Irish Maternity Indicator System

National Report 2023

National Women and Infants Health Programme

October 2024

Contents

Introduction

This Irish Maternity Indicator System (IMIS) National Report shows data from the 19 maternity hospitals/units across Ireland in 2023. It begins with an overview of longitudinal trends for selected metrics over the past decade, including the following points:

- Declining births in Ireland: There were 19% fewer births in 2023 than 2014.
- Increasing rate of nulliparas nationally and declining rate of multiparas shows more women having babies and smaller family sizes overall.
- Declining rate of multiple births may relate to improvements in IVF techniques and policies of single-embryo transfer.
- Declining rate of perinatal deaths, including adjusted perinatal deaths, indicate improvements in care.
- A rise in ectopic pregnancies over the decade.
- Declining rates of serious obstetric conditions such as eclampsia, uterine rupture, pulmonary embolism, and severe perineal tears.
- Falling rates of operative (assisted) vaginal deliveries, while inductions of labour and Caesarean section (CS) rates are rising year on year.
- Rising rate of peripartum hysterectomies, which may be associated with increasing CS rates.
- Relatively stable rates of general anaesthetic for CS and labour epidurals over the past decade.

Developed in 2014 by the National Clinical Programme for Obstetrics and Gynaecology under the leadership of Professor Michael Turner, the IMIS was the first nationally standardised, combined management and clinical data-collection tool in Obstetrics and Neonatology. Its creation followed several national recommendations (HIQA 2013; HSE NIMT 2013). While Ireland has a long history and tradition of data reporting at individual hospital level, the IMIS allows units to audit their local performance and also provides a national standardised overview of activities.

The IMIS has been developed over the years and now contains 40 metrics across Obstetrics and Neonatology. All metrics use agreed definitions, thus ensuring a standardised national approach.

The IMIS has led to quality improvement interventions that have a bearing on all maternity units. For example, there have been recent interventions in respect of neonatal encephalopathy, therapeutic hypothermia, and postpartum haemorrhage. Individual maternity units may focus on quality improvement initiatives based on their own local data. The IMIS report complements other valuable reports, including the National Therapeutic Hypothermia report, which is a collaboration with the National Perinatal Epidemiology centre (NPEC). Furthermore, national clinical guidelines have been developed on subjects directly related to the IMIS metrics.

The IMIS dataset is continually reviewed to ensure relevance and usefulness. Its success is dependent on the hard work of staff at the 19 maternity hospitals/units.

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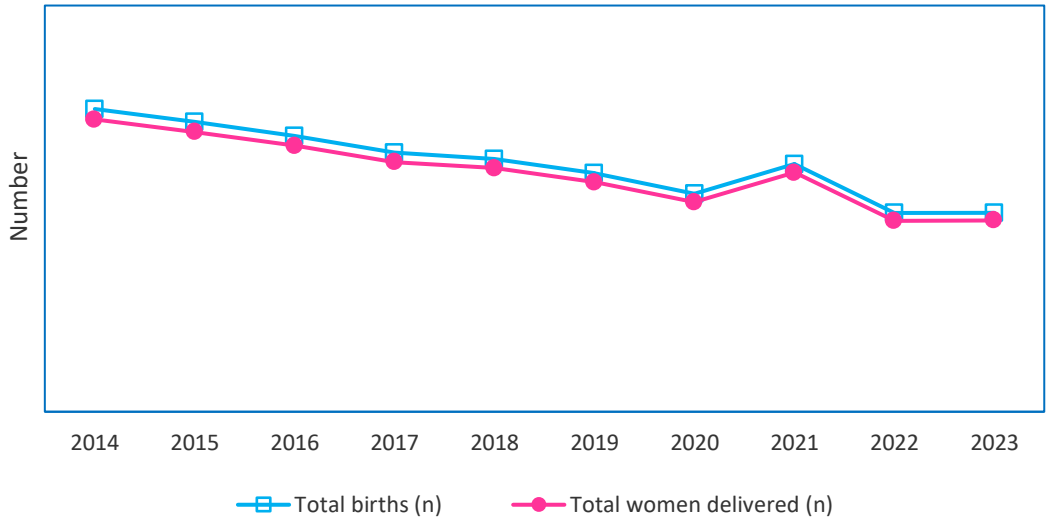
A decade of the IMIS:

National longitudinal trends 2014-2023

1. National longitudinal trends 2014-23: Total births and Total women delivered



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total births *(N)*	67263	65680	63964	61902	61084	59352	56833	60492	54456	54488
Total women *(N)*	65987	64435	62736	60744	59981	58272	55799	59443	53495	53558

Source: IMIS 2014-2023

Definitions: Total births: Total births weighing ≥500g, including live birth and stillbirths.

Total women: Total women delivering a baby weighing ≥500g, including live birth and stillbirths.

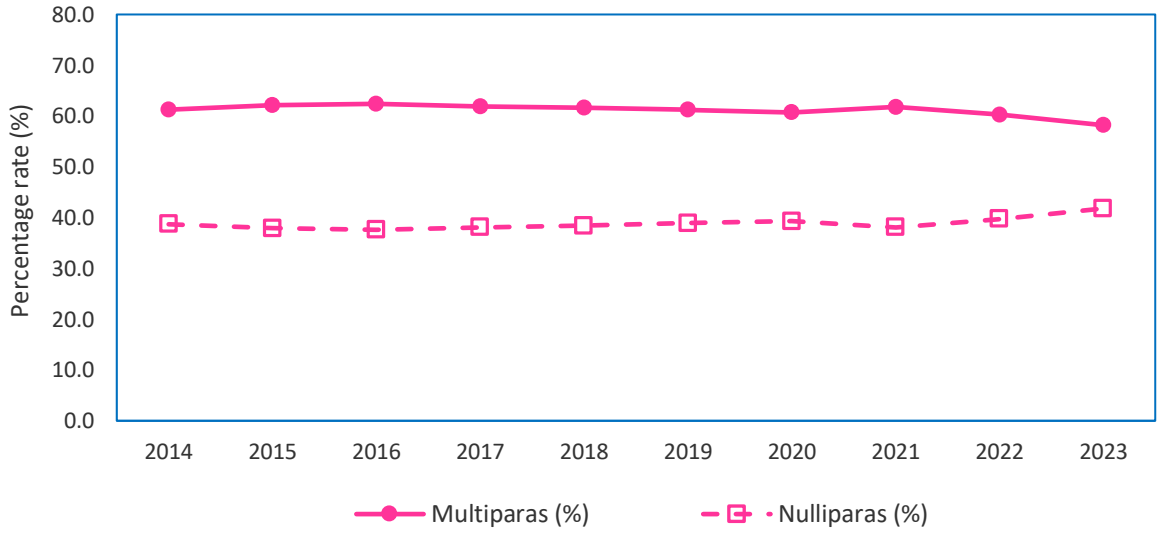
Total births in Ireland, including live births and stillborn babies, have fallen by an average of 2.1% per annum over the past decade: There was 19% fewer births in 2023 compared to 2014.

Similar trends are occurring in most other EU countries. The number of live births in the EU has been declining since the 1960s and reached its lowest level 1.46 in 2022 (Eurostat), below the level considered necessary for a stable population without immigration.

Ireland's birth numbers saw a temporary jump in 2021, during the early months of the COVID-19 pandemic, when birth numbers increased by 6.5%. They fell back again in 2022 by 10%.

International research shows differing trends in births during the early COVID years. In Ireland and some northern European and Nordic countries, births increased, while in most western high-income countries, the birth rate declined. Findings about the influence of the COVID-19 pandemic on fertility patterns vary between countries. Influences included timing of infection waves, shutdown policies, and pre-existing fertility changes (Bujard & Andersson 2024).

2. National longitudinal trends 2014-23: Total Multiparas and Nulliparas



The rate of nulliparas is increasing in recent years, while multiparas declines. These trends are important for future planning of healthcare provision.

More women giving birth for the first time will alter demands on maternity care providers.

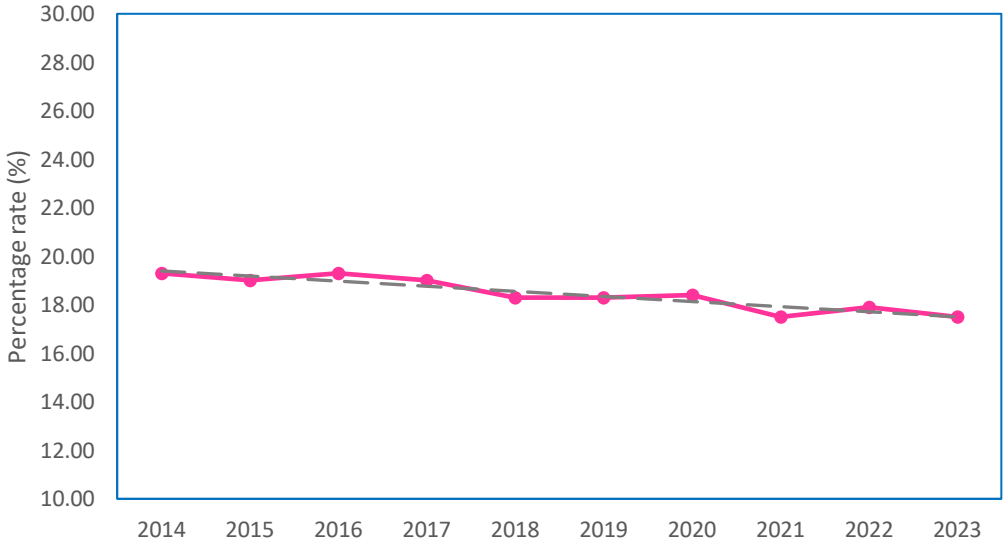
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Multiparas *(%)*	61.3%	62.1%	62.4%	61.9%	61.6%	61.2%	60.7%	61.9%	60.3%	58.2%
Nulliparas *(%)*	38.7%	37.9%	37.6%	38.1%	38.4%	38.8%	39.3%	38.1%	39.7%	41.8%

Source: IMIS 2014-2023. Rates calculated as percentage of Total women delivered.

Definitions: Nulliparas: Number of women delivering a baby ≥500g who have never had a previous pregnancy resulting in a live birth or stillbirth.

Multiparas: Number of women delivering a baby ≥500g who have had at least one previous pregnancy resulting in a live birth or stillbirth.

3. National longitudinal trends 2014-23: Total Multiple deliveries



The rate of multiple deliveries (births) has been declining in Ireland over the past decade.

This recent trend is observed in other countries, including the US and the UK, where the twin-birth rate declined by 4% from 2014-18 (Khalil & Liu 2021).

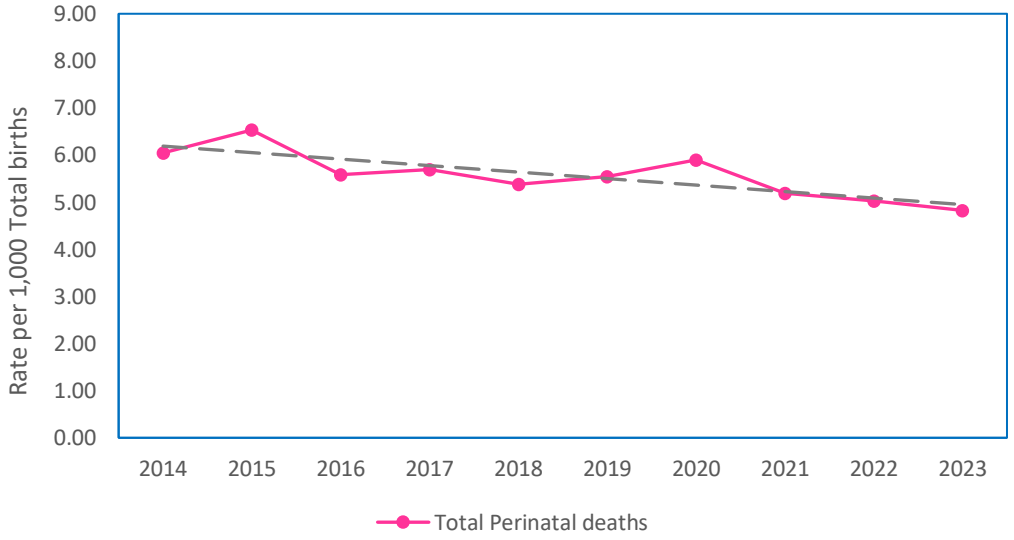
One explanation for the declining rates in recent years relates to policies of single-embryo transfer and improvements in IVF techniques.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Multiple deliveries *(%)*	1.93%	1.90%	1.93%	1.90%	1.83%	1.83%	1.84%	1.75%	1.79%	1.75%

Source: IMIS 2014-2023. Rates calculated as a percentage of Total women delivered.

