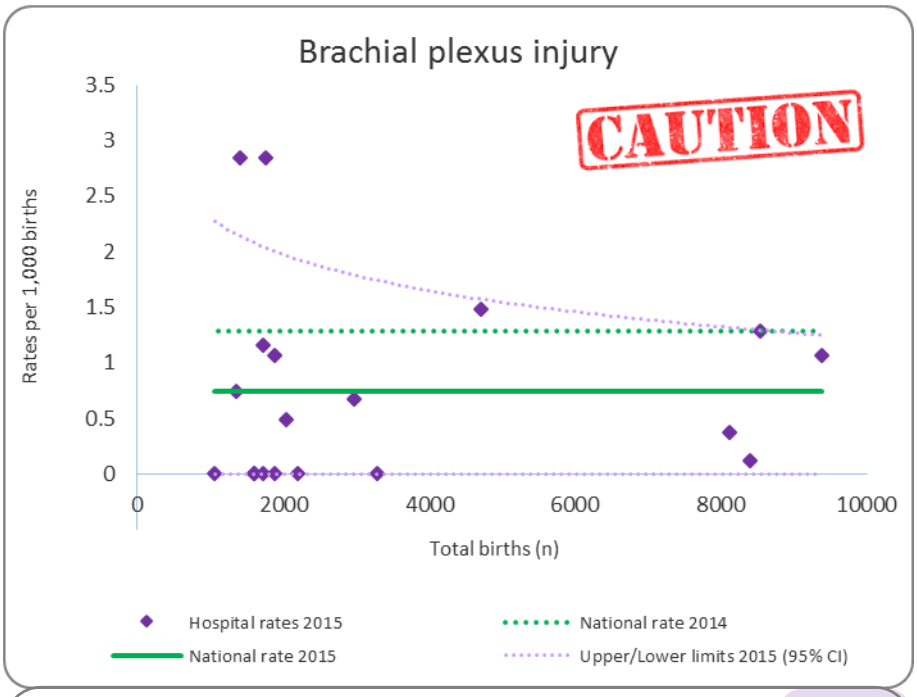
Note:

The definition of neonatal encephalopathy has been adopted from the National Maternity Hospital Annual Clinical Report. However, it is challenging to standardise the definition as it continues to evolve nationally (for example, the aetiology of the encephalopathy may not be immediately evident at the time of hospital coding).

There are discrepancies across hospitals about the inclusion of babies born in the hospital (inborns) and babies born elsewhere (outborns) and transferred to the hospital for a diagnosis of neonatal encephalopathy. Following review of the definition, it was agreed the metric should be restricted to counting inborns only. This condition will be clarified in 2017 for all hospitals.

Indicator #12: Neonatal brachial plexus injury

Definition Number of neonatal brachial plexus injuries, either transient or permanent, diagnosed after childbirth.



	2014†	2015*
Total births (n)	65,280	65,680
Neonatal brachial plexus injury (n)	84	49
National rates (per 1,000 total births)	1.3	0.8
95% CI	1.0-1.6	0.5-1.0

†Based on data from 18 units, including one hospital estimate based on 6 months of data (July-December 2014) (all 2014 data were revised in 2016).

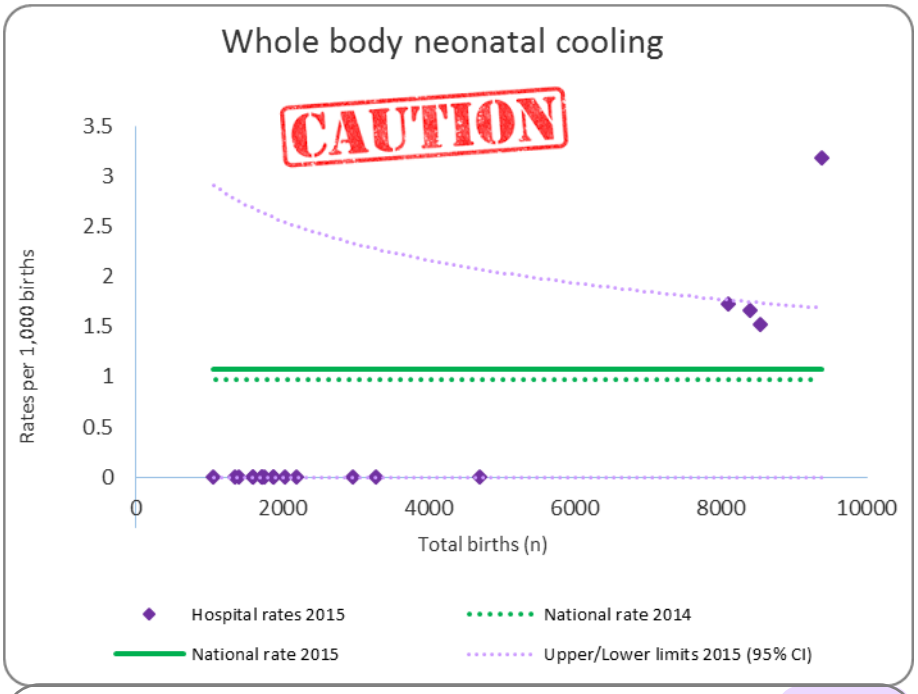
***Based on complete** data for 2015 from 18 units.

Notes:

This indicator was recorded and reported nationally for the first time in 2014 with the introduction of the IMIS. It is not possible at present to comment on the proportion of 'transient' vs 'permanent' diagnoses. It is proposed to refine the name of the indicator to 'Brachial Plexus Palsy', commencing in 2017. Interestingly, the rate reported nationally is similar to the rate reported after a review of the international literature in the 2014 ACOG Taskforce Report on Neonatal Brachial Plexus Palsy (Turner M. and Farren M., 'Neonatal brachial plexus palsy and causation', *IMJ Editorial,* August 2016).

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.



	2014†	2015
Total births (n)	63,826	65,680
Whole body neonatal cooling (n)	62	71
National rates (per 1,000 total births)	1.0	1.1
95% CI	0.7-1.2	0.8-1.3

†Based on data from 17 units (revised in 2016).

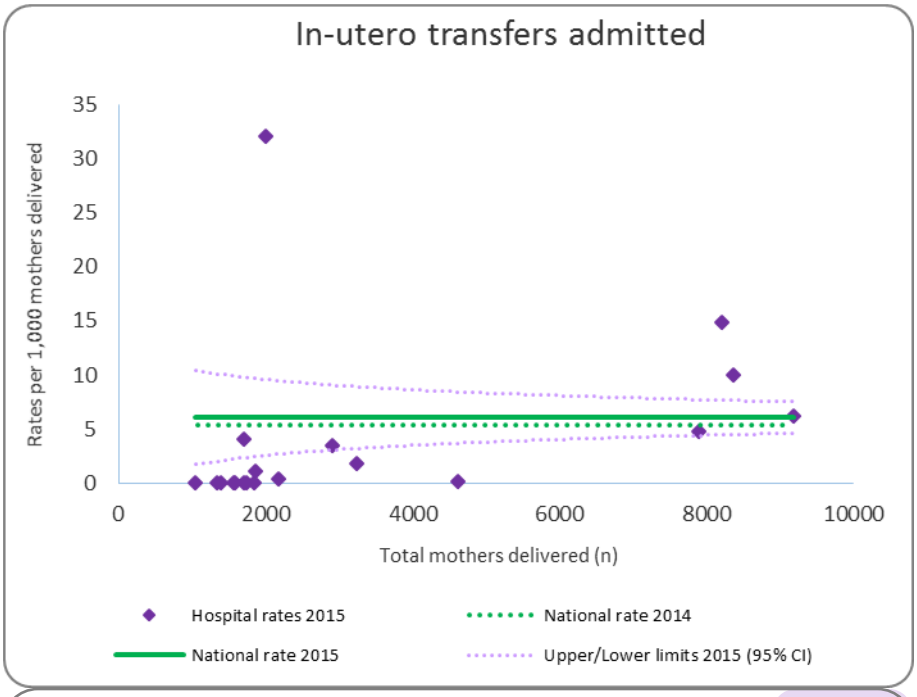
Notes:

Whole body neonatal cooling (WBNC) is only undertaken in the stand-alone maternity hospitals in Dublin and Cork. To verify the correct national data, the IMIS restricts counts of WBNC to the four large maternity hospitals and includes babies born in these hospitals (inborns) and babies transferred in from elsewhere (outborns) in these four hospitals.

Neonatal cooling is a preventive therapy; it 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. A more detailed review of WBNC is being conducted under the leadership of the National Clinical Programme in Neonatology.

Indicator #14: In-utero transfers admitted

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



	2014†	2015
Total mothers delivered (n)	65,987	64,435
In-utero transfers admitted (n)	356	392
National rates (per 1,000 mothers delivered)	5.4	6.1
95% CI	4.8-6.0	5.5-6.7

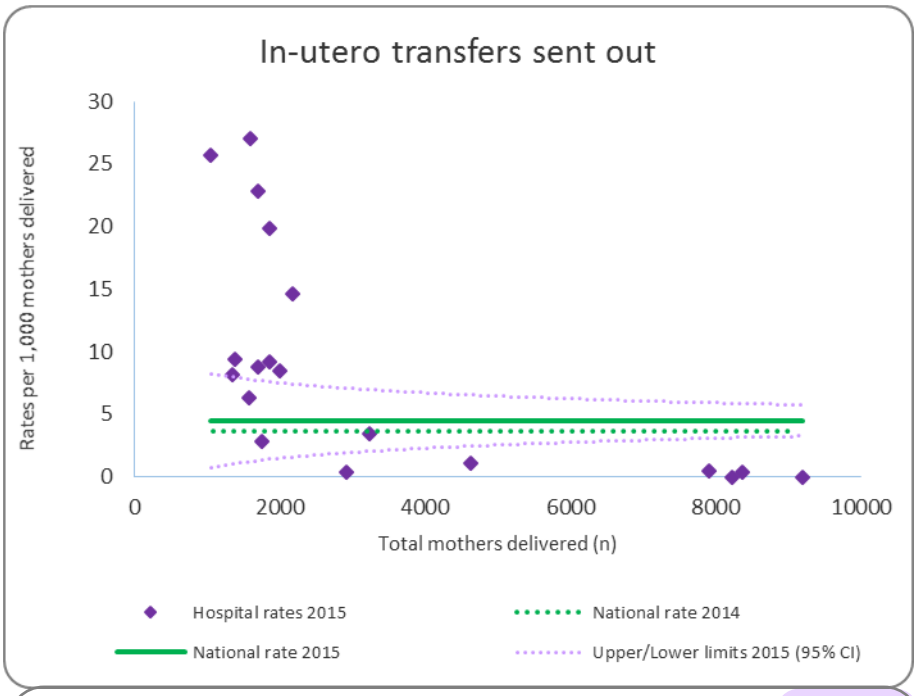
†Data include an estimate from one hospital based on 6 months of data (July-December 2014) (all 2014 data were revised in 2016).

Note:

The outlier is explained by existing practices at the maternity unit at University Hospital Waterford (UHW) and other nearby hospitals: UHW admits an above-average rate of in-utero transfers as, historically, this hospital admits women from all other maternity units in the greater South-east region. The metric does not count patients who are transferred back to the hospital in which they delivered.

Indicator #15: In-utero transfers sent out

Definition Number of women with a fetus in utero transferred out of the hospital to another hospital *in the fetal interest.* (Refers to transfers of inpatients only, not outpatients.)