Definition: Number of women with multiple births (not the number of babies delivered) occurring during the current month. A multiple birth results when more than one baby is born from a single pregnancy.

4. National longitudinal trends 2014-23: (Total) Perinatal Deaths



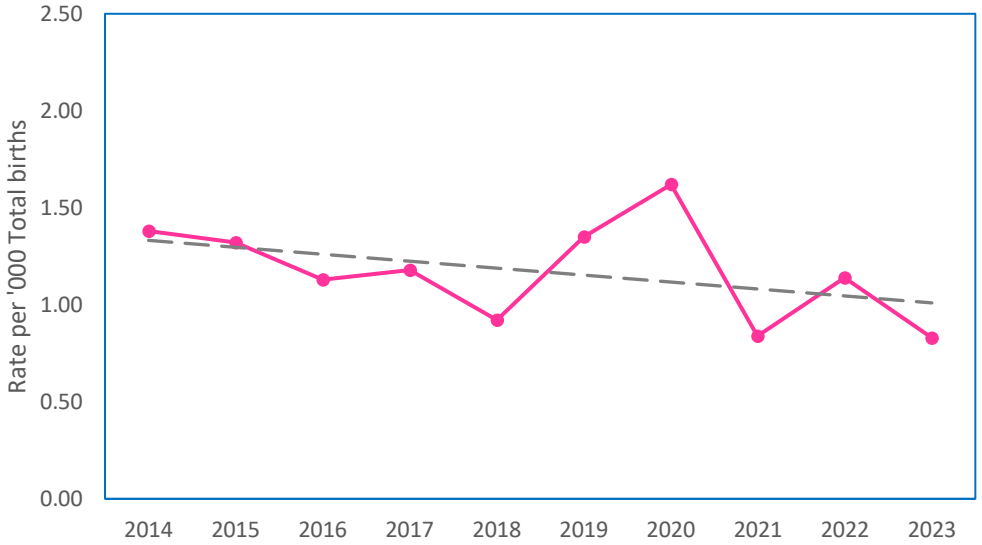
Annual rates of perinatal death have fluctuated over the past decade, but the overall trend has been declining. There were slight increases in 2019/20 and 2022. Similarly, in the UK, there was an increase in 2021, following seven years of annual reduction (Rimmer 2023).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
(Total) Perinatal Deaths *('000)*	6.05	6.53	5.58	5.69	5.38	5.64	5.89	5.19	5.03	4.83

Source: IMIS 2014-2023. Rates calculated per '000 Total births.

Definition: Number of deaths, including stillbirths and early neonatal deaths from delivery to six completed days occurring during the current month. A stillbirth in this report refers to the death of a fetus weighing ≥500g, irrespective of duration of pregnancy; an early neonatal death refers to the death of a live born infant during the first seven days of life. This metric is not adjusted to exclude congenital anomalies.

5. National longitudinal trends 2014-23: (Adjusted) Perinatal Deaths



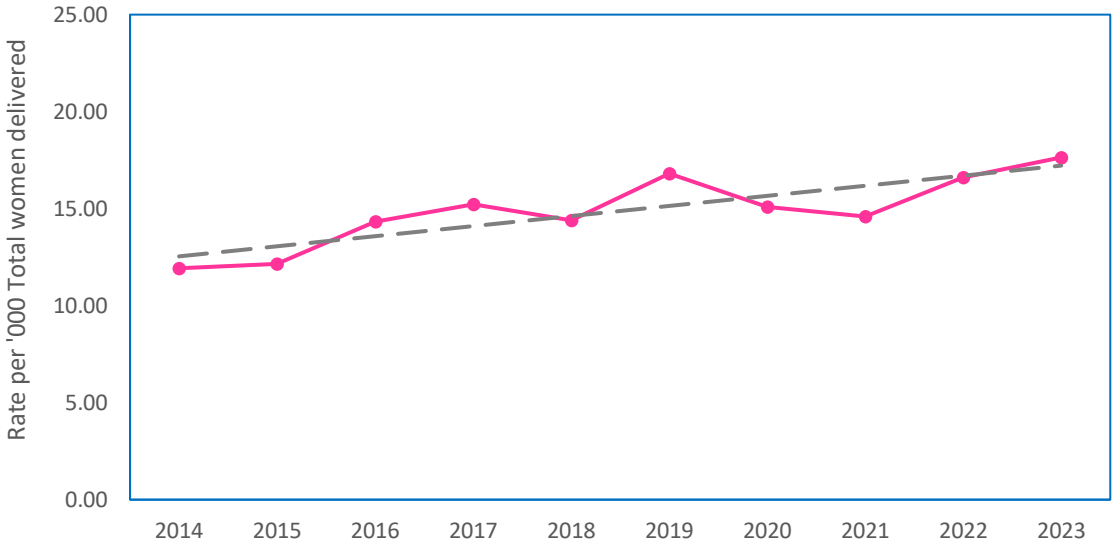
There has been a decline over the past decade in the overall trend in rates of Perinatal deaths among babies weighing 2.5kg or more without physiological or structural abnormalities that develop at or before birth and are present at the time of birth.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
(Adjusted) Perinatal Deaths *('000)*	1.38	1.32	1.13	1.18	0.92	1.35	1.62	0.84	1.14	0.83

Source: IMIS 2014-2023. Rates calculated per '000 Total births.

Definition: Number of perinatal deaths (stillbirths and early neonatal 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.

6. National longitudinal trends 2014-23: Ectopic pregnancy



The trend in rates of Ectopic pregnancy has been increasing over the past decade.

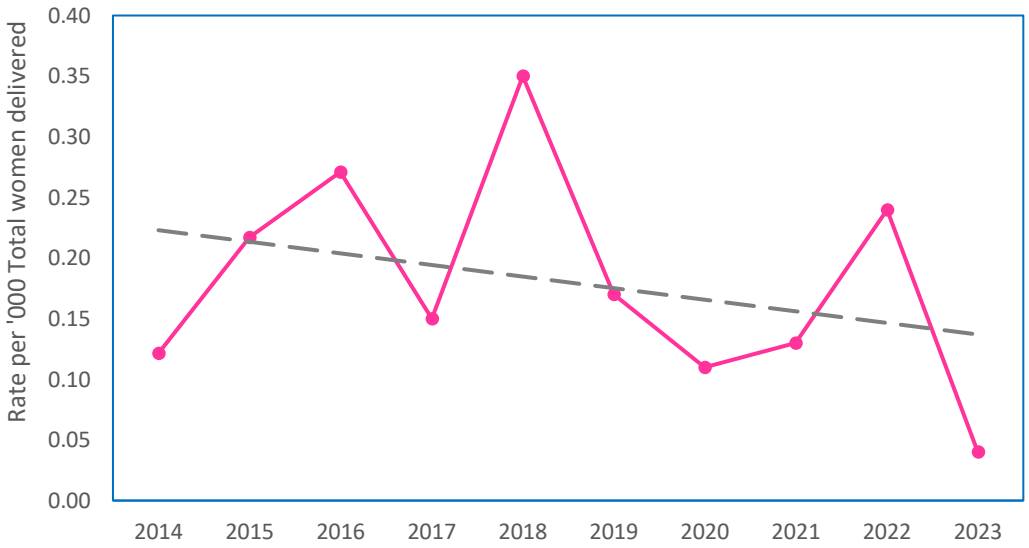
The morbidity, mortality, and disease burden of EP have decreased over the past few decades (Zhang et al., 2023).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Ectopic pregnancy *('000)*	11.9	12.2	14.3	15.2	14.4	16.8	15.1	14.6	16.6	17.6

Source: IMIS 2014-2023.Rates calculated per '000 Total women delivered.

Definition: Number of women diagnosed during the current month with an ectopic pregnancy, including abdominal pregnancy, tubal pregnancy, ovarian pregnancy, and other/unspecified pregnancy.

7. National longitudinal trends 2014-23: Eclampsia



The trend in rates of eclampsia in Ireland has been (unsteadily) declining over the past decade.

There are varying trends in eclampsia (and pre-eclampsia) in different countries: for example, increasing rates in UK, parts of Australia, and Qatar, and decreases in Norway and parts of the USA.

Research shows increasing proportions of high-risk parturients (advanced age, lower parity, use of assisted reproduction) may influence hypertensive disorder rates. There is also evidence that improved antenatal care and medical management, such as increase in aspirin usage among fertile women and clinical interventions like increase in labour inductions, may partly explain improved outcomes for women experiencing hypertensive disorders and their babies.

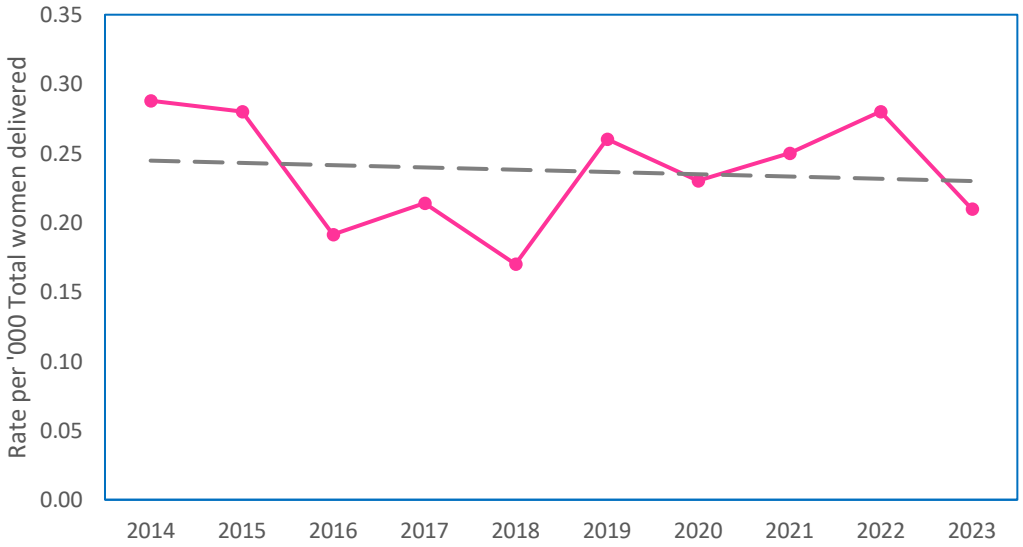
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Eclampsia *('000)*	0.12	0.22	0.27	0.15	0.35	0.17	0.11	0.13	0.24	0.04

Source: IMIS 2014-2023.Rates calculated per '000 Total women delivered.

Definition: Number of women 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.

Exclude severe pre-eclampsia. Seizure associated with antepartum, intrapartum or postpartum symptoms and signs of pre-eclampsia.

8. National longitudinal trends 2014-23: Uterine rupture



Rates of uterine rupture (UR) have changed from year-to-year over the past decade, from 0.17 to 0.29 per '000 women delivered.