	2014†	2015
Total mothers delivered (n)	65,987	64,435
In-utero transfers sent out (n)	241	290
National rates (per 1,000 mothers delivered)	3.7	4.5
95% CI	3.2-4.1	4.0-5.0

†Data include an estimate from one hospital based on 6 months of data (July-December 2014) (all 2014 data were revised in 2016).

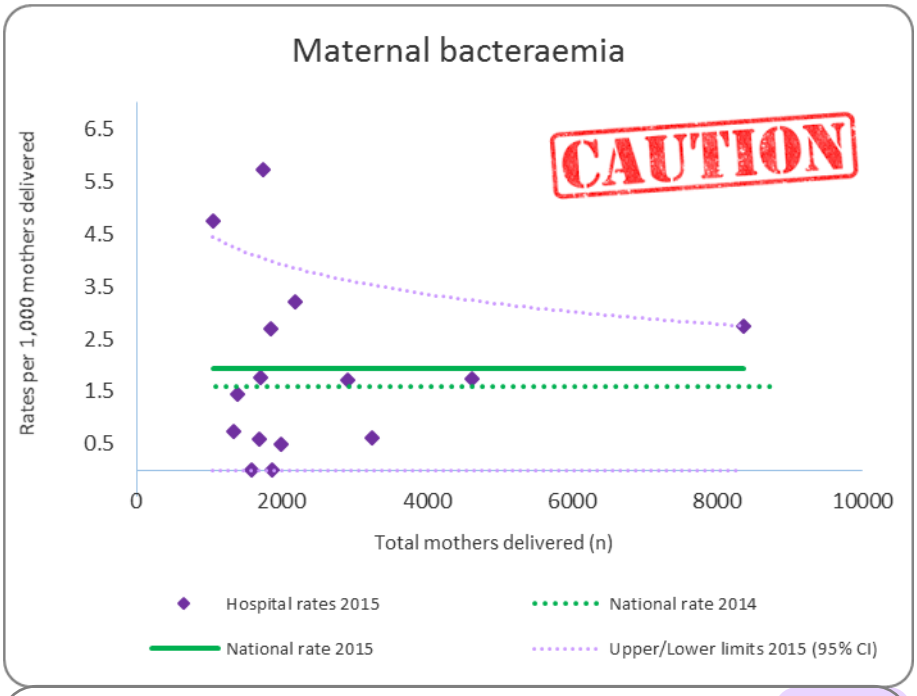
Note:

The large stand-alone maternity hospitals have very low rates of in-utero transfers sent out, as would be expected. 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. 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 (Source: ECDC 2012: 47).



	2014†	2015*
Total mothers delivered (n)	47,578	37,554
Maternal bacteraemia (n)	76	73
National rates (per 1,000 mothers delivered)	1.6	1.9
95% CI	1.2-2.0	1.5-2.4

†Data for 2014 based on 16 units, including estimate from one hospital based on 6 months of data (July-December 2014) (all 2014 data were revised in 2016).

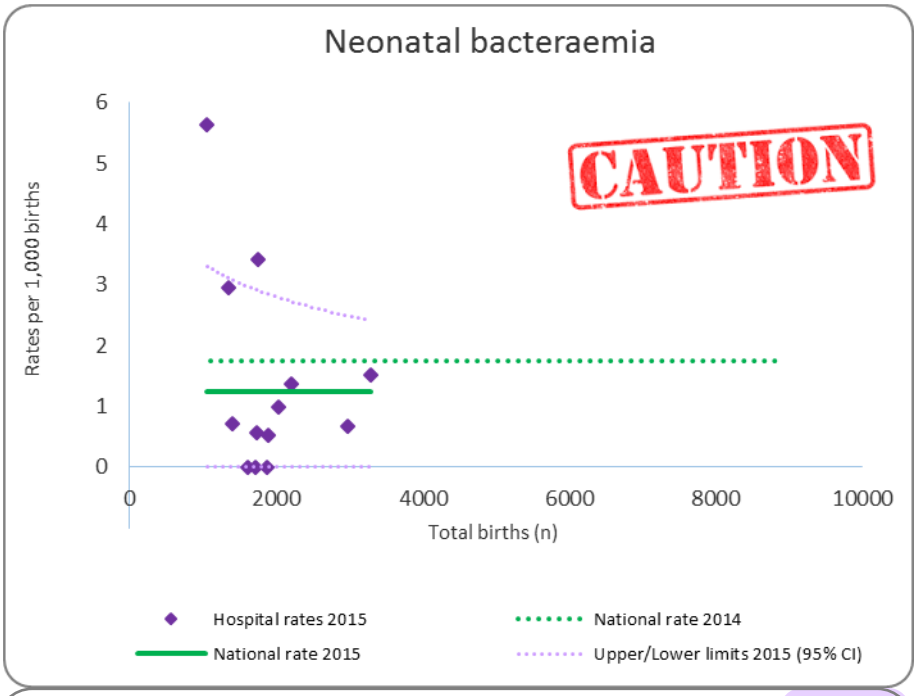
*Data for 2015 based on 15 hospitals.

Note:

Several maternity units did not supply data for maternal bacteraemia for reasons relating to staffing (i.e., no Surveillance Scientist available) and the definition. Several hospitals recorded data for bacteraemia based on their hospital files, rather than Laboratory files. The definition for maternal bacteraemia is derived from the European Centre for Disease Control; it is planned to review the definition to accommodate issues arising in 2017.

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. Cases should be defined as neonatal if the positive blood culture is taken at any time during the neonatal period (Source: ECDC 2012: 47).



	2014†	2015*
Total births (n)	39,458	24,922
Neonatal bacteraemia (n)	69	31
National rates (per 1,000 total births)	1.8	1.2
95% CI	1.3-2.2	0.8-1.7

†Data for 2014 based on 15 units, including estimate from one hospital based on 6 months of data (July-December 2014) (all 2014 data were revised in 2016).

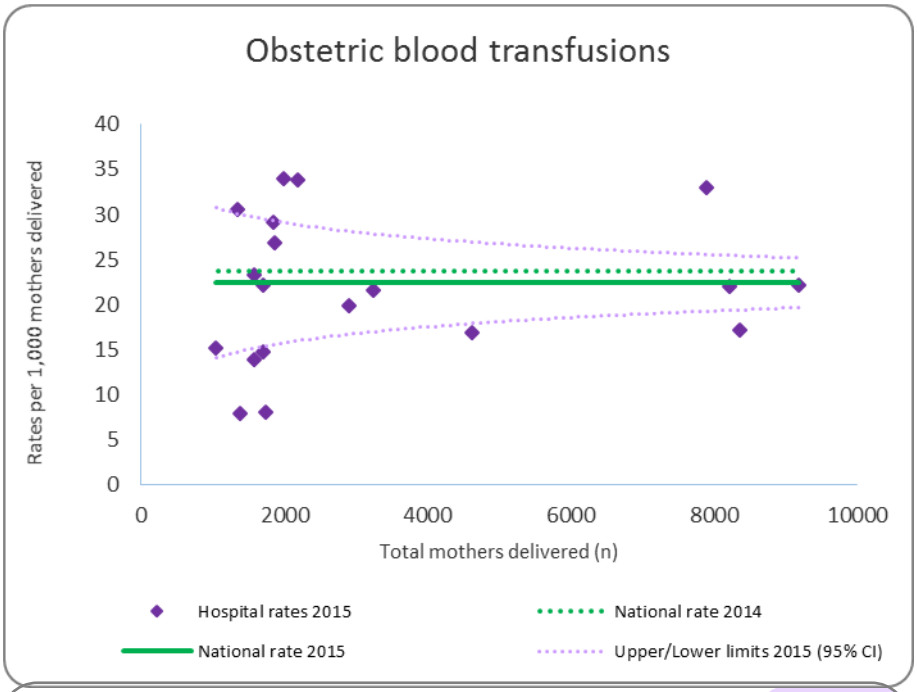
*Data for 2015 based on 13 hospitals.

Note:

Several maternity units, including the four large maternity hospitals, did not provide data for neonatal bacteraemia for reasons relating to staffing (i.e., no Surveillance Scientist available) and issues with the definition. Several hospitals recorded data for bacteraemia based on their hospital files, rather than Laboratory files. The definition for neonatal bacteraemia is derived from the European Centre for Disease Control; it is planned to review the definition to accommodate issues arising in 2017.

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).



	2014†	2015
Total mothers delivered (n)	59,787	64,435
Obstetric blood transfusions (n)	1,419	1,445
National rates (per 1,000 mothers delivered)	23.7	22.4
95% CI	22.5-25.0	21.3-23.6

†Figures for 2014 are based on data from 15 maternity units.

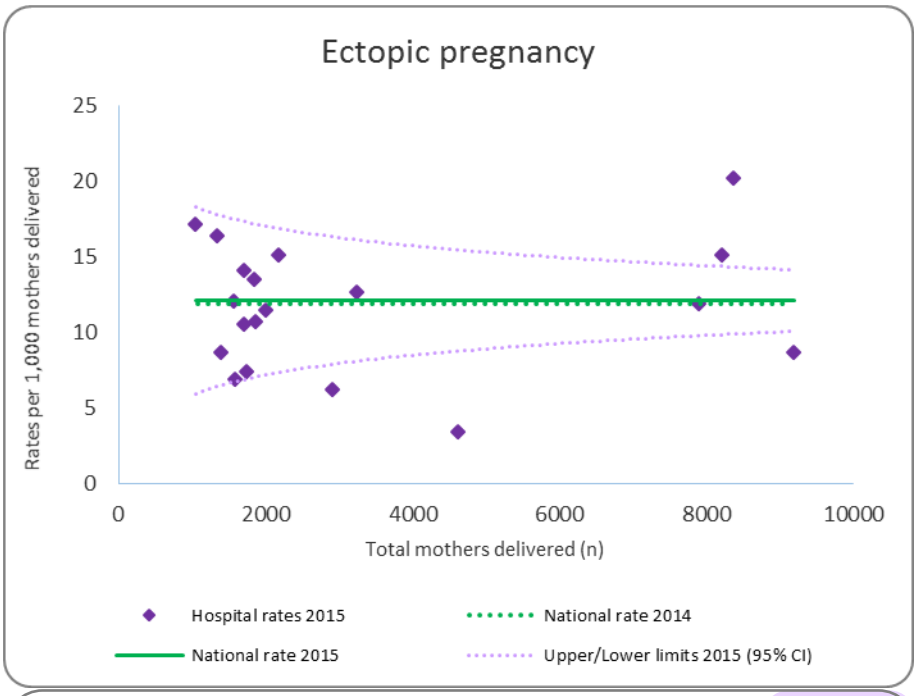
Note:

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.

Serious Obstetric Events

Indicator #19: Ectopic pregnancy

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



	2014	2015
Total mothers delivered (n)	65,987	64,435
Ectopic pregnancy (n)	787	780
National rates (per 1,000 mothers)	11.9	12.1
95% CI	11.1-12.8	11.3-13.0

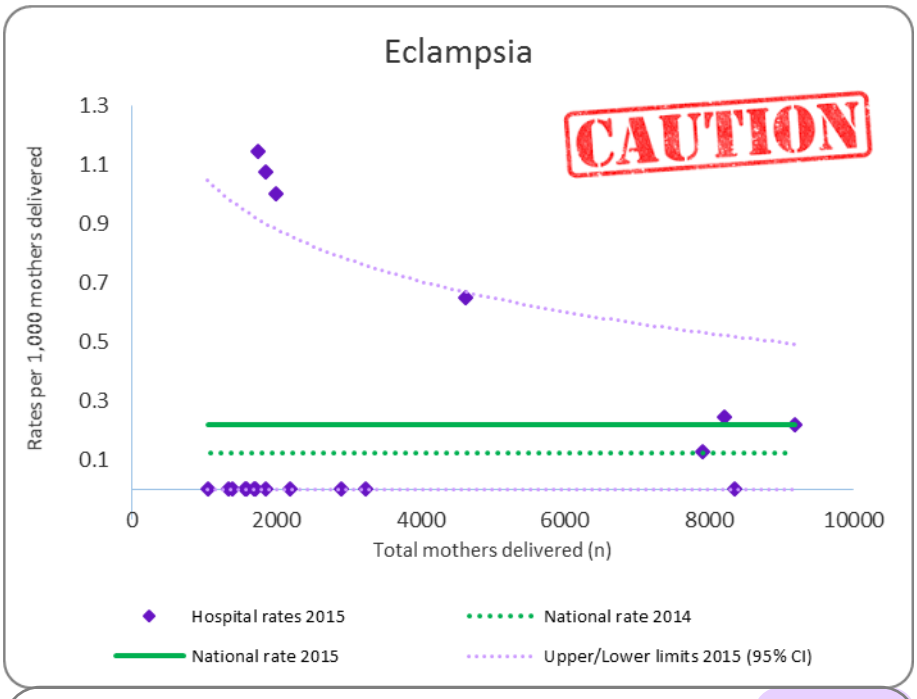
Note:

Ectopic pregnancies are treated surgically and medically. This means patients may be inpatients or outpatients/daypatients. Several maternity units report figures for ectopic pregnancies from the HIPE database. However, this may lead to under-reporting, since the HIPE does not record data for outpatients. We recommend all maternity units should implement a separate data collection process for ectopic pregnancies (aligned with EPAU first visits).

Rates of ectopic pregnancy are reported using total mothers delivered or total live births or number of pregnancies as the base.

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.



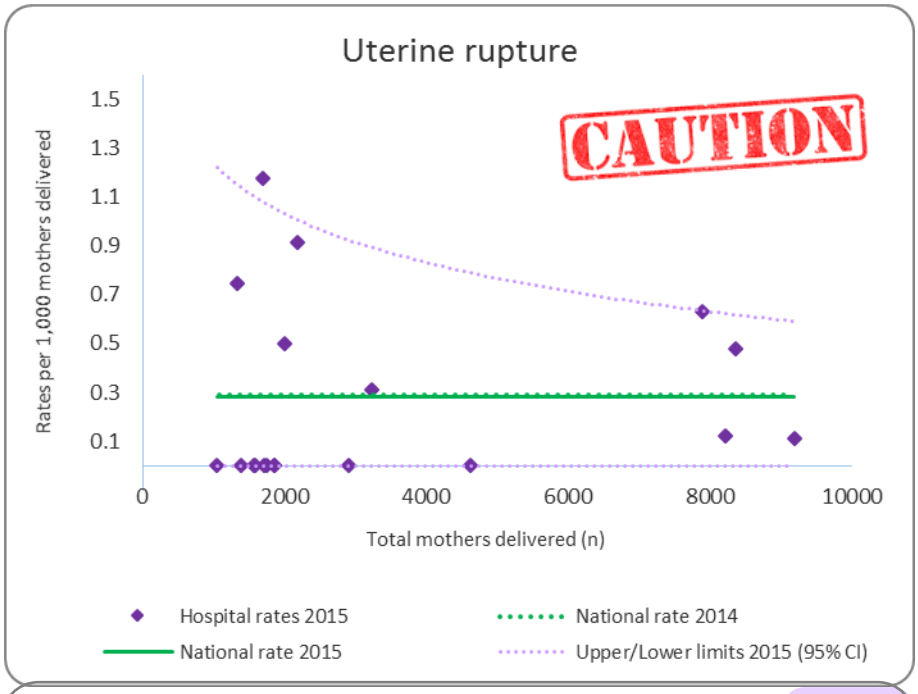
	2014	2015
Total mothers delivered (n)	65,987	64,435
Eclampsia (n)	8	14
National rates (per 1,000 mothers delivered)	0.12	0.22
95% CI	0.04-0.21	0.10-0.33

Note:

Indicators that are based on serious obstetric events with, typically, very small values, should be treated with extreme caution.

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.



	2014	2015
Total mothers delivered (n)	65,987	64,435
Uterine rupture (n)	19	18
National rates (per 1,000 mothers delivered)	0.3	0.3
95% CI	0.2-0.4	0.2-0.4

Notes:

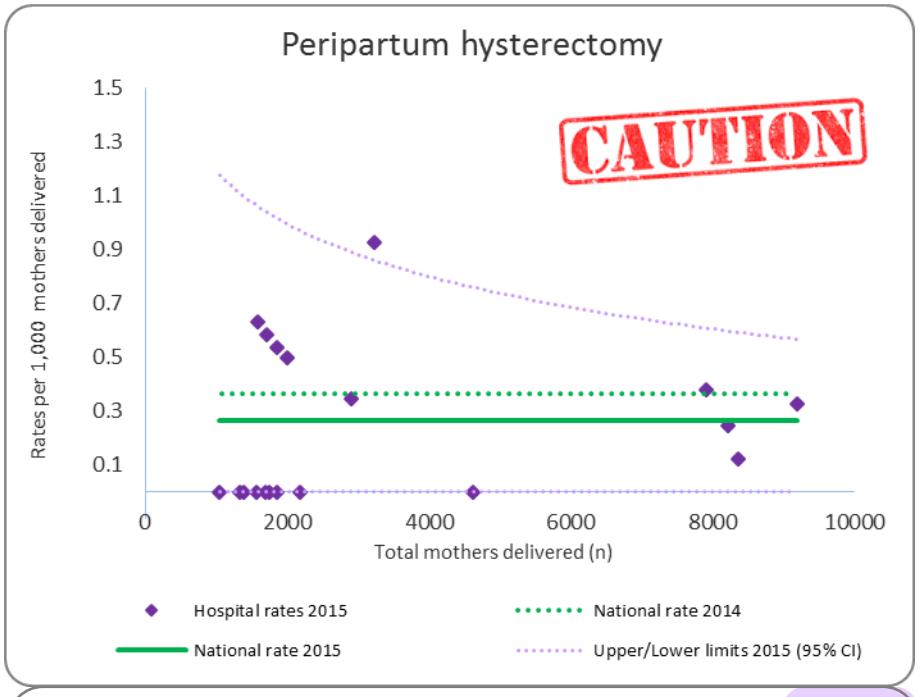
For clinical audit, coding of uterine rupture should be restricted to complete rupture. The IMIS definition will be amended to specify this distinction.

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.

Annual rates of uterine rupture should be interpreted with caution, as hospital incidence is rare and the numbers are very small.

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.



	2014	2015
Total mothers delivered (n)	65,987	64,435
Peripartum hysterectomy (n)	24	17
National rates (per 1,000 mothers delivered)	0.4	0.3
95% CI	0.2-0.5	0.1-0.4

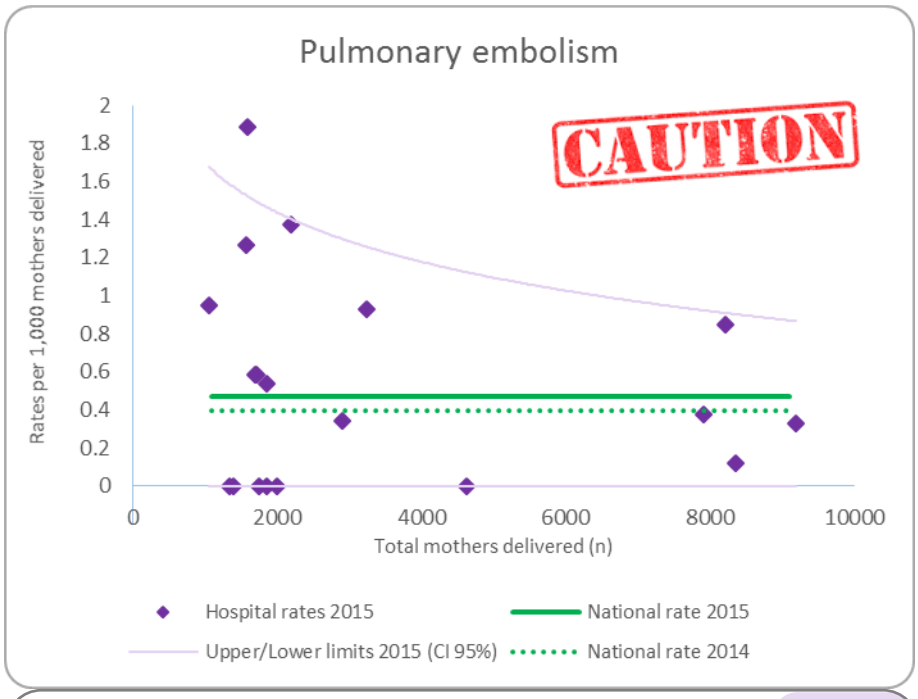
Notes:

Peripartum hysterectomy, usually performed in emergency situations, is rare in modern obstetrics, but it may be a life-saving procedure in cases of severe haemorrhage. Nationally, there has been a downward trend in recent years of peripartum hysterectomy for uterine atony (loss of tone in the uterine musculature) and an upward trend of peripartum hysterectomy for pathological placental bed localisation. Peripartum hysterectomy may be associated with increasing caesarean section trends.

The incidence of peripartum hysterectomy is low 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.



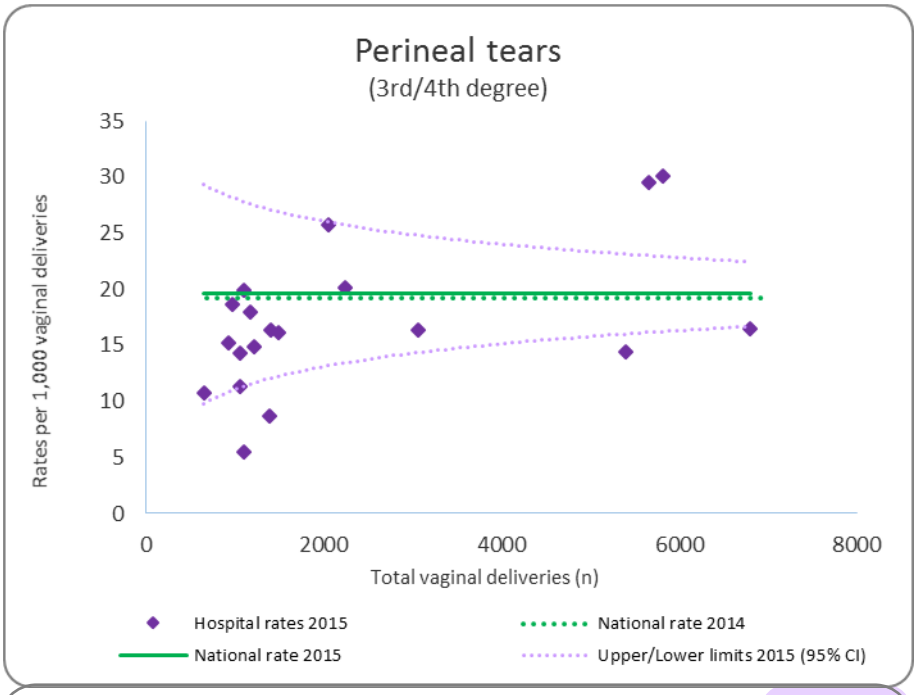
	2014	2015
Total mothers delivered (n)	65,987	64,4354
Pulmonary embolism (n)	26	30
National rates (per 1,000 mothers delivered)	0.4	0.5
95% CI	0.2-0.6	0.3-0.6

Note:

Pulmonary embolism (PE) is a leading cause of maternity mortality in developed countries. It is hoped that the number of cases nationally will decrease in response to hospitals' implementation of the National Clinical Guideline, Venous Thrombo-prophylaxis in Pregnancy (2013). As with all serious obstetric events, annual rates of PE should be interpreted with caution, due to small numbers. We recommend maternity units examine data collection processes around PE to ensure they are counting numbers of diagnoses occurring during the previous month/year.