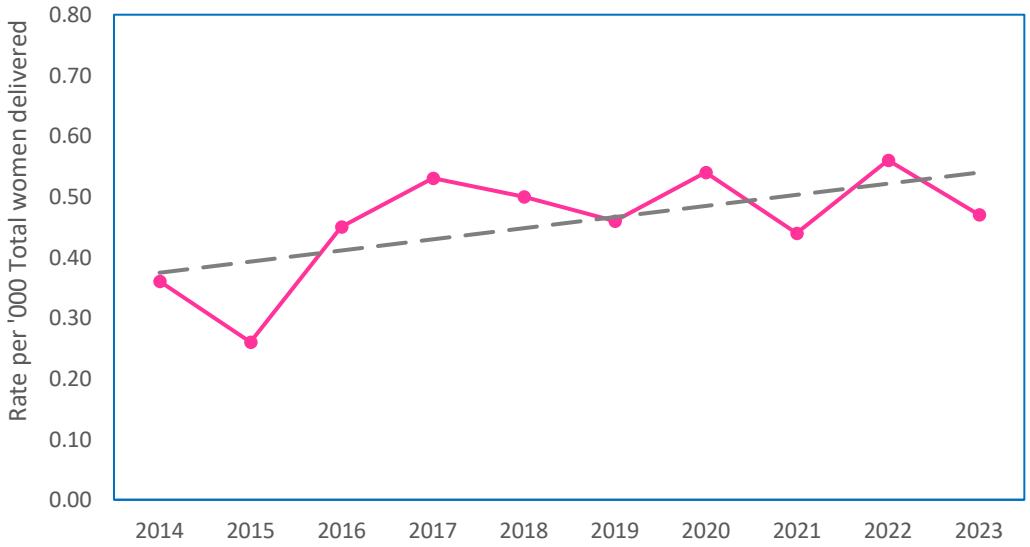
According to the World Health Organization (WHO), the average incidence of UR is 5.3/10,000. The incidence is increasing worldwide and is found to be more common in women with prior CS deliveries and VBAC (Togioka & Tonismae 2023).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Uterine rupture *('000)*	0.29	0.28	0.19	0.21	0.17	0.26	0.23	0.25	0.28	0.21

Source: IMIS 2014-2023. Rates calculated per '000 Total women delivered.

Definition: Number of women with rupture of uterus before onset of labour or during labour, including cases that may not be diagnosed until after delivery. Rupture implies complete separation of the wall of the pregnant uterus, with or without expulsion of the fetus, involving rupture of membranes at the site of the uterine rupture or extension into uterine muscle separate from any previous scar, and endangering the life of the mother or fetus. Exclude any asymptomatic palpable or visualised defect (e.g., dehiscence noted incidentally at caesarean section delivery.

9. National longitudinal trends 2014-23: Peripartum hysterectomy



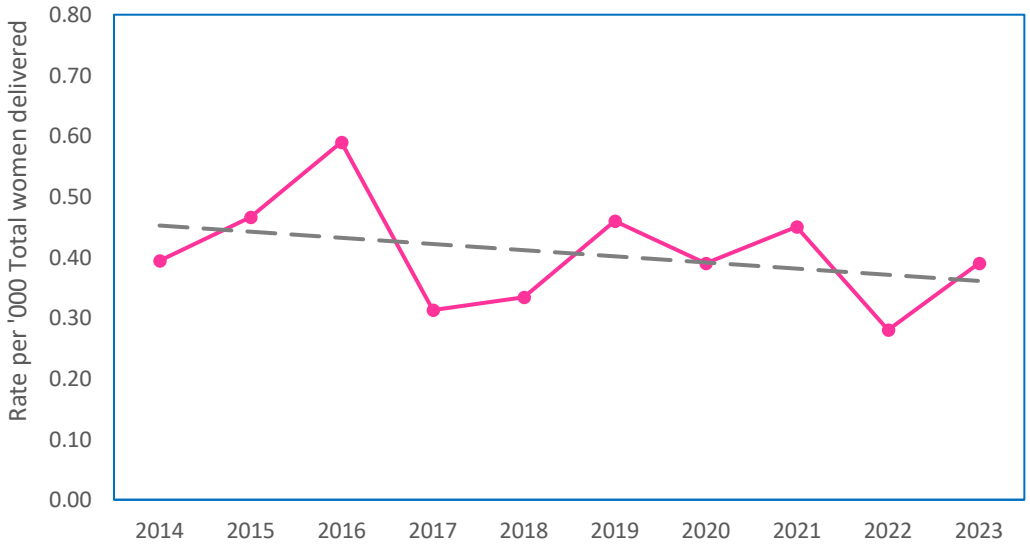
The trend in rates of peripartum hysterectomy has been increasing over the past decade. This trend is not surprising, since peripartum hysterectomy rates are known to be associated with CS rates (Khallianidis et al., 2020).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Peripartum hysterectomy (Rate per '000 Total women delivered)	0.36	0.26	0.45	0.53	0.50	0.46	0.54	0.44	0.56	0.47

Source: IMIS 2014-2023.

Definition: Total number of hysterectomy procedures performed during pregnancy and/or within seven completed days after delivery.

10. National longitudinal trends 2014-23: Pulmonary embolism



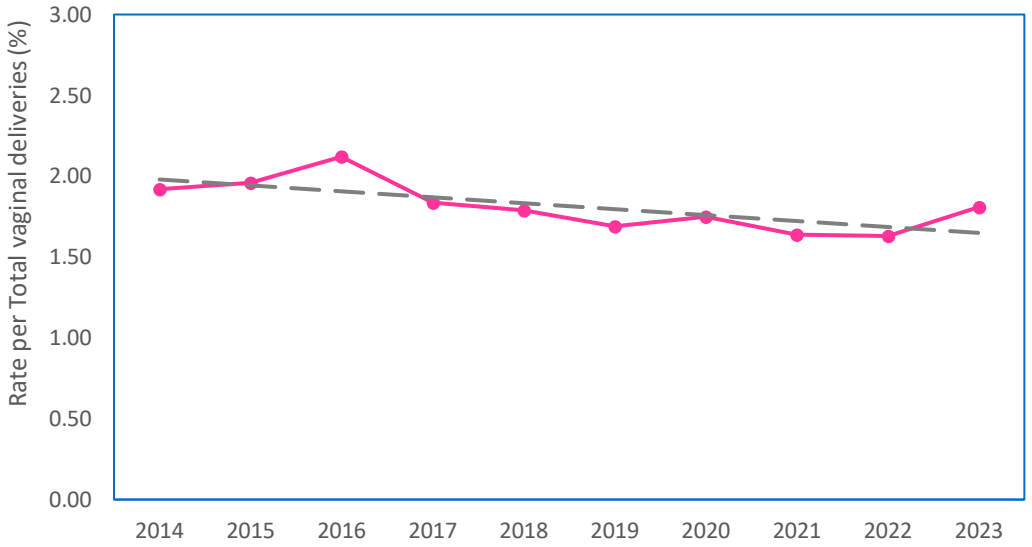
The trend in rates of pulmonary embolism (PE) has been declining over the past decade. Internationally, PE occurs in approximately 1 in 1,000-3,000 pregnancies (Uchikova & Ledjev 2005). Although PE-related mortality has been declining over the past two decades, PE remains one of the leading causes of maternal death (Hobohm et al., 2022).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Pulmonary embolism (Rate per '000 Total women delivered)	0.39	0.47	0.59	0.31	0.33	0.46	0.39	0.45	0.28	0.39

Source: IMIS 2014-2023.

Definition: Number of women with obstetric pulmonary embolism, including pulmonary emboli in pregnancy and/or the puerperium. Exclude embolism complicating abortion or ectopic or molar pregnancy.

11. National longitudinal trends 2014-23: Perineal tears, third- and fourth-degree



The trend in rates of perineal tears been declining over the past decade. Studies show rates typically range from 5.1%-8.3% of primiparous women and 1.8%-2.8% of multiparous women (Jansson et al., 2020).

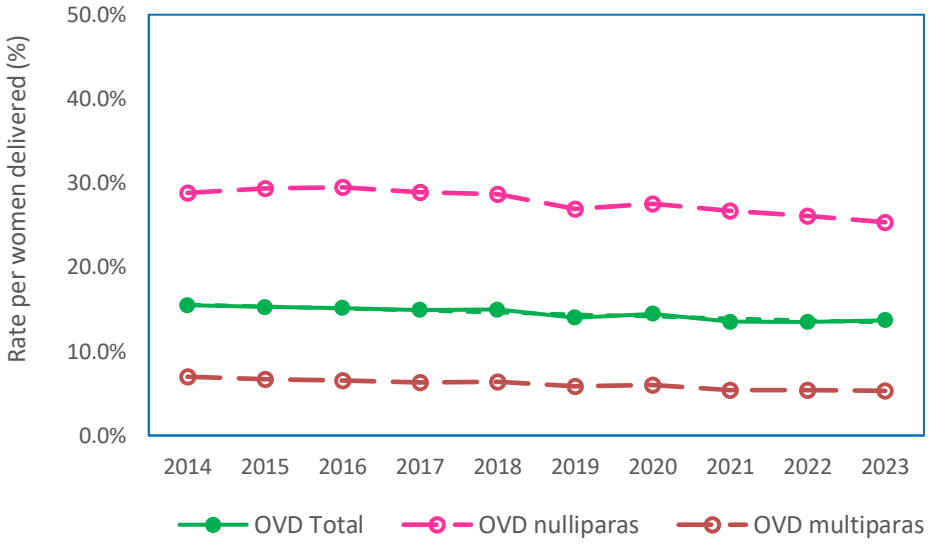
Several risk factors have been identified: Instrumental delivery, midline episiotomy, and a persistent occiput posterior position were associated with higher risk of developing several perineal lacerations (Pergialiotis et al., 2020).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Perineal tears (%) (Rate per Total vaginal deliveries)	1.92%	1.96%	2.12%	1.84%	1.79%	1.69%	1.75%	1.64%	1.63%	1.81%

Source: IMIS 2014-2023.

Definition: Number of third-degree and/or fourth-degree perineal lacerations diagnosed during the current month, including 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.

12. National longitudinal trends 2014-23: Operative vaginal deliveries (OVD)



The trends in rates of Operative (or Assisted) vaginal deliveries (OVD) been declining over the past decade, most notably among nulliparas.

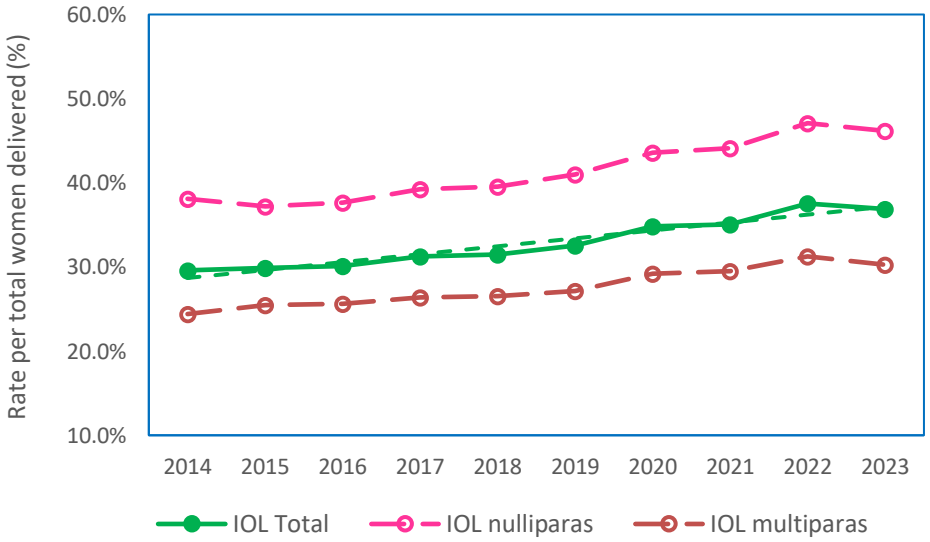
Assisted vaginal birth rates are falling globally, with rising CS delivery rates (Bahl et al., 2023). The incidence of assisted delivery tends to be more common in high-income countries (Bailey et al., 2017).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
OVD (%) (Rate per Total women delivered)	15.5%	15.3%	15.2%	14.9%	15.0%	14.0%	14.5%	13.5%	13.5%	13.7%
OVD nulliparas (%) (Rate per Total nulliparas)	28.8%	29.4%	29.5%	28.9%	28.7%	26.9%	27.5%	26.7%	26.1%	25.3%
OVD multiparas (%) (Rate per Total multiparas)	7.0%	6.7%	6.5%	6.3%	6.4%	5.8%	6.0%	5.4%	5.4%	5.3%

Source: IMIS 2014-2023.