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.



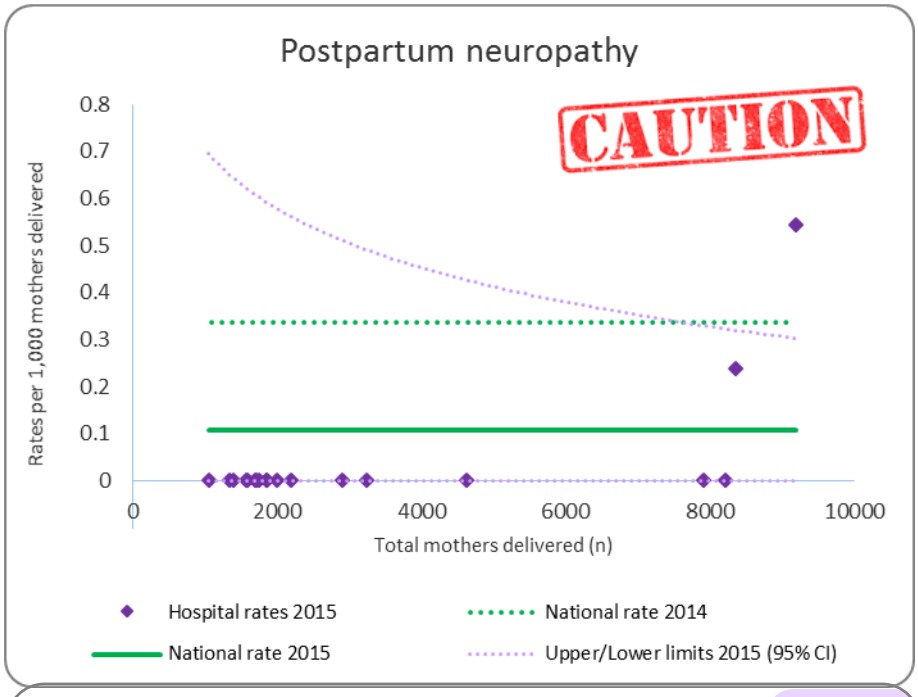
	2014	2015
Total vaginal deliveries (n)	46,437	44,536
Perineal tears (n)	891	872
National rates (per 1,000 vaginal deliveries)	19.2	19.6
95% CI	17.9-20.4	18.3-20.9

Note:

In recent years, rates of perineal tears have been increasing worldwide. Common risk factors may include occiptoposterior position during delivery, primigravida, high birthweight, instrumental deliveries, and the presence of shoulder dystocia. Conversely, induction of labour, use of medio-lateral episiotomy, epidural analgesia, and instrumental deliveries of occipitoanterior position have been associated with a reduced 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.



	2014†	2015
Total mothers delivered* (n)	56,367	64,435
Postpartum neuropathy (n)	19	7
National rate (per 1,000 mothers delivered)	0.34	0.11
95% CI	0.19-0.49	0.03-0.19

†Figures for 2014 are based on data from 17 maternity units.

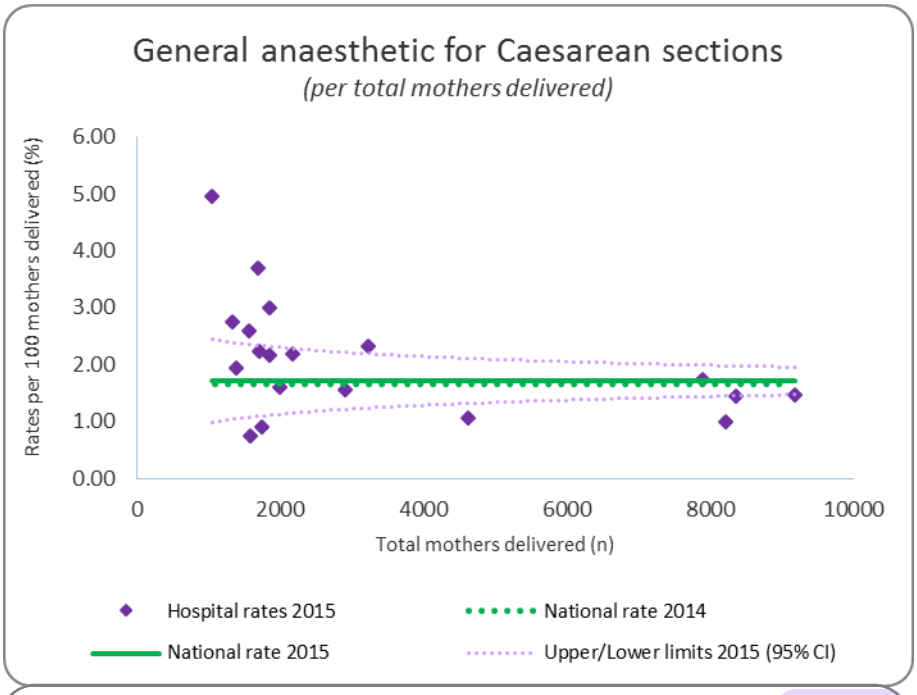
Note:

This is the first time postpartum neuropathy has been recorded in Ireland, which may account for the small numbers reported on the IMIS. Furthermore, to our knowledge, there are no international data collected on postpartum neuropathy. We would recommend the anaesthetic services in all hospitals introduce data collection procedures around diagnosis of postpartum neuropathy.

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 also conversion to GA from regional anaesthetic (epidural or spinal).



	2014	2015
Total mothers delivered (n)	65,987	64,434
General anaesthetic for C-sections (n)	1,090	1,105
National rates (%)	1.7%	1.7%
95% CI	1.6-1.8	1.6-1.8

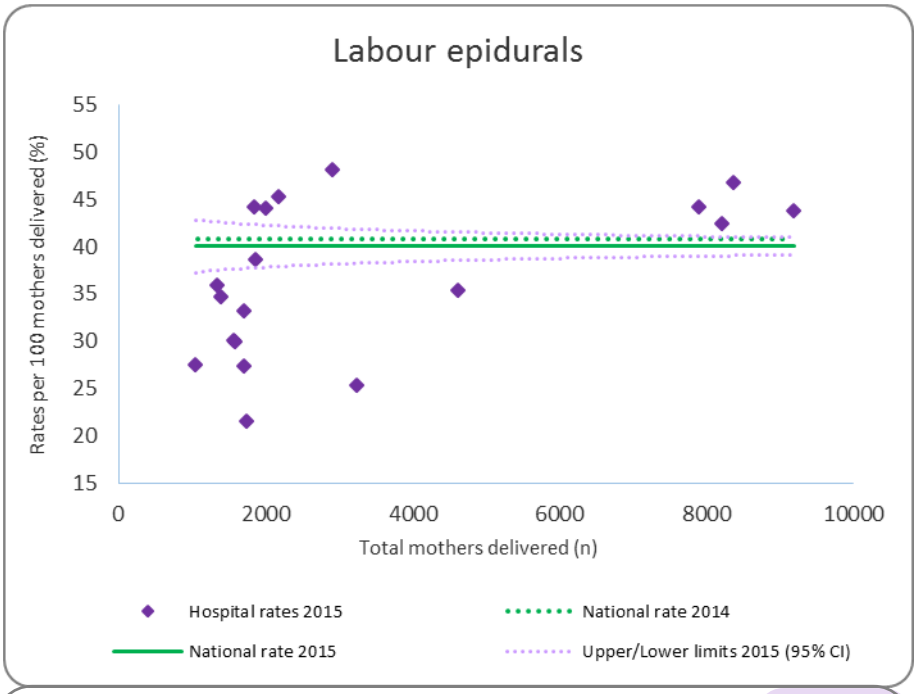
Note:

General anaesthesia for caesarean sections may be used with patients who have bleeding disorders or who require immediate delivery; it may also be used when regional anaesthesia is insufficient. However, general anaesthesia for caesarean sections has declined significantly with increasing awareness of the associated potentially life-threatening risks for both mother and baby. Regional anaesthetic (spinal or epidural) is usually the preferred option. Hence, the chart above is best interpreted in conjunction with intrapartum epidurals (to facilitate such comparison, the rates for the two indicators are calculated on the common base of total mothers delivered).

The rates of GA for caesarean sections per total caesarean sections were 5.6% (CI 5.3-5.9) in 2014 and 5.6% (5.2-5.9) in 2015.

Indicator #27: Labour epidurals

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



	2014	2015
Total mothers delivered (n)	65,987	64,435
Labour epidurals (n)	26,941	25,798
National rates (%)	40.8%	40.0%
95% CI	40.5-41.2	39.7-40.4

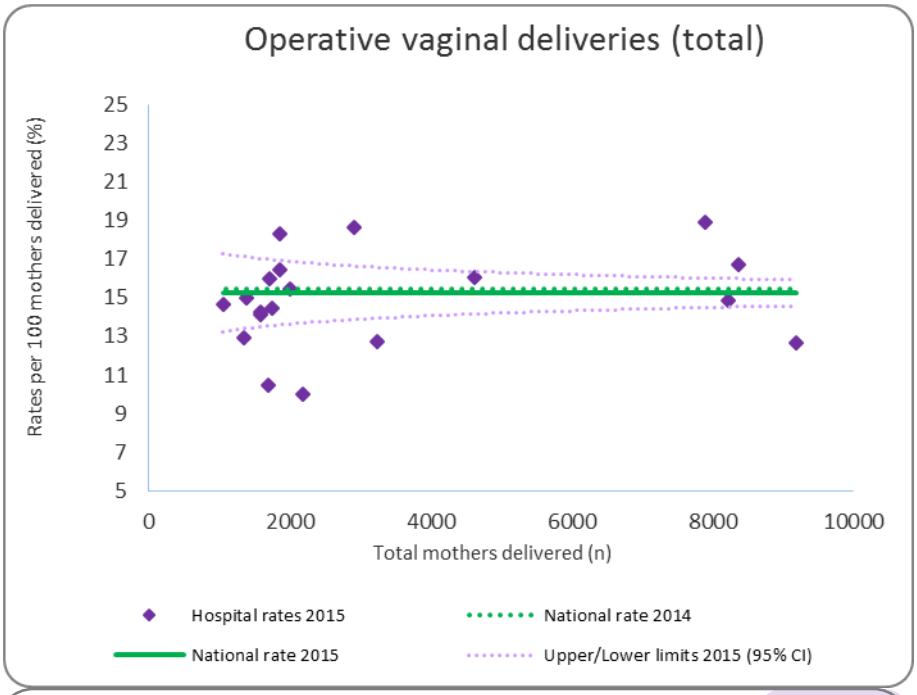
Note:

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 may not be 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.

In some maternity units, there appears to be an inverse relationship between rates of general anaesthetic for caesarean sections and rates of intrapartum epidurals. The reasons for this require investigation at local level.

Indicator #28 and #31 (combined): OVD (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 'Instrumental' delivery.)