Definition: Number of women undergoing operative vaginal delivery (OVD), also known as instrumental delivery, including forceps delivery and vacuum extraction. Include: 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. Exclude: Failed forceps and failed vacuum extraction.

13. National longitudinal trends 2014-23: Induction of labour (IOL)



The trend in rates of Induction of labour (IOL) been rising over the past decade.

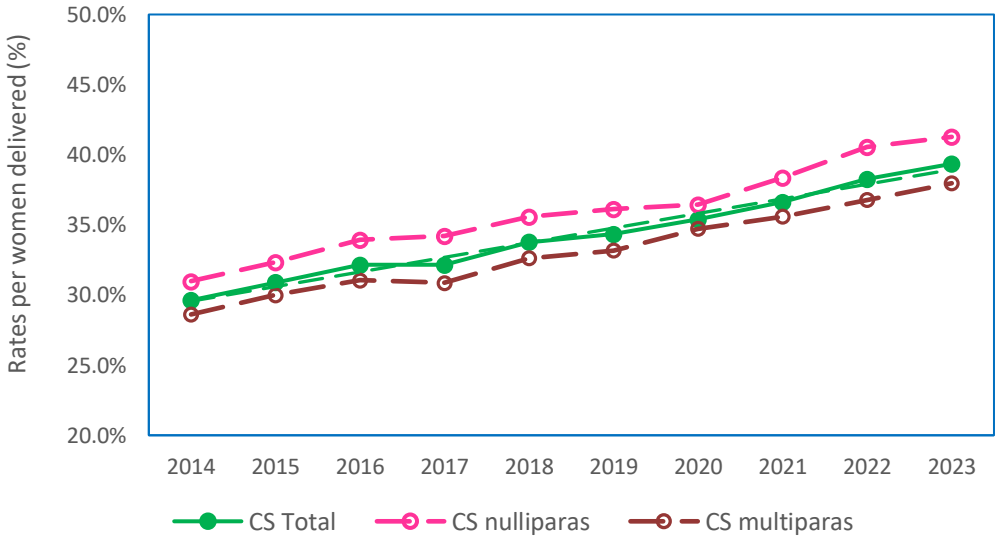
This trend is in accordance with most middle- and high-income countries, which have seen use of labour induction increase rapidly over the past decade. The reasons for the stark rise are largely unknown (Swift et al., 2022).

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
IOL (%) (Rate per Total women delivered)	29.6%	29.9%	30.1%	31.3%	31.5%	32.5%	34.9%	35.1%	37.5%	36.9%
IOL nulliparas (%) (Rate per Total nulliparas)	38.1%	37.2%	37.6%	39.3%	39.5%	41.0%	43.5%	44.1%	47.1%	46.1%
IOL multiparas (%) (Rate per Total multiparas)	24.4%	25.5%	25.6%	26.4%	26.5%	27.1%	29.2%	29.5%	31.3%	30.2%

Source: IMIS 2014-2023.

Definition: Number of women undergoing induction of labour, including medical induction with oxytocin or prostaglandin or other, surgical induction by artificial rupture of membranes or other; and synchronous medical and surgical induction of labour.

14. National longitudinal trends 2014-23: Caesarean sections (CS)



The trend in rates of Caesarean sections (CS) has been rising steadily over the past decade. In recent years, there has been a pronounced rise in rates of CS among nulliparas.

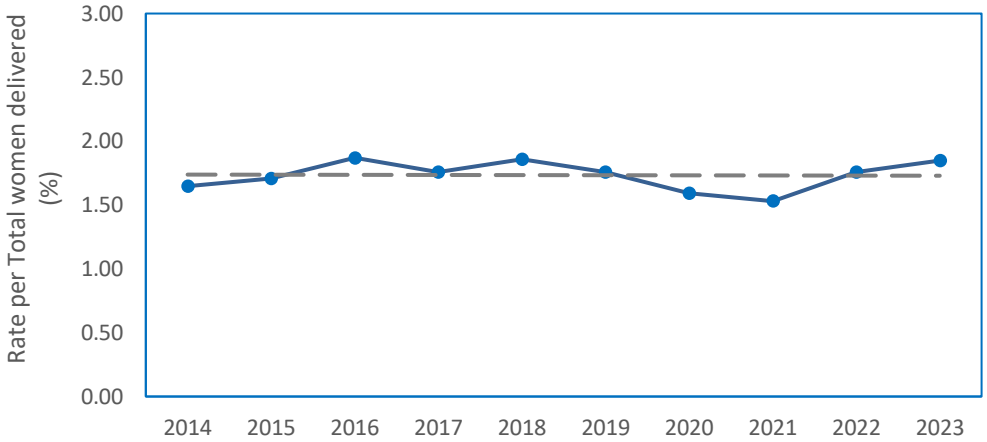
Research shows varying CS trends and rates across European countries (Amyx et al., 2023). Globally, CS rates are rising, albeit unequally (WHO 2021).

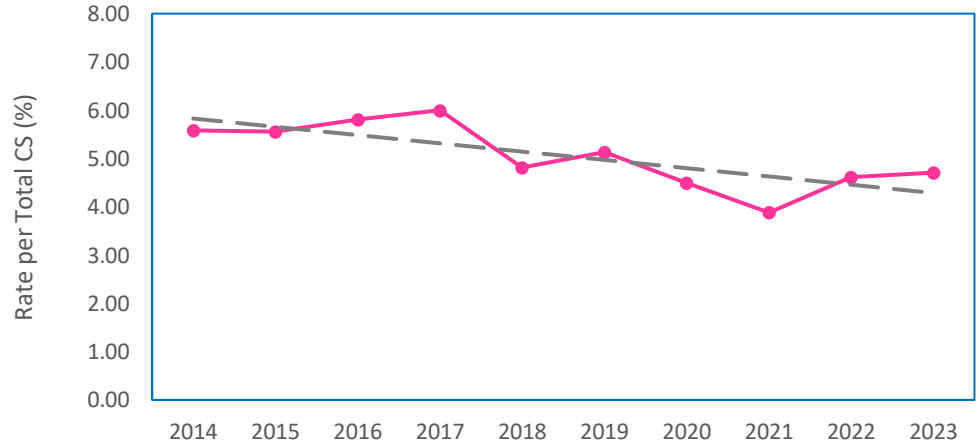
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CS (%) (Rate per Total women delivered)	29.6%	30.9%	32.1%	32.1%	33.8%	34.3%	35.4%	36.6%	38.3%	39.4%
CS nulliparas (%) (Rate per Total nulliparas)	31.0%	32.3%	34.0%	34.2%	35.6%	36.1%	36.4%	38.4%	40.5%	41.3%
CS multiparas (%) (Rate per Total multiparas)	28.6%	30.0%	31.0%	30.9%	32.6%	33.2%	34.7%	35.6%	36.8%	38.0%

Source: IMIS 2014-2023.

Definition: Number of women giving birth by Caesarean section, including elective classical Caesarean section, emergency classical Caesarean section, elective lower segment Caesarean section, and emergency lower segment, Caesarean section.

15. National longitudinal trends 2014-23: General anaesthetic for Caesarean sections





The trend in rates of General anaesthetic for Caesarean sections (CS) among women delivering by CS has fallen over the past decade. However, this downward trend may relate to the increasing numbers of CS.

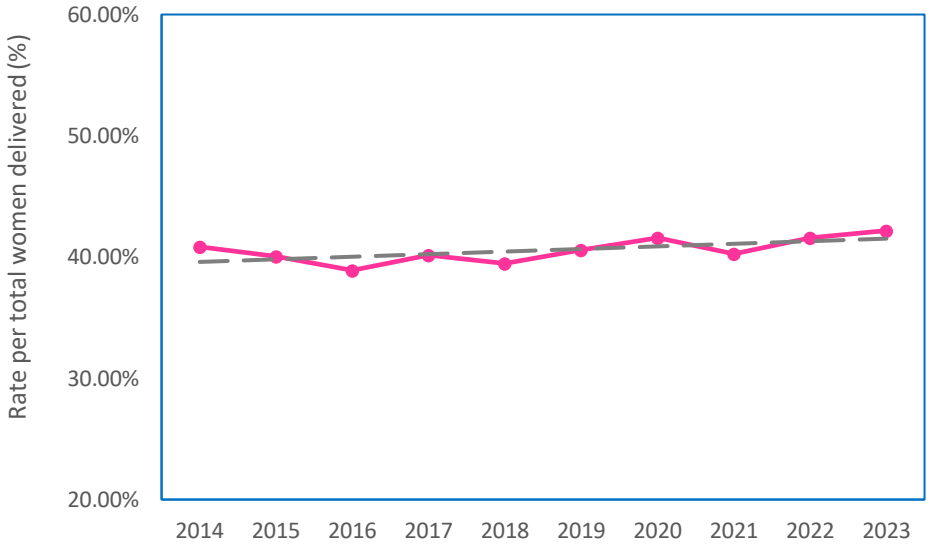
As a trend among all women delivering, irrespective of the mode of delivery, the use of GA for CS has been relatively stable.

	2014	2015	2016	2017	2018	2019	2020	2021*	2022	2023
GA for CS *(% per Total women)*	1.65%	1.71%	1.87%	1.76%	1.86%	1.76%	1.59%	1.53%	1.76%	1.85%
GA for CS *(% per Total CS)*	5.58%	5.55%	5.81%	6.00%	4.81%	5.13%	4.49%	3.88%	4.61%	4.71%

Source: IMIS 2014-2023. Missing data in 2021.

Definition: Number of women who underwent a CS and were administered a general anaesthetic (GA), including primary GA and conversion to GA from regional anaesthetic (epidural or spinal).

16. National longitudinal trends 2014-23: Labour epidurals



The trend in rates of Labour epidurals has been largely steady over the past decade, apart from a notable 'dip' in 2021, when many aspects of childbirth practices altered during COVID.

Note, the base used in the IMIS, 'per total vaginal deliveries', is a proxy denominator for total women in labour. Studies have shown primiparous women are more likely to have epidural analgesia than multiparous women (e.g., Carroll et al., 2022). It would be useful for the IMIS to provide the breakdown of rates among nulliparous and multiparous women.

	2014	2015	2016	2017	2018	2019	2020	2021*	2022	2023
Labour epidurals (%) *(Rate per Total women delivered)*	40.8%	40.0%	38.9%	40.2%	39.4%	40.6%	41.6%	40.3%	41.6%	42.2%

Source: IMIS 2014-2023. Missing data in 2021

Definition: Number of women for whom labour epidurals were administered, including Neuraxial block during labour and Neuraxial block during labour and delivery procedure. Does not refer to spinal anaesthesia.