	2014	2015
Total mothers delivered (n)	65,987	64,435
OVD (total) (n)	10,215	9,830
National rates (%)	15.5%	15.3%
95% CI	15.2-15.8	15.0-15.5

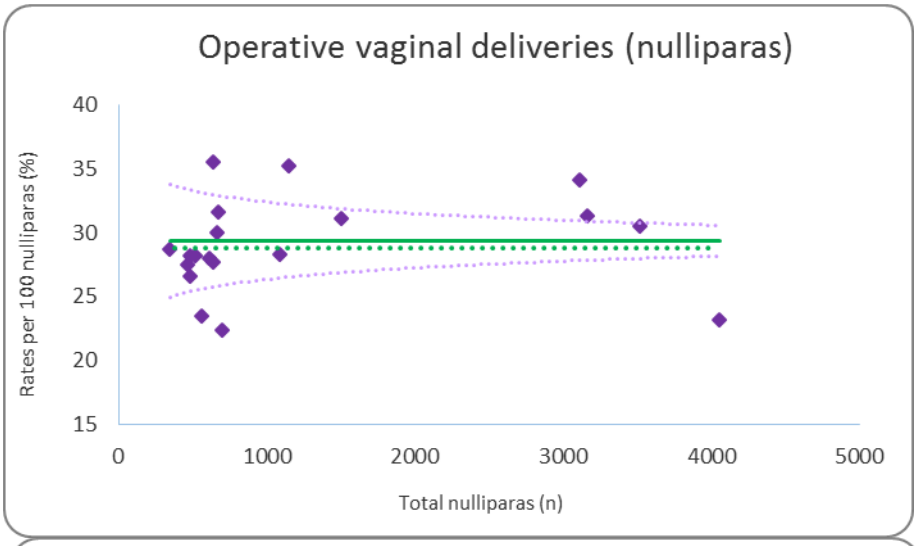
Note:

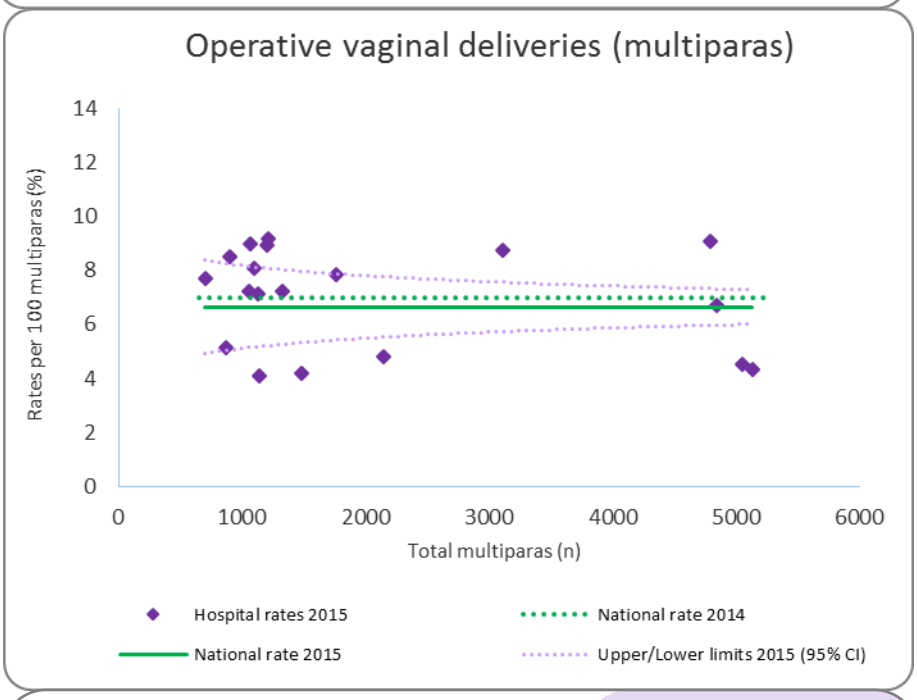
Previous studies have shown nationally and internationally wide variations not only in the overall rates of instrumental vaginal delivery, but also in the rates of use of vacuum and/or forceps as the instrument of choice by the obstetrician (Hehir et al, 2013)[3]. This has implications for the training of specialists for the future.

[3] Hehir, Mark P; Reidy, Fiona R; Wilkinson, Michael N; Mahony, R. (2013). Increasing rates of operative vaginal delivery across two decades: accompanying outcomes and instrument preferences. *Eur. J. Obstet. Gynecol. Reprod. Biol., 171* (1):40-3, http://lenus.ie/hse/handle/10147/332798.

OVD among nulliparas (#28) and OVD among multiparas (#31)

(Definitions as before)



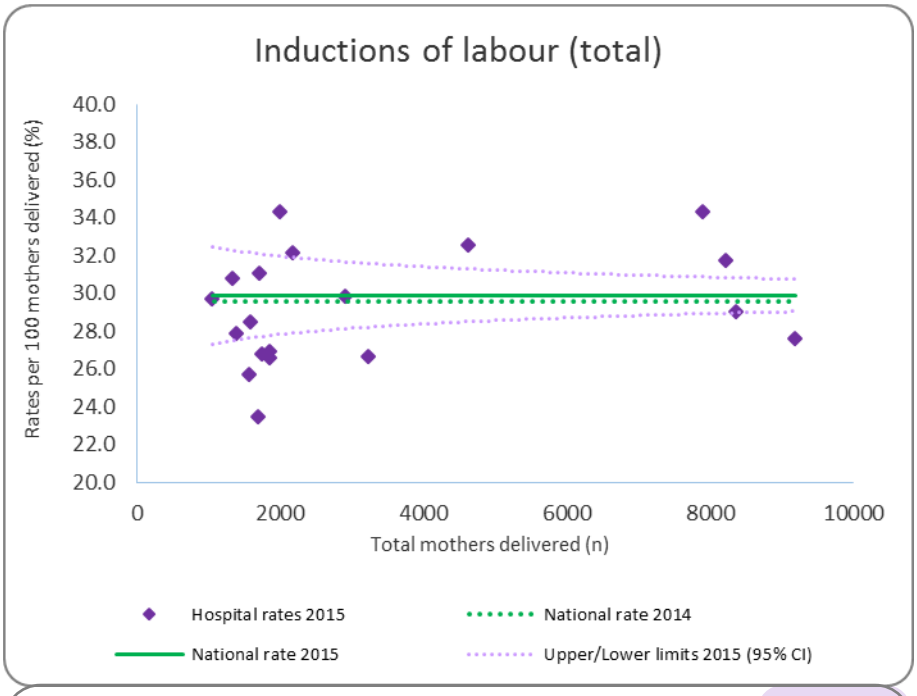


	2014†		2015	
	Nulliparas	*Multiparas*	*Nulliparas*	*Multiparas*
Totals (n)	24,417	38,360	24,389	40,046
OVD (n)	7,031	2,677	7,163	2,664
National rates (%)	28.8%	7.0%	29.4%	6.7%
95% CI	28.2-29.4	6.7-7.2	28.8-29.9	6.4-6.9

†Figures for 2014 are based on complete data from 17 maternity units.

Indicator #29 and #32 (combined): 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.



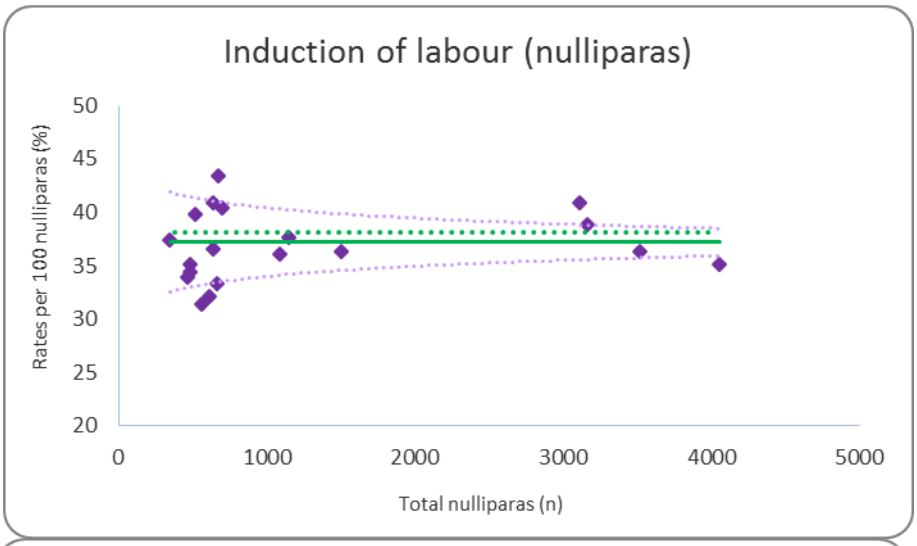
	2014	2015
Total mothers delivered (n)	65,987	64,435
Inductions of labour (total) (n)	19,531	19,270
National rates (%)	29.6%	29.9%
95% CI	29.3-30.0	29.6-30.3

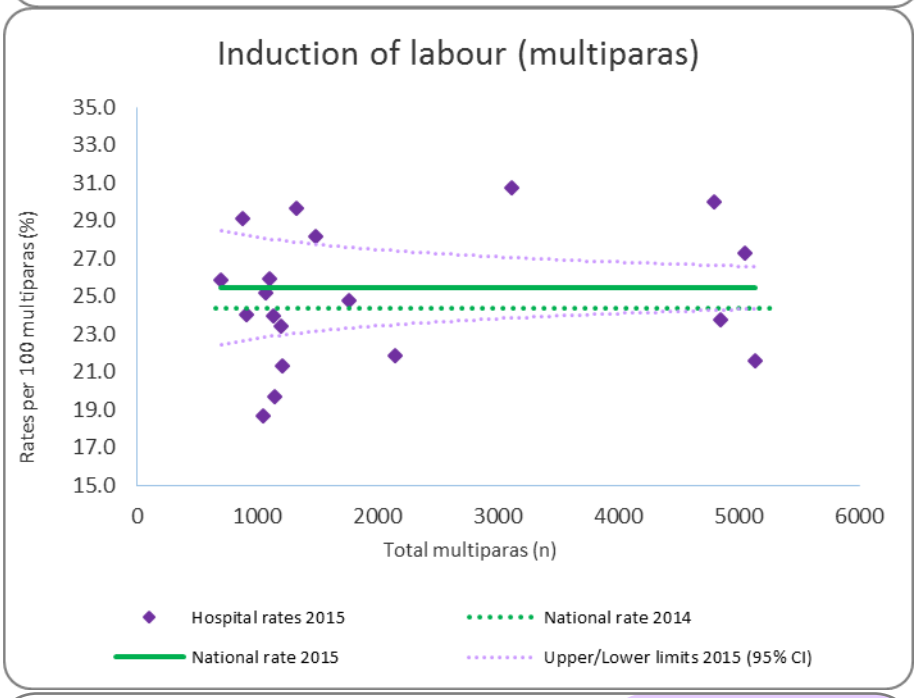
Note:

A recent Irish report has shown wide variations in induction rates between maternity units (Sinnott et al, 2016)[4]. Some of the variation may be explained clinically factors and sociodemographic variables, but some also relates to organisational behaviour and practices. It also should be acknowledged that the optimum induction rate is not known scientifically.

[4] Sinnott, SJ; Layte, R; Brick, A; Turner MJ. (2016). Variation in induction of labour rates across Irish hospitals: A cross-sectional study. *European Journal of Public Health*, June 5.