IMIS 2023: Demographics

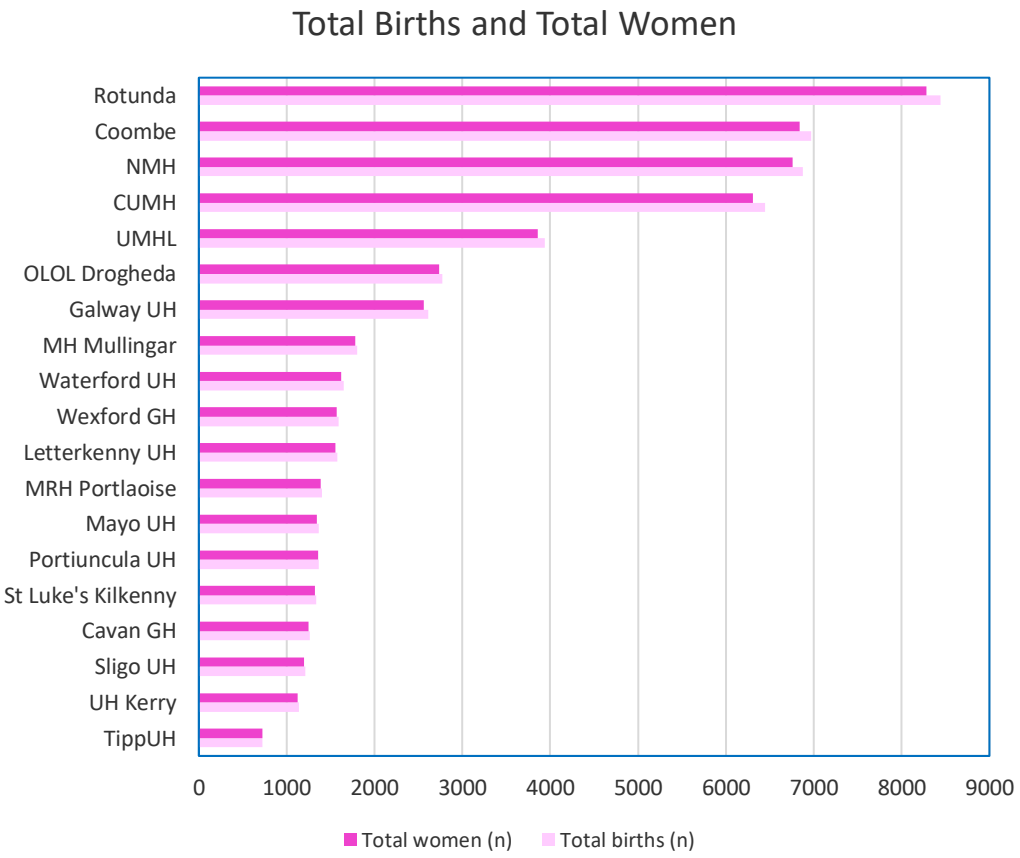
Total women and Total births

(Refers to Metric #1 and Metric #4 on the IMIS)

Definitions

Total women: Number of women delivering a baby weighing ≥ 500g.

Total births: Number of births, including live births and stillbirths, weighing ≥ 500g.



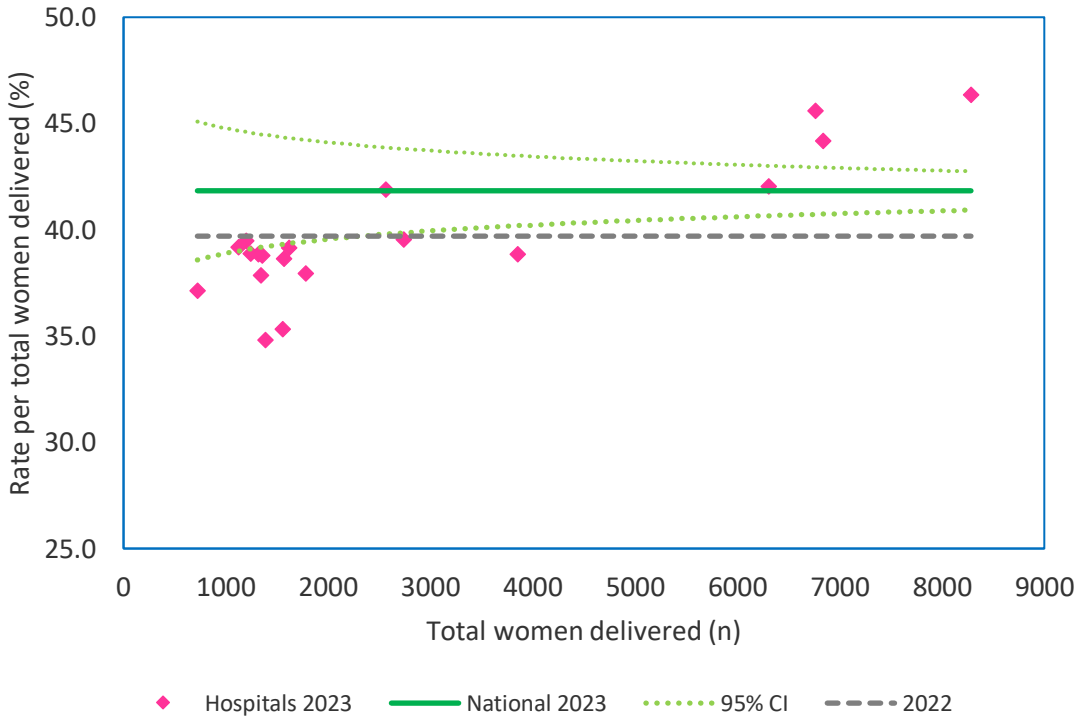
	Total women		Total births	
	2022	2023	2022	2023
National (n)	53,495	53,558	54,467	54,488
Mean (S.D.)	2,815 (2,365)	2,819 (2,375)	2867 (2415)	2,868 (2,425)
Range	785-8,151	722-8,283	796-8,292	727-8,442

Note: Total live births in 2023=54,315 (99.7% of total births)

Total nulliparas

(Refers to Metric #2 on the IMIS)

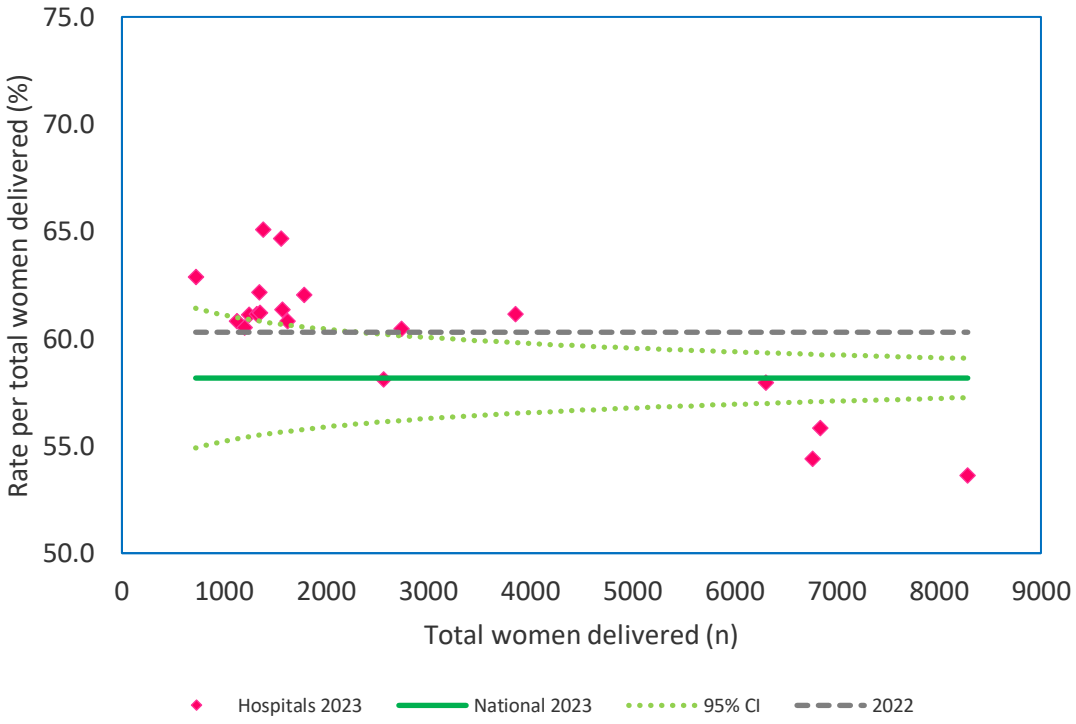
Definition Total number of women delivering a baby (live birth or stillbirth) at least 500 grams who never had a previous pregnancy resulting in a live birth or stillbirth.



	2022	2023
Rate *(% total women delivered)*	39.7%	41.8%
95% Confidence interval (CI)	39.3%-40.1%	41.4%-42.3%
Range	33.5%-43.9%	34.9%-46.4%
Total nulliparas (n)	21,224	22,407
Total women delivered (n)	53,495	53,558

Total multiparas
(Refers to Metric #3 on the IMIS)

Definition Total number of women delivering a baby (live birth or stillbirth) at least 500 grams who had at least one previous pregnancy resulting in a live birth/stillbirth.

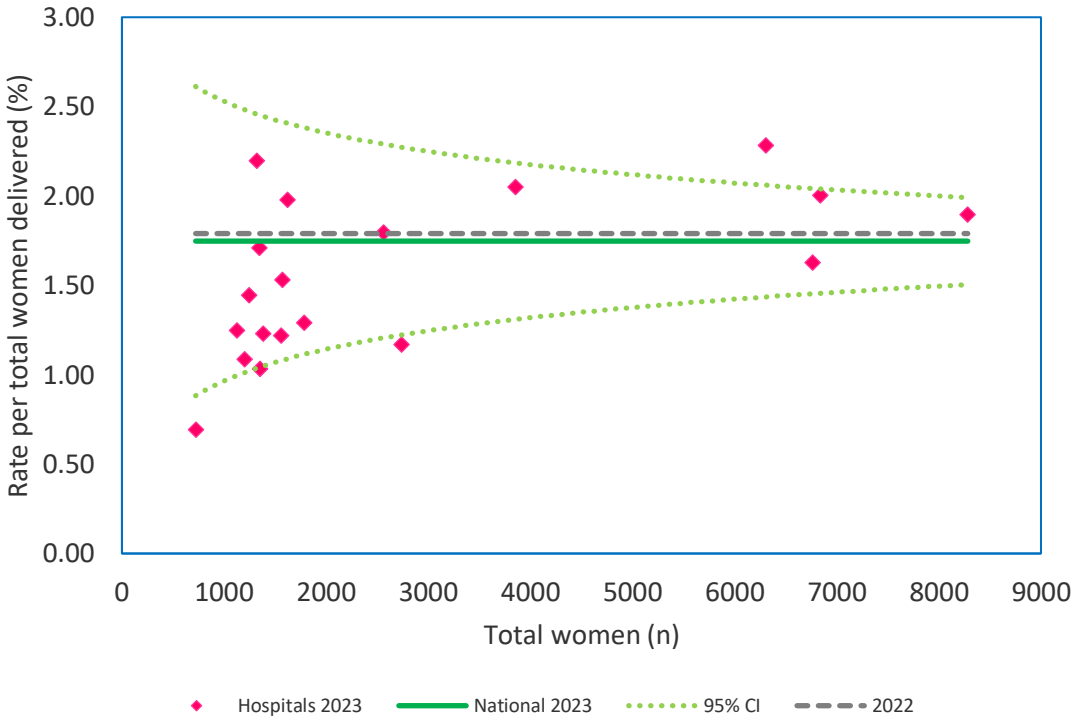


	2022	2023
Rate *(% total women delivered)*	60.3%	58.2%
95% CI	59.9%-60.7%	57.7%-58.6%
Range	56.1%-66.5%	53.6%-65.1%
Total multiparas (n)	32,271	31,151
Total women delivered (n)	53,495	53,558

Total multiple births

(Refers to Metric #6 on the IMIS)

Definition Total number of women delivering more than one baby (live births or stillbirths) at least 500 grams from a single pregnancy. Count the number of women, not the number of babies born.

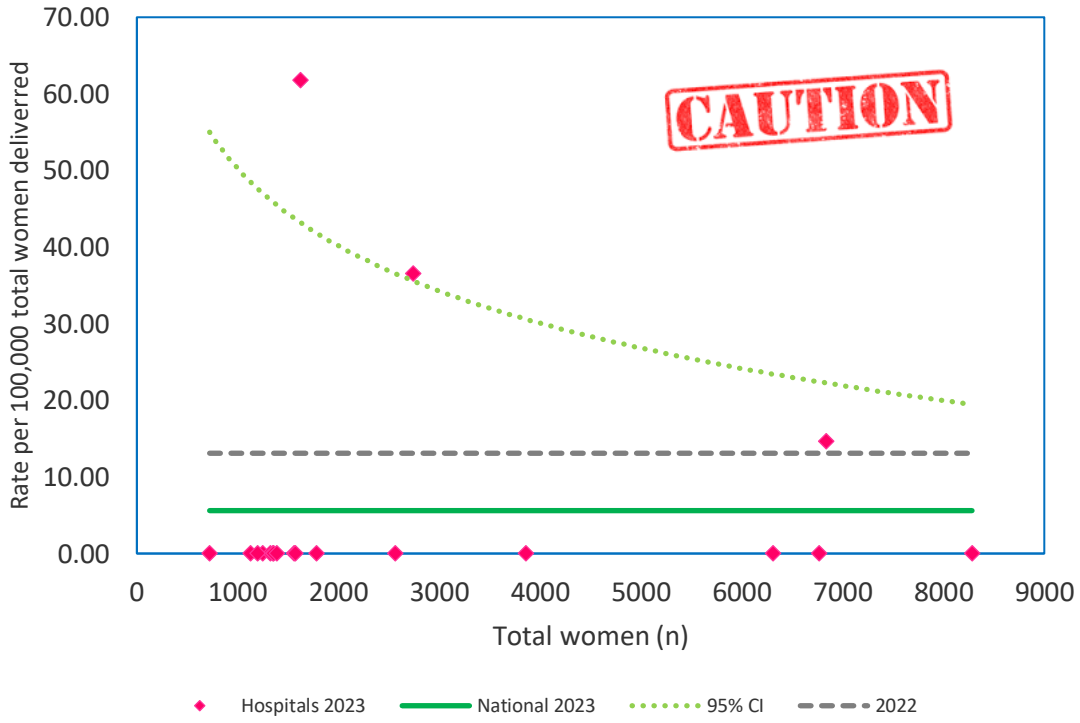


	2022	2023
Rate *(% total women delivered)*	1.79%	1.75%
95% CI	1.68%-1.90%	1.64%-1.86%
Range	0.98%-2.38%	0.69%-2.28%
Total multiple births (n)	958	936
Total women delivered (n)	53,495	53,558

Total maternal deaths

(Refers to Metric #7 on the IMIS)

Definition — Total number of deaths of women while pregnant or within 42 days of the end of the pregnancy (includes giving birth, ectopic pregnancy, miscarriage, or termination of pregnancy), from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes *(based on WHO 2010 definition and Confidential Maternal Death Enquiry 2016: 10).* For the purposes of the IMIS, count both direct and indirect maternal deaths. Exclude late maternal deaths.

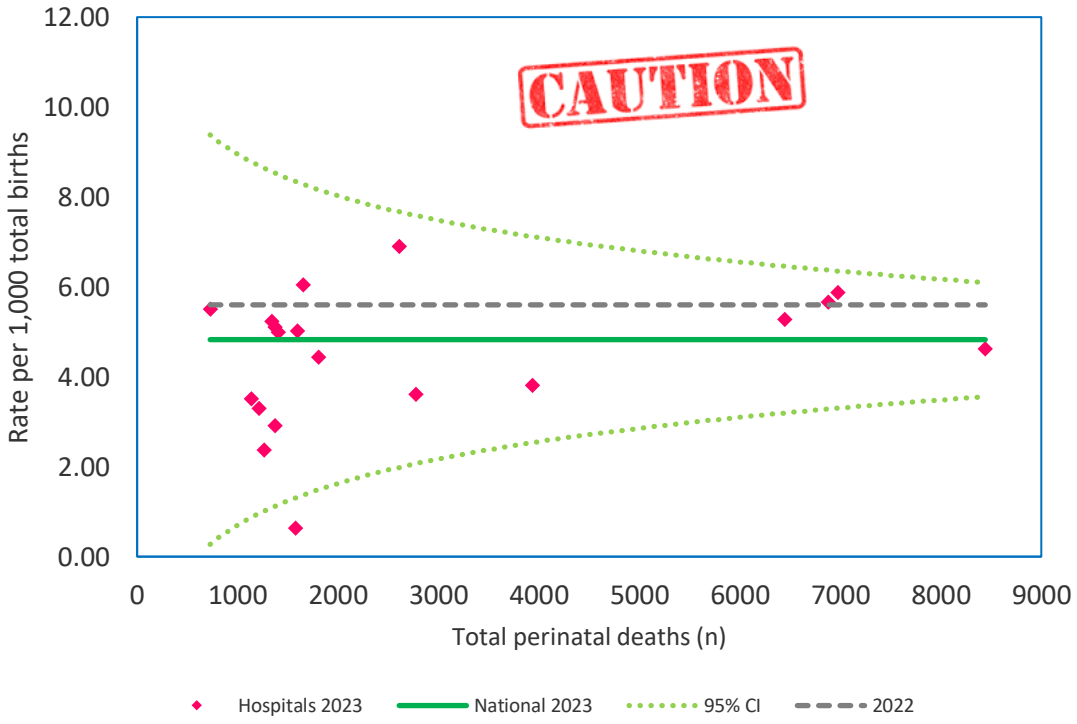


	2022	2023
Rate *(per 100,000 women delivered)*	13.09	5.60
95% CI	0.00-22.78	0.00-11.94
Total maternal deaths (n)	7	3
Total women delivered (n)	53,495	53,558

Perinatal deaths (total)

(Refers to Metric #8 on the IMIS)

Definition — Total number of infant deaths, including stillbirths and early neonatal deaths weighing 500 grams or more. For the purposes of IMIS, a stillbirth refers to the death of a fetus weighing ≥500g. An early neonatal death refers to the death of a live born infant during the first week (seven partial or completed) days of life.

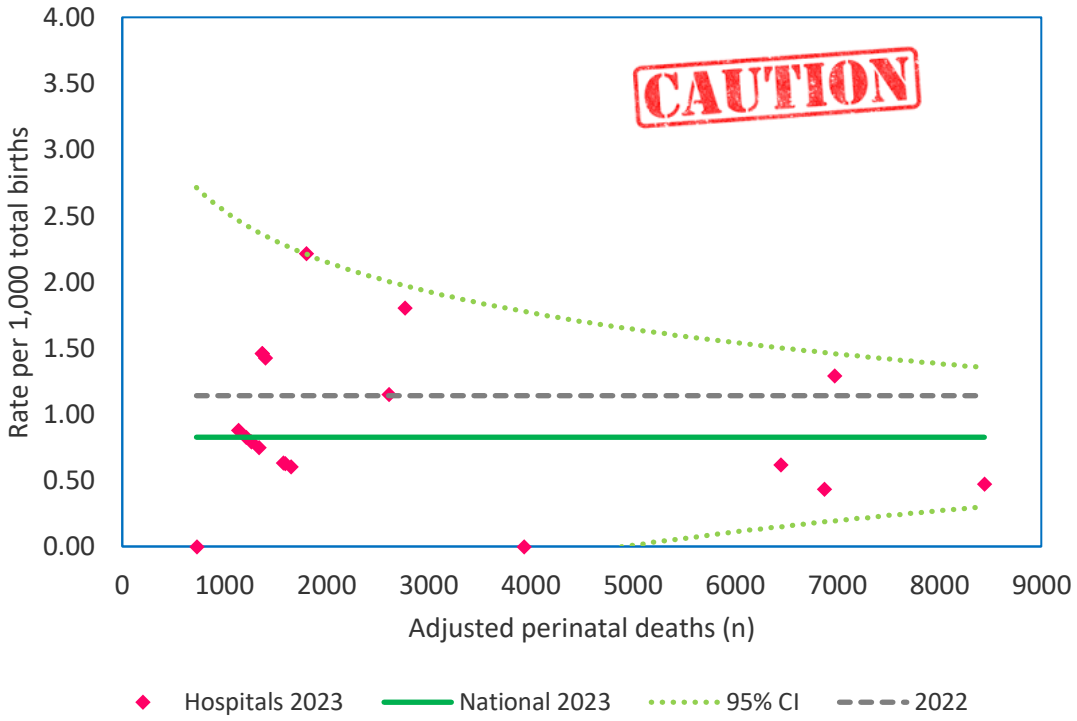


	2022	2023
Rate *(per '000 total births)*	5.54	4.83
95% CI	4.92-6.17	4.24-5.41
Range	1.26-8.87	0.63-6.90
Total perinatal deaths (n)	302	263
Total births (n)	54,467	54,488

Adjusted perinatal deaths

(Refers to Metric #9 on the IMIS)

Definition Total number of perinatal deaths (stillbirths and early neonatal deaths combined) weighing 2.5kg or more without a congenital anomaly. Congenital anomalies are physiological or structural abnormalities that develop at or before birth and are present at the time of birth.



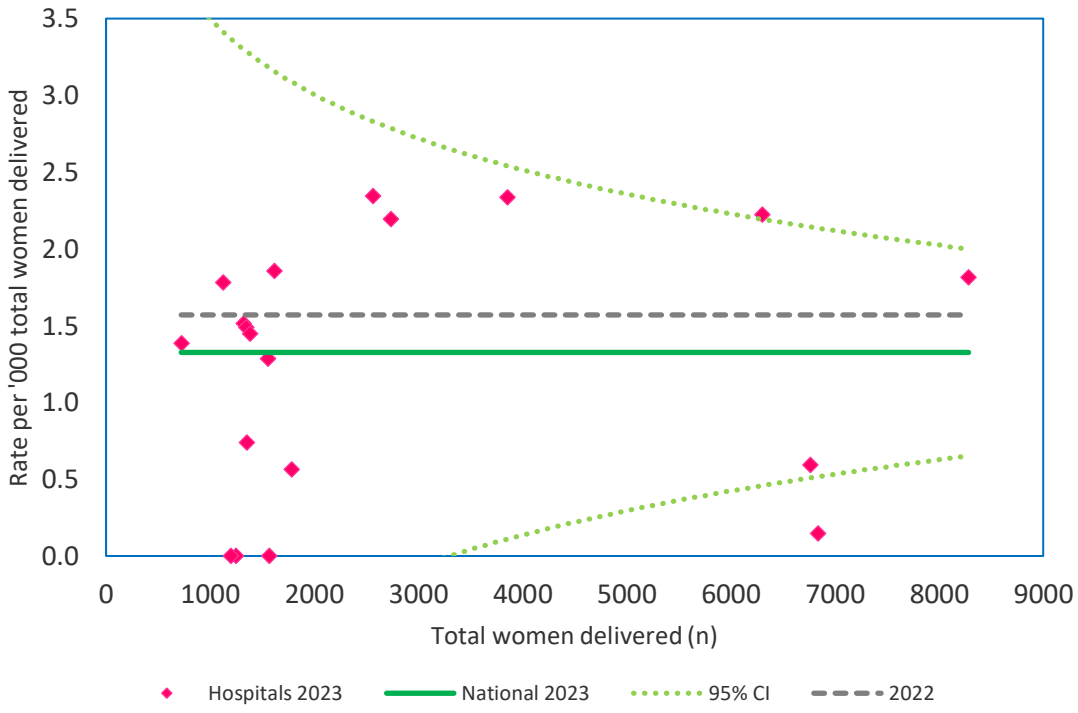
	2022	2023
Rate *(per '000 total births)*	1.14	0.83
95% CI	0.86-1.42	0.58-1.07
Range	0.00-2.42	0.00-2.22
Adjusted perinatal deaths (n)	62	45
Total births (n)	54,467	54,488

IMIS 2023: Obstetric risks and complications

Maternal sepsis

(Refers to Metric #23, IMIS 2023)

Definition Number of women diagnosed with maternal sepsis. Maternal sepsis is a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion, or postpartum period, i.e., within 42 days of termination of pregnancy (WHO 2016).