Induction of labour among nulliparas (#29) and among multiparas (#32) (Definitions as before)



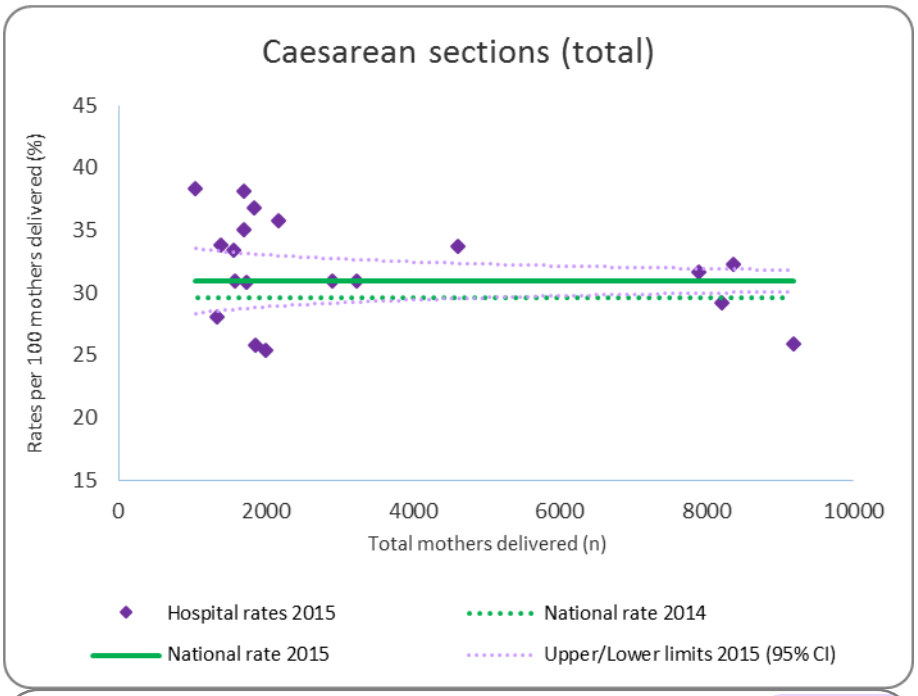


	2014†		2015	
	Nulliparas	*Multiparas*	*Nulliparas*	*Multiparas*
Totals (n)	25,048	39,505	24,389	40,046
IoL (n)	9,536	9,643	9,073	10,197
National rates (%)	38.1%	24.4%	37.2%	25.5%
95% CI	37.5-38.7	24.0-24.8	36.6-37.8	25.0-25.9

†Figures for 2014 are based on data from 18 maternity units.

Indicator #30 and #33 (combined): 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.



	2014	2015
Total mothers delivered (n)	65,987	64,435
Caesarean sections (total) (n)	19,550	19,902
National rates (%)	29.6%	30.9%
95% CI	29.3-30.0	30.5-31.2

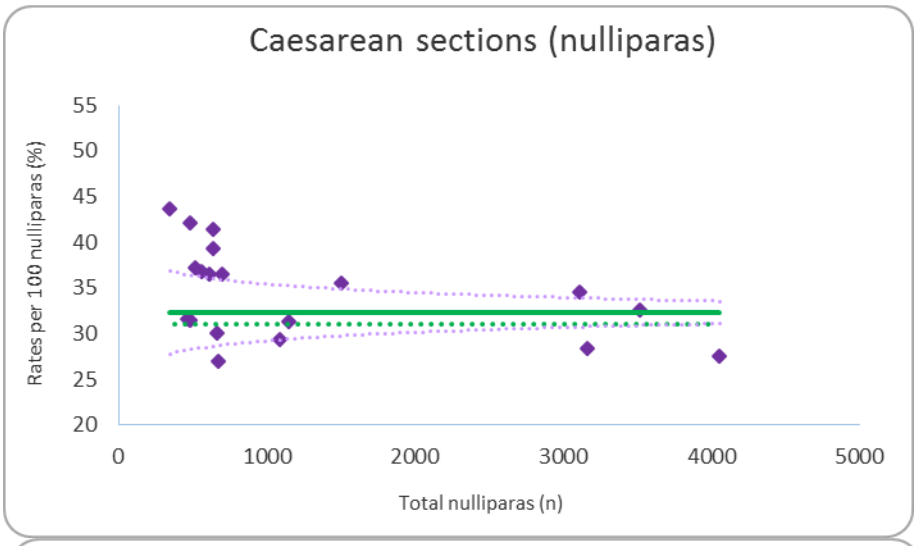
Note:

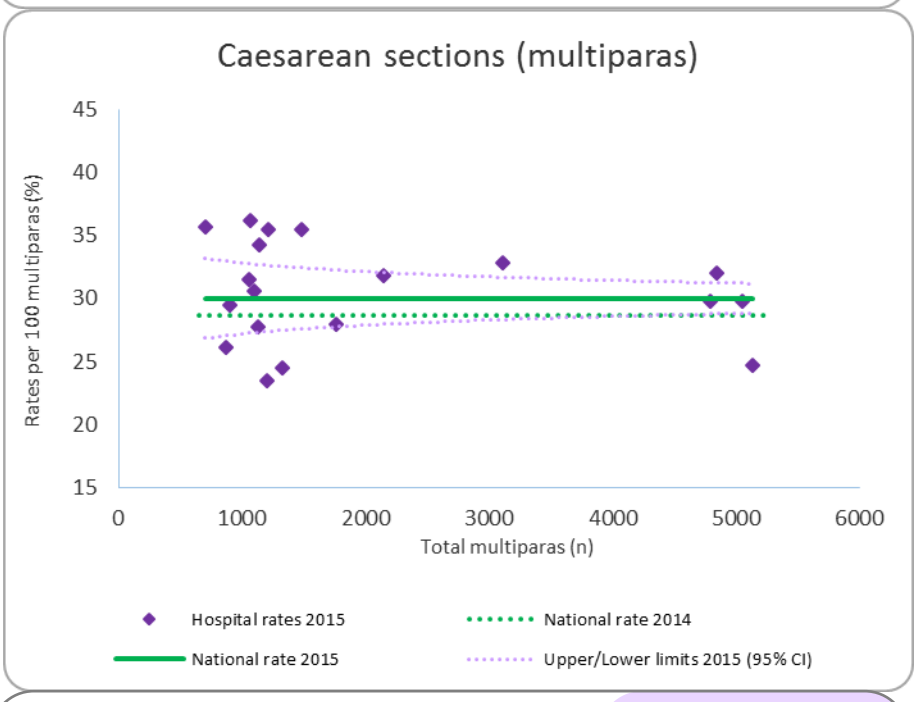
Like other countries, the proportion of women undergoing caesarean section deliveries in Irish maternity units is increasing (see Sinnott et al. 2016)[5]. There are many possible reasons for these increases, including reductions in the risk of caesarean delivery, increasing litigation, increases in first 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. It would be useful for maternity units to analyse caesarean section rates using the Robson Ten Groups Classification.

5 Sinnott, SJ; Brick, A; Layte, R; Cunningham, N; Turner, MJ. (2016). National variation in caesarean section rates: A cross sectional study. *PLoS ONE 11(6)*: e0156172. Doi: 10.1371/journal.pone.0156172

Caesarean sections among nulliparas (#30) and among multiparas (#33)

(Definitions as before)





	2014†		2015	
	Nulliparas	*Multiparas*	*Nulliparas*	*Multiparas*
Totals* (n)	25,048	39,505	24,389	40,046
Caesarean sections (n)	7,763	11,305	7,883	12,019
National rates (%)	31.0%	28.6%	32.3%	30.0%
95% CI	30.4-31.6	28.2-29.1	31.7-32.9	29.6-30.5

†Figures for 2014 are based on data from 18 maternity units.

Appendices

Appendix 1: Acknowledgements

IMIS Officers/Teams in maternity units:

Karen Malocca, Ann Arnott, Margaret Mulvany, Cavan General Hospital
Claire O'Halloran, Riona Cotter, Claire Everard, Cork University Maternity Hospital
Mary Holden, Emma McNamee, Coombe Women and Infants University Hospital
Claire Shannon, Our Lady's of Lourdes Hospital, Drogheda
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Shane Neary, Evelyn Smith, Eileen P. Egan, Elizabeth Neely, Letterkenny University Hospital
Louise Reid, Limerick University Maternity Hospital
Andrea McGrail, Catherine Donohue, Mayo General Hospital, Castlebar
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Fionnuala Byrne, National Maternity Hospital, Dublin
Marie-Christine de Tavernier, Priscilla Neilan, Portiuncula Hospital, Ballinasloe
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Dr Hugh Magee, Department of Health (2013-14)
Dr Jennifer Martin, HSE (until 2015)

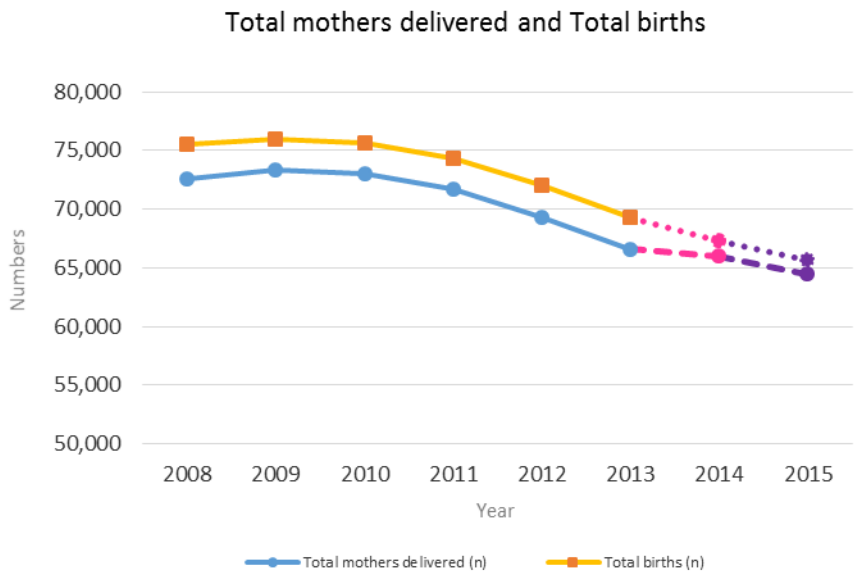
Appendix 2: IMIS Data Collection Form

		Previous year		Current year	
		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.	Babies delivered ≥ 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 transfer – admitted (n)				
15.	In-utero transfer – 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.	Operative vaginal deliveries (OVD) (total) (n)				
	OVD for nulliparas (n)				
	OVD for multiparas (n)				
29.	Induction of labour (total) (n)				
	Induction of labour for nulliparas (n)				
	Induction of labour for multiparas (n)				
30.	Caesarean sections (total) (n)				
	Caesarean sections for nulliparas (n)				
	Caesarean sections for multiparas (n)				

Appendix 3: National Longitudinal Trends: 2008-2015

1.1 Total Mothers delivered and Total births

Total mothers delivered: Number of women delivering a baby weighing 500g or more
Total births: Number of live births and stillbirths weighing 500g or more



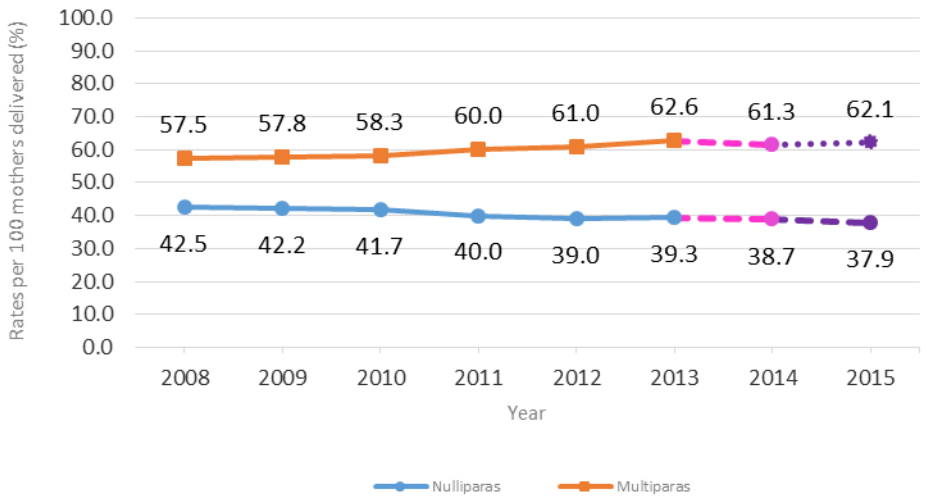
	NPRS						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Total mothers delivered (n)	*72,574*	*73,373*	*73,032*	*71,705*	*69,263*	*66,574*	*65,987*	*64,435*
Total births (n)	*75,587*	*76,023*	*75,600*	*74,377*	*71,986*	*69,267*	*67,263*	*65,680*

Sources: NPRS Annual Report 2014, IMIS 2014 and IMIS 2015

1.2 Total nulliparas and Total multiparas

Nulliparas: Number of women delivered (baby/ies ≥500g) who have never had a previous pregnancy resulting in a live birth or stillbirth.