	2022*	2023
Rate *(per '000 women delivered)*	1.57	1.33
95% CI	1.21-1.93	1.02-1.63
Range	0.00-5.84	0.00-2.34
Maternal sepsis (n)	74	71
Total women delivered (n)	47,113	53,558

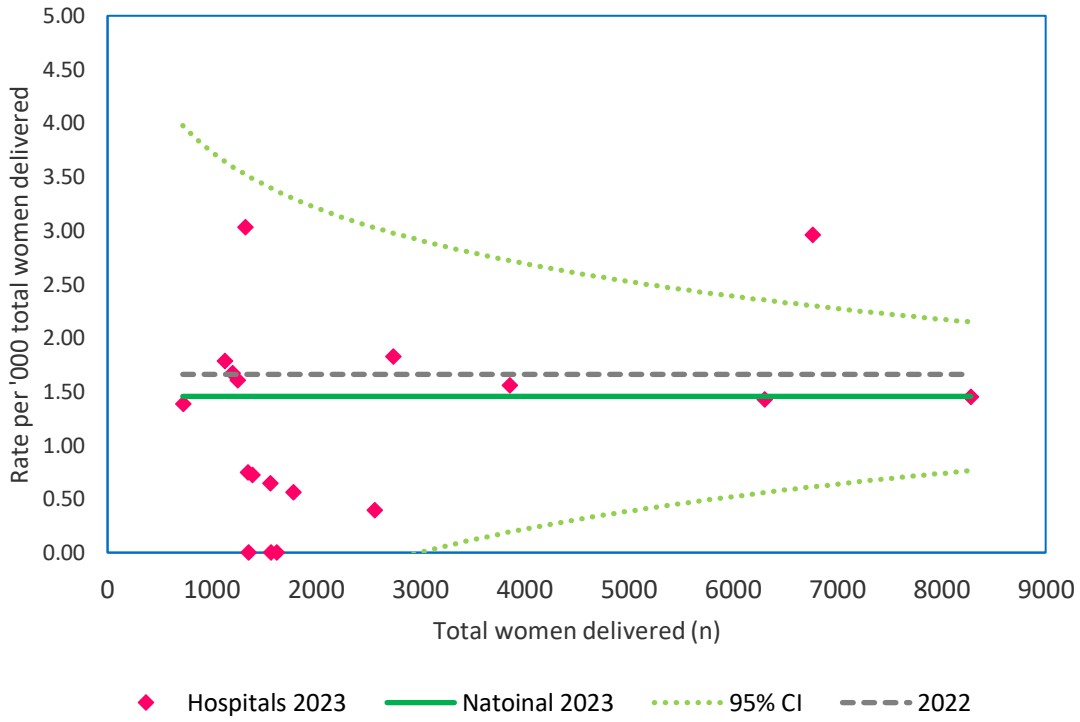
**Missing data from CUMH in 2022*

Maternal bacteraemia

(Refers to Metric #20 on the IMIS)

Definition

Diagnosis of bacteraemia is based on laboratory definition and classification only and does not include clinical indications. It is based on ONE positive blood culture for a recognised bacterial pathogen (e.g. *Staphylococcus aureus, Escherichia coli*). If any doubt regarding what constitutes a recognised bacterial pathogen, please discuss with consultant microbiologist at the hospital. Exclude cases of blood culture contamination (e.g. skin contaminants). Cases should be defined as 'maternal' bacteraemia if the positive blood culture is taken at any time during pregnancy or within 42 days of the end of pregnancy.



	2022*	2023*
Rate *(per '000 total women delivered)*	1.66	1.46
95% CI	1.26-2.06	1.11-1.80
Range	0.00-3.03	0.00-3.03
Total maternal bacteraemia (n)	67	68
Total women delivered (n)	40,327	46,722

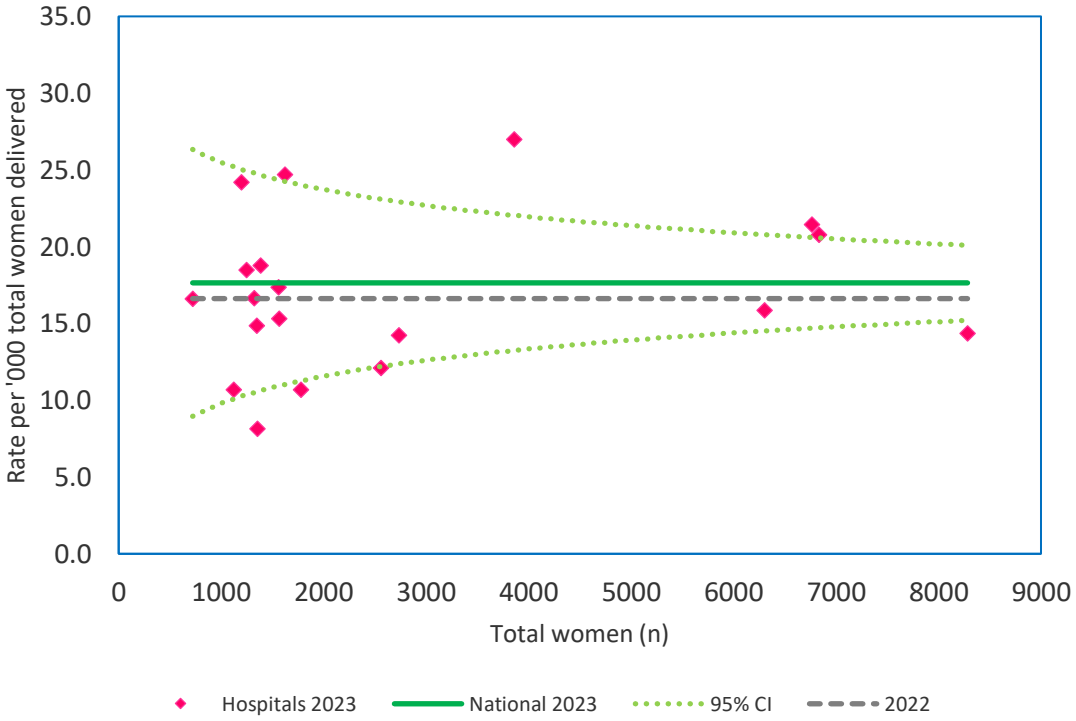
**Missing data from CUMH and Coombe Maternity Hospital in 2022 and Coombe in 2023*

NOTE: This metric will be discontinued in 2024

Ectopic pregnancy

(Refers to Metric #24 on the IMIS)

Definition Number of women diagnosed during the current month with an ectopic pregnancy, including abdominal pregnancy, tubal pregnancy, ovarian pregnancy, and other/unspecified pregnancy. Do not source data on ectopic pregnancies from the HIPE.



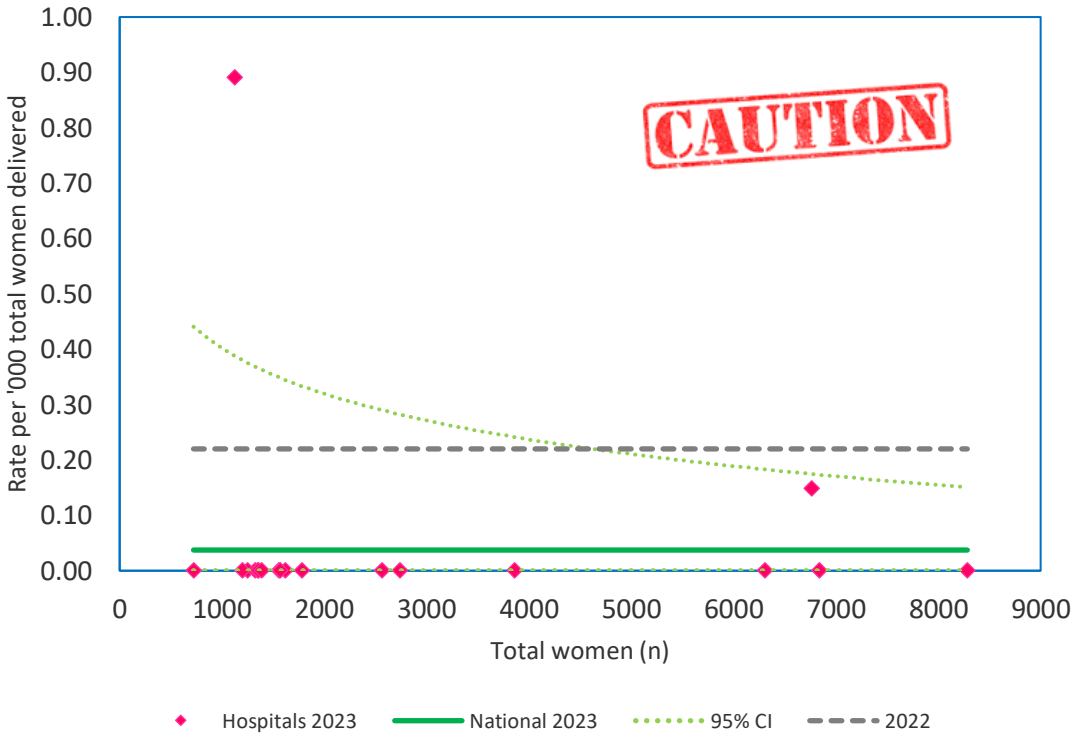
	2022	2023
Rate *(per '000 women delivered)*	16.6	17.6
95% CI	15.5-17.7	16.5-18.8
Range	9.8-25.9	8.1-27.0
Total ectopic pregnancies (n)	889	945
Total women delivered (n)	53,495	53,558

Note:
This metric does not include women who present at general hospitals with ectopic pregnancies. These women may be very early in their pregnancy and may not be booked at a maternity hospital/unit.

Eclampsia

(Refers to Metric #25 on the IMIS)

Definition Number of women diagnosed during the current month 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. The metric does not include severe pre-eclampsia.



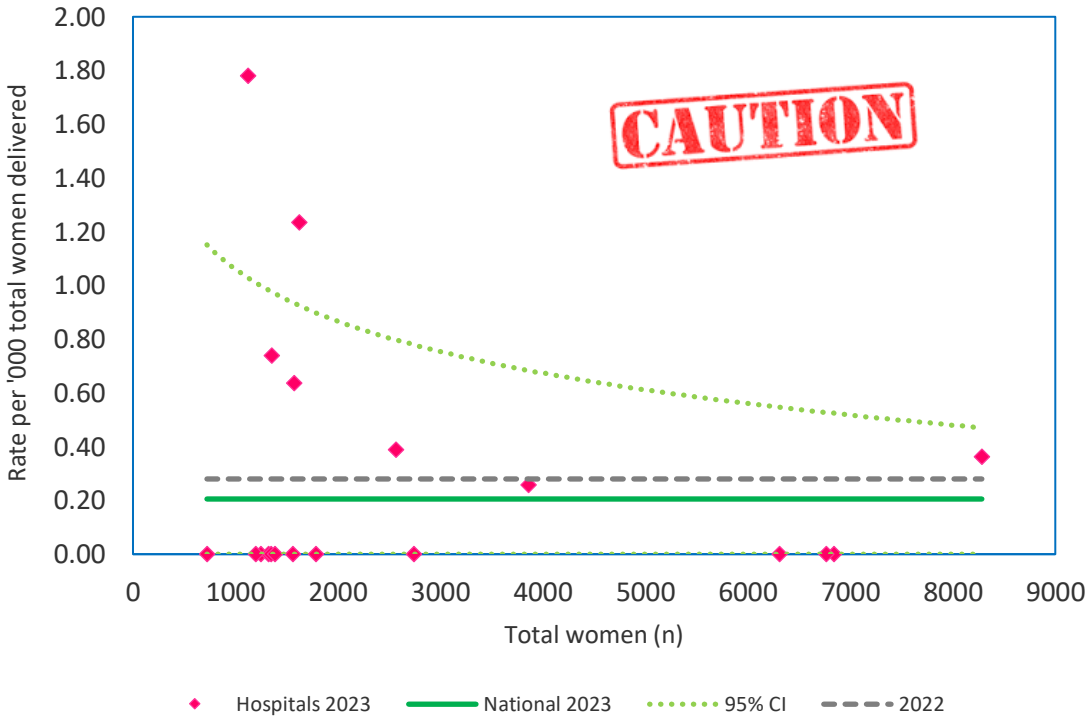
	2022*	2023
Rates *(per '000 women delivered)*	0.22	0.04
95% CI	0.10-0.35	0.00-0.09
Range	0.00-0.89	0.00-0.89
Total eclampsia (n)	12	2
Total women delivered (n)	53,495	53,558

Note: Data for eclampsia nationally were amended subsequent to the publication of the IMIS 2022 National Report

Uterine rupture

(Refers to Metric #26 on the IMIS)

Definition Number of women diagnosed during the current month with rupture of uterus before onset of labour or during labour, including cases that may not be diagnosed until after delivery. The IMIS definition of uterine rupture refers to complete rupture.