Multiparas: Number of women delivered (baby/ies ≥500g) who have had at least one previous pregnancy resulting in a live birth or stillbirth

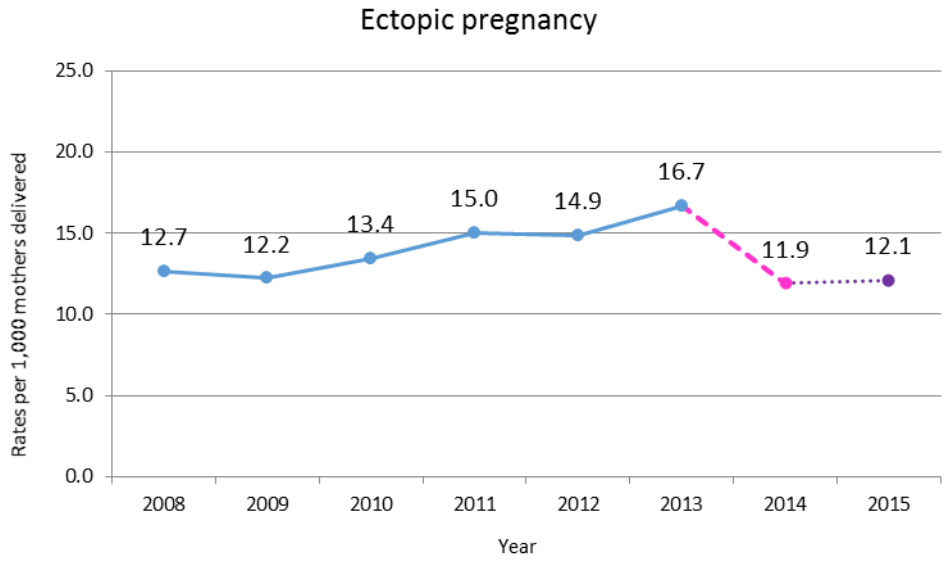


	NPRS						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Multiparas	*57.5*	*57.8*	*58.3*	*60.0*	*61.0*	*62.6*	*61.3*	*62.1*
Nulliparas	*42.5*	*42.2*	*41.7*	*40.0*	*39.0*	*39.3*	*38.7*	*37.9*

Sources: *NPRS Annual Report 2013, IMIS 2014 and IMIS 2015*

1.3 Ectopic pregnancy

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



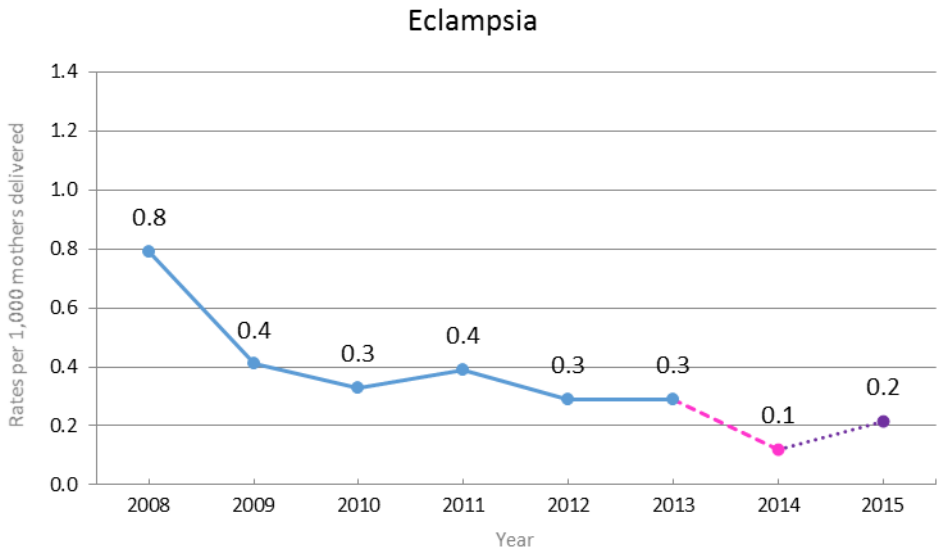
	HIPE						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
*Rates**	*12.7*	*12.2*	*13.5*	*15.0*	*14.9*	*16.7*	*11.9*	*12.1*

**Per 1,000 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); NPRS 2008-2013; IMIS 2014 and IMIS 2015

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.



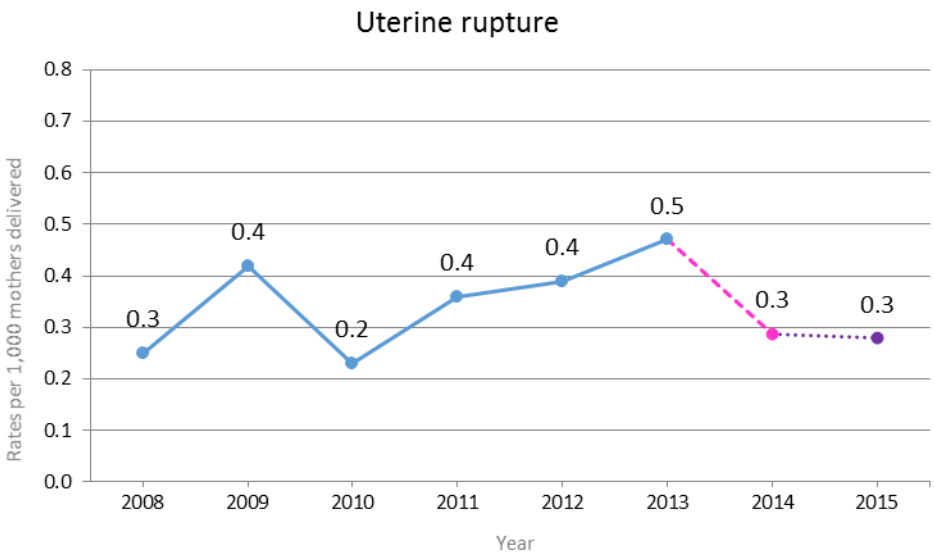
	HIPE						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates*	*0.8*	*0.4*	*0.3*	*0.4*	*0.3*	*0.3*	*0.1*	*0.2*

**Per 1,000 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); IMIS 2014 and IMIS 2015

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.



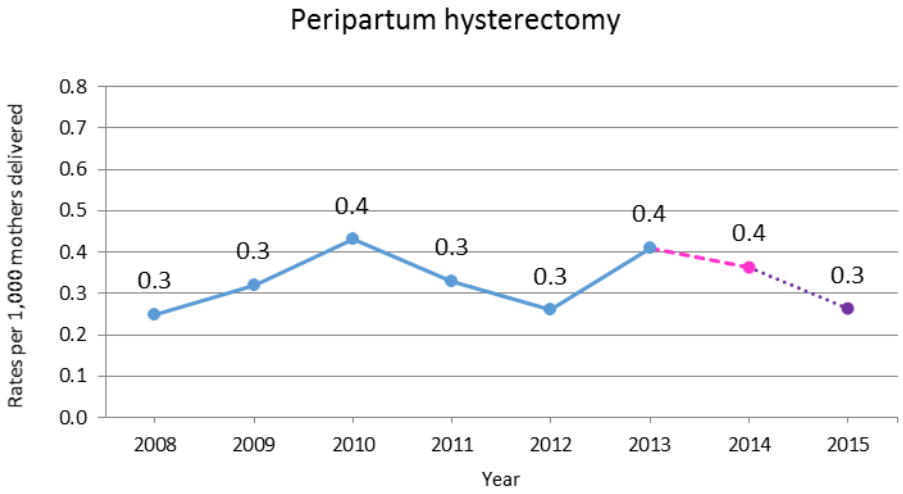
	HIPE						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates*	*0.3*	*0.4*	*0.2*	*0.4*	*0.4*	*0.5*	*0.3*	*0.3*

**Per 1,000 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); IMIS 2014 and IMIS 2015

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.



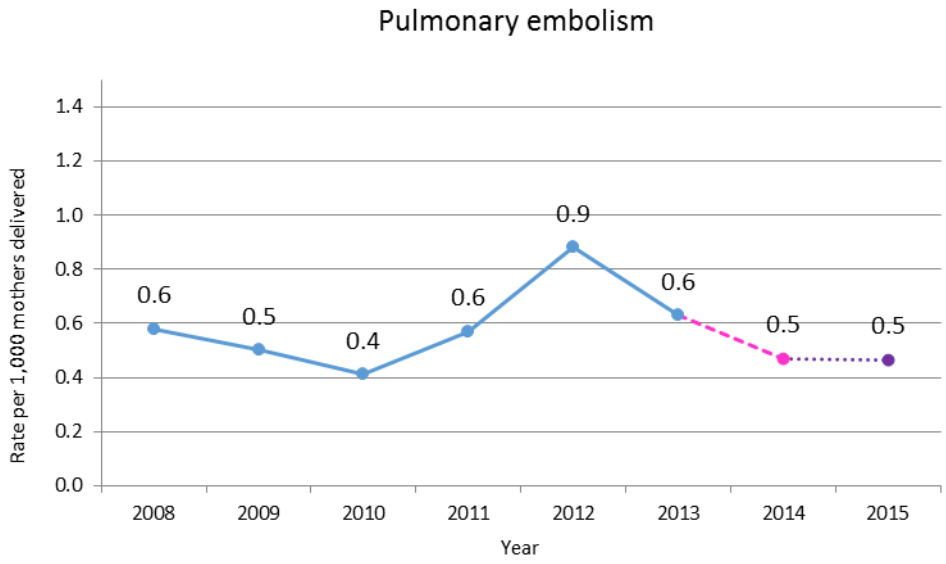
	HIPE						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates*	*0.3*	*0.3*	*0.4*	*0.3*	*0.3*	*0.4*	*0.4*	*0.3*

**Per 1,000 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); IMIS 2014 and IMIS 2015

1.7 Pulmonary embolism

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



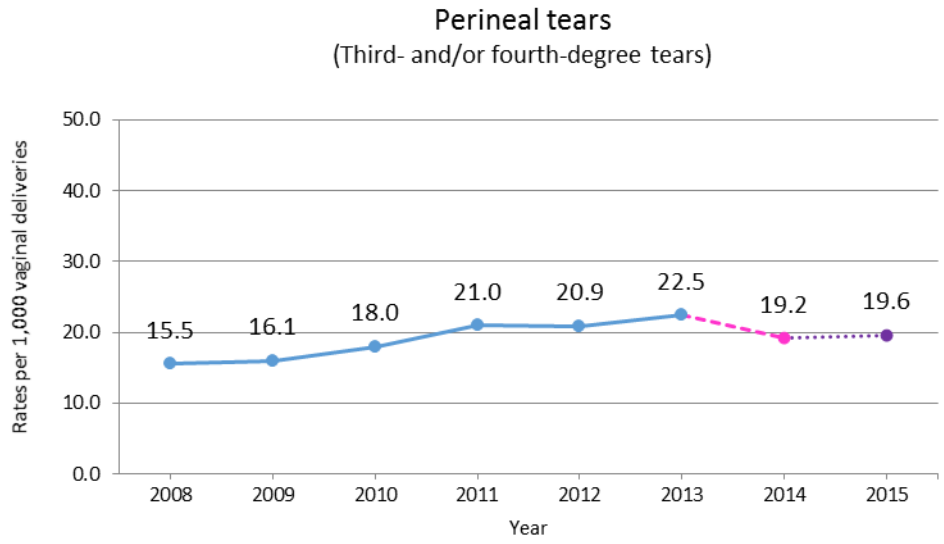
	HIPE						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates*	*0.6*	*0.5*	*0.4*	*0.6*	*0.9*	*0.6*	*0.5*	*0.5*

**Per 1,000 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); IMIS 2014 and IMIS 2015

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



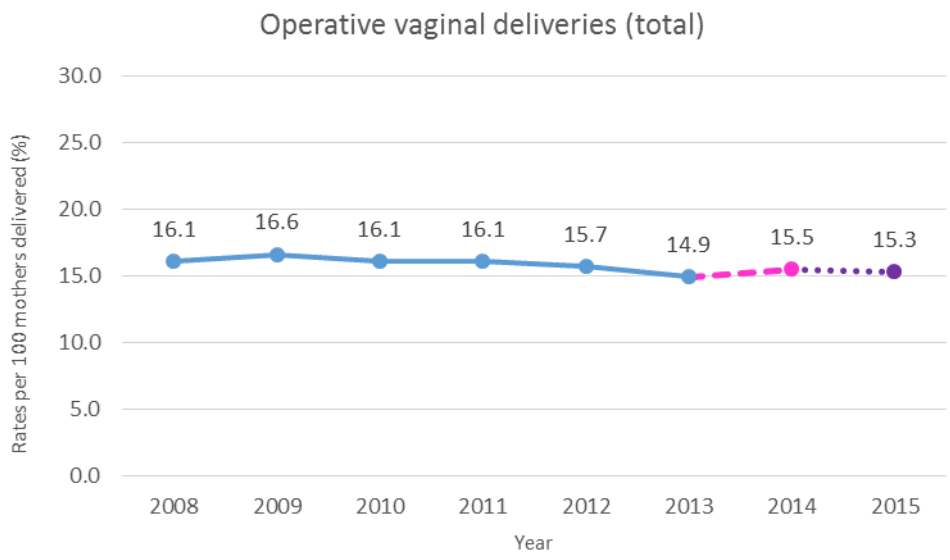
	HIPE/NPRS						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates*	*15.5*	*16.1*	*18.0*	*21.0*	*21.0*	*22.5*	*19.2*	*19.6*

**Per 1,000 vaginal deliveries*

Sources: HIPE (closed national files for 2008-2013); NPRS 2008-2013; IMIS 2014 and IMIS 2015

1.9 Operative vaginal deliveries (OVD) (Total)

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 Instrumental deliveries).



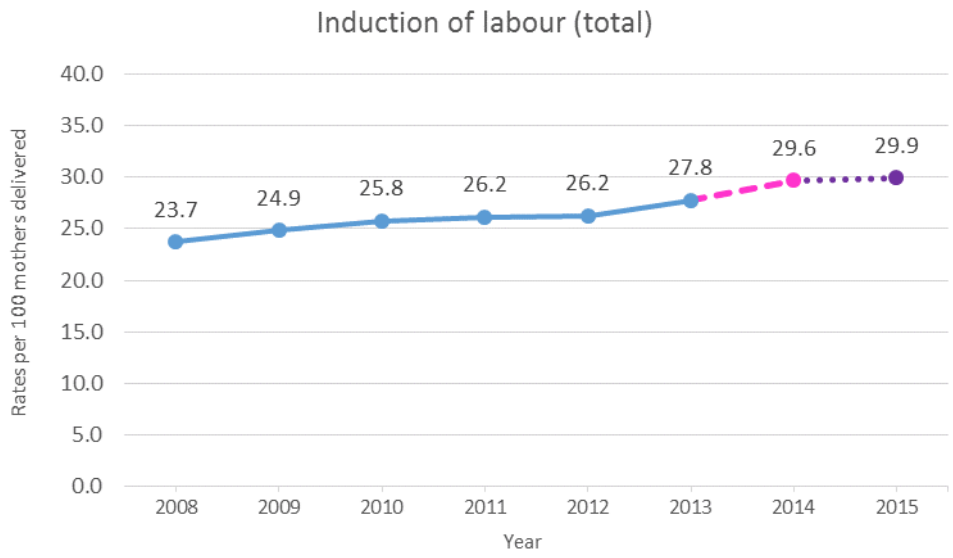
	HIPE/NPRS						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates (%)*	*16.1*	*16.6*	*16.1*	*15.7*	*15.7*	*14.9*	*15.5*	*15.3*

**Per 100 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); NPRS 2008-2013; IMIS 2014 and IMIS 2015

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.



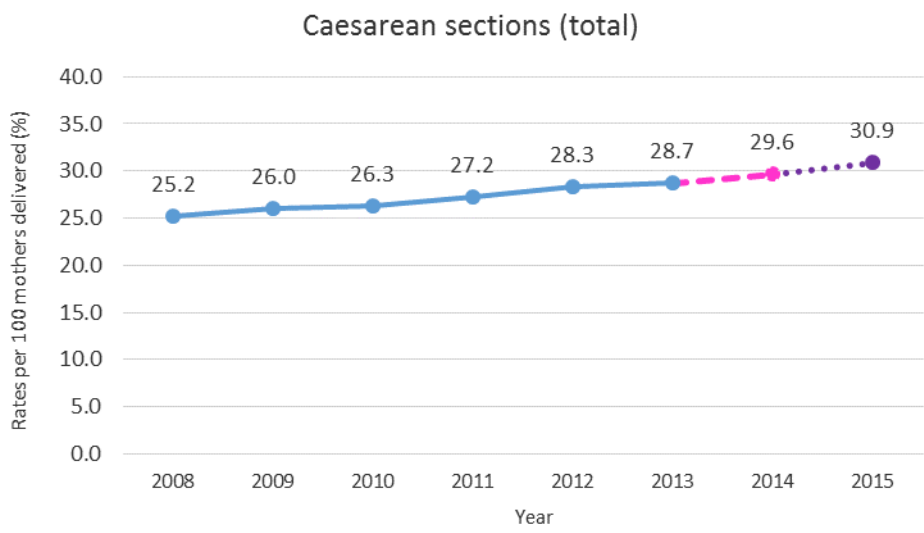
	NPRS						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates (%)*	*23.7*	*24.9*	*25.8*	*26.2*	*26.2*	*27.8*	*29.6*	*29.9*

**Per 100 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); NPRS 2008-2013; IMIS 2014 and IMIS 2015

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.



	NPRS						IMIS	
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Rates (%)*	*25.2*	*26.0*	*26.3*	*27.2*	*28.3*	*28.7*	*29.6*	*30.9*

**Per 100 mothers delivered*

Sources: HIPE (closed national files for 2008-2013); NPRS 2008-2013; IMIS 2014 and IMIS 2015

Appendix 4: National Recommendations

There follows an outline of the relevant national recommendations and initiatives produced since June 2013, which align with and support the IMIS and quality of care provision in maternity services.

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 Clinical Programme in Obstetrics and Gynaecology, 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 intended to be a monthly statement on the quality of care in maternity units. It is based on the design of the IMIS and uses 16 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)

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)
- 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 (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. HIQA 'Portlaoise' Report (May 2015)

Recommendation 6c: 'The Health Service Executive (HSE), along with the chief executive officers of each hospital group, must ensure that the new hospital groups prioritise the development of strong clinical networks underpinned by regular evaluation and audit of the quality and safety of services provided.'

6. 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 5: Data and Methods

Data

The data from IMIS 2014-2015 are provided by the hospitals themselves. Data for 2014 were updated and 2015 data were cleaned and verified in collaboration with staff at the hospitals.

Where relevant, comparative national data are drawn from the National Perinatal Reporting System (NPRS) and the Hospital In-Patient Enquiry (HIPE). 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 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).

Methods

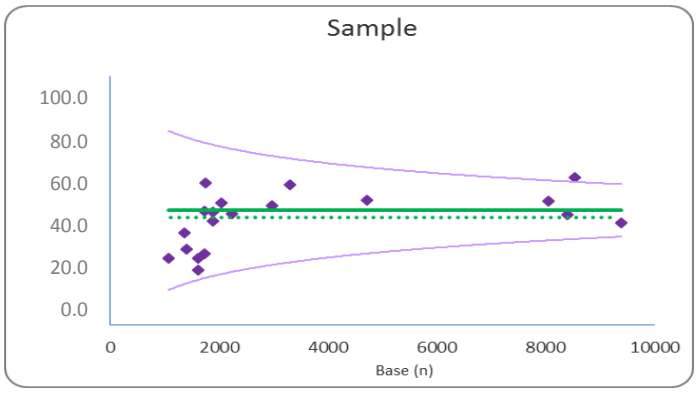
The IMIS data were analysed using MS Excel. National rates were calculated for all maternity units and hospital-level rates were calculated for each unit individually. Confidence limits were calculated using 95% confidence levels. Funnel charts were customised for selected IMIS indicators.

Funnel charts

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., including 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 purple dot represents a maternity unit (19 in total).

The vertical axis measures the frequency of the outcome, usually expressed as a rate per 1,000 mothers delivered or births, or as a percentage. The dots higher up on the chart represent maternity units with higher rates of the outcome.

The horizontal axis represents the base (in most charts, the number of total births or total maternities). The dots further to the right are maternity units with more births/ maternities.

The solid green horizontal line shows the national average rate in the current year.

The broken green horizontal line shows the national average rate in the previous year.

The purple curved lines constitute the reference range or 95% confidence limits. The reference range defines what is regarded as the 'normal', or typical, range. Anything beyond the range is therefore regarded as abnormal or non-standard. The reference range allows us to say that if the true value of the parameter lies beyond the 95% confidence limits, then an event has occurred which had a probability of 5% (or less) of happening by chance alone.

Caution is advised where small values are concerned.

Maternity units lying beyond the confidence limits on the funnel plots may be considered in a 'warning' sector. 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 does not indicate high or low 'quality'. We recommend senior managers at maternity units should investigate the reasons for the variation at the hospital level before action is taken.

Several funnel plots in this report show evidence of a phenomenon known as overdispersion (Spiegelhalter 2005).[6] This 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. Given that no risk adjustment has been executed in the analysis presented in this report, it is likely that these are the underlying reasons for much of the systematic variation between units. Consequently, it would be premature to draw conclusions from the charts alone about whether differences in the patterns of maternity care provision reflect differences in quality.

To compensate for the absence of statistical risk adjustment, notes are provided after the funnel charts. These notes contain crucial details that inform or explain the results. They are based on clinical expertise and hospital management experiences. The notes contribute explanations of the annual hospital rates where they lie above or below the national rates and, particularly, where they lie beyond the confidence limits.

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)

HSE Clinical Programme in Obstetrics and Gynaecology

August 2016

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

OBSTETRICS AND GYNAECOLOGY