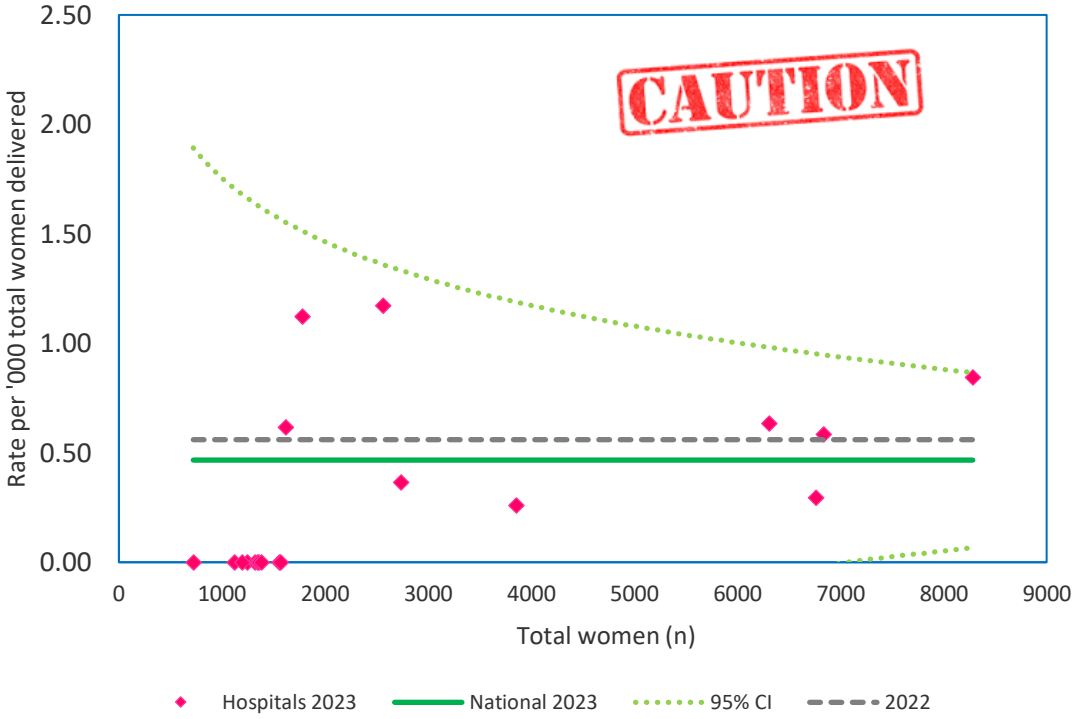


	2022	2023
Rates *(per '000 women delivered)*	0.28	0.21
95% CI	0.14-0.42	0.08-0.33
Range	0.00-1.17	0.00-1.78
Total uterine rupture (n)	15	11
Total women delivered (n)	53,495	53,558

Peripartum hysterectomy

(Refers to Metric #27 on the IMIS)

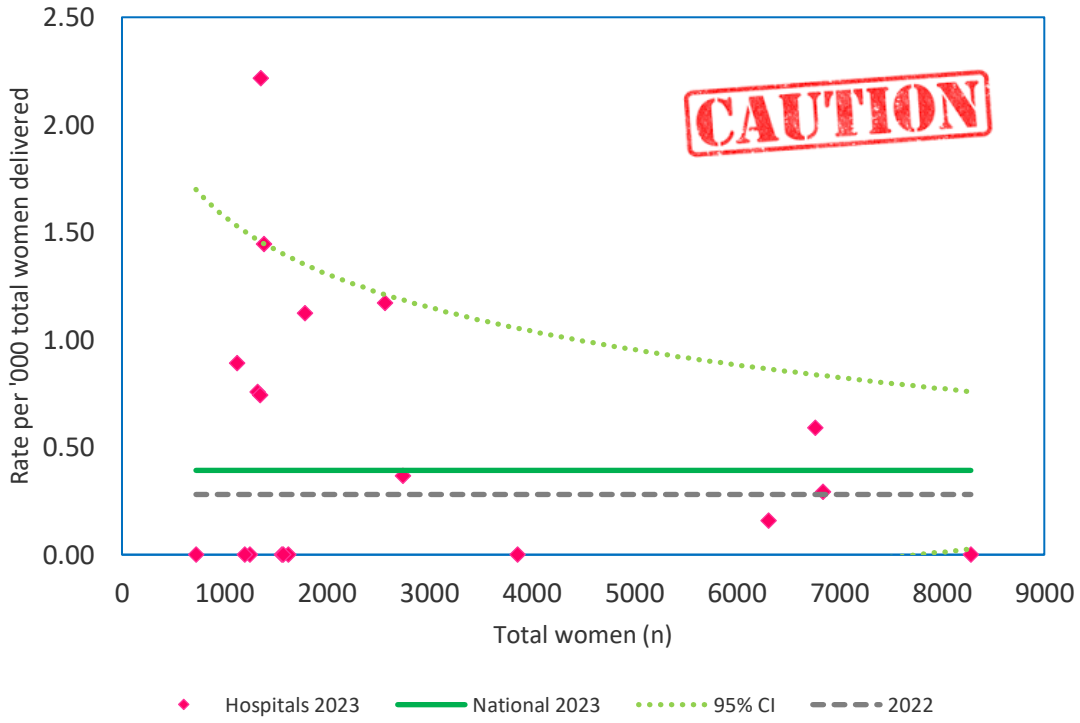
Definition Total number of hysterectomy procedures performed during pregnancy and/or within seven completed days after delivery.



	2022	2023
Rates *(per '000 women delivered)*	0.56	0.47
95% CI	0.36-.076	0.28-0.65
Range	0.00-1.54	0.00-1.17
Total peripartum hysterectomy (n)	30	25
Total women delivered (n)	53,495	53,558

Pulmonary embolism
(Refers to Metric #28 on the IMIS)

Definition Number of women with obstetric pulmonary embolism, including pulmonary emboli in pregnancy and/or the puerperium. Exclude embolism complicating abortion or ectopic or molar pregnancy.

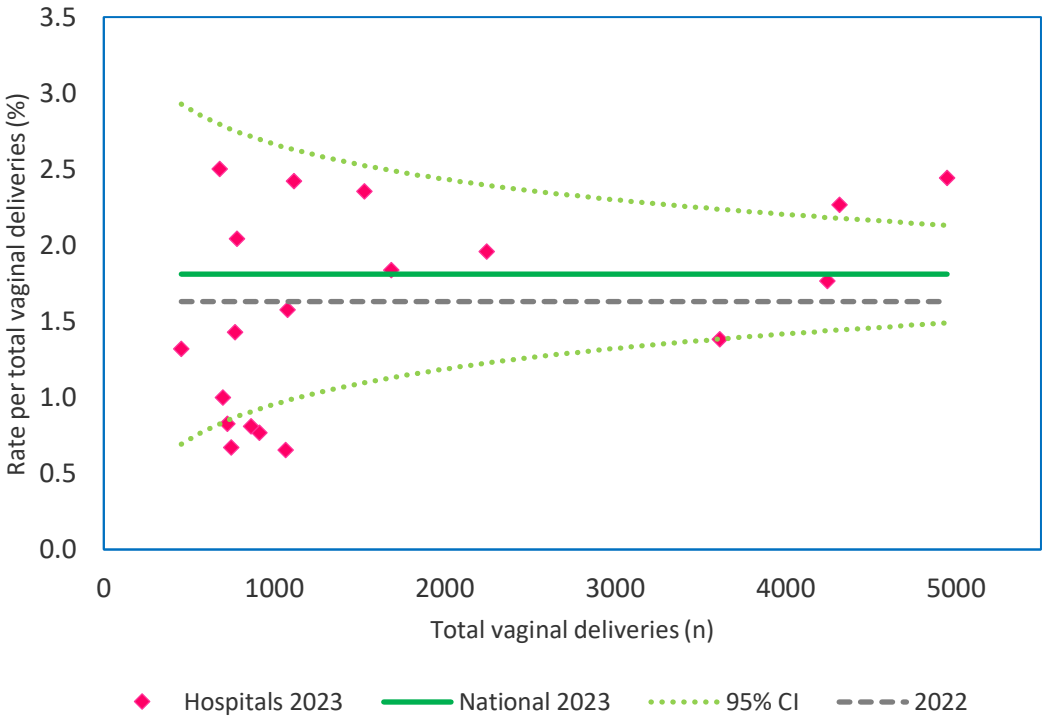


	2022	2023
Rates *(per '000 women delivered)*	0.28	0.39
95% CI	0.14-0.42	0.22-0.56
Range	0.00-1.48	0.00-0.22
Total pulmonary embolism (n)	15	21
Total women delivered (n)	53,495	53,558

Perineal tears

(Refers to Metric #29 on the IMIS)

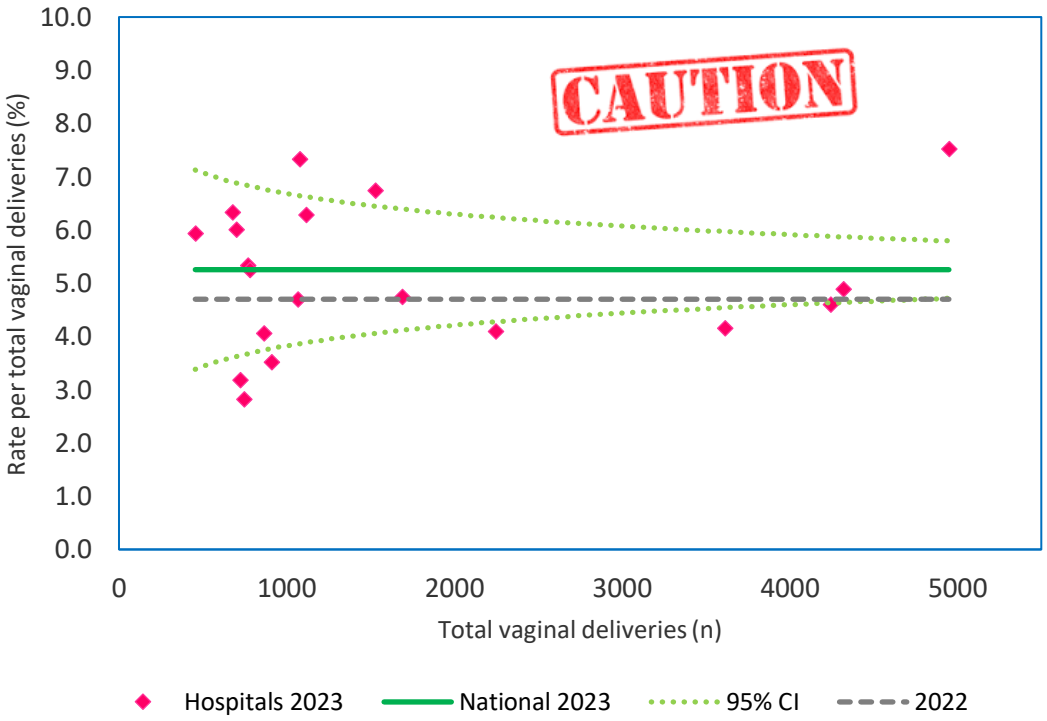
Definition Number of women with third-degree and/or fourth-degree perineal lacerations during the current month, including tears in the vaginal tissue, perineal skin, and perineal muscles that extend into the anal sphincter and/or go through the anal sphincter and the tissue underneath.



	2022	2023
Rates *(% total vaginal deliveries)*	1.63%	1.81%
95% CI	1.49%-1.76%	1.67%-1.96%
Range	0.96%-2.79%	0.66%-2.50%
Total perineal tears (n)	535	588
Total vaginal deliveries (n)	32,875	32,481

PPH Vaginal delivery
(Refers to Metric #30 on the IMIS)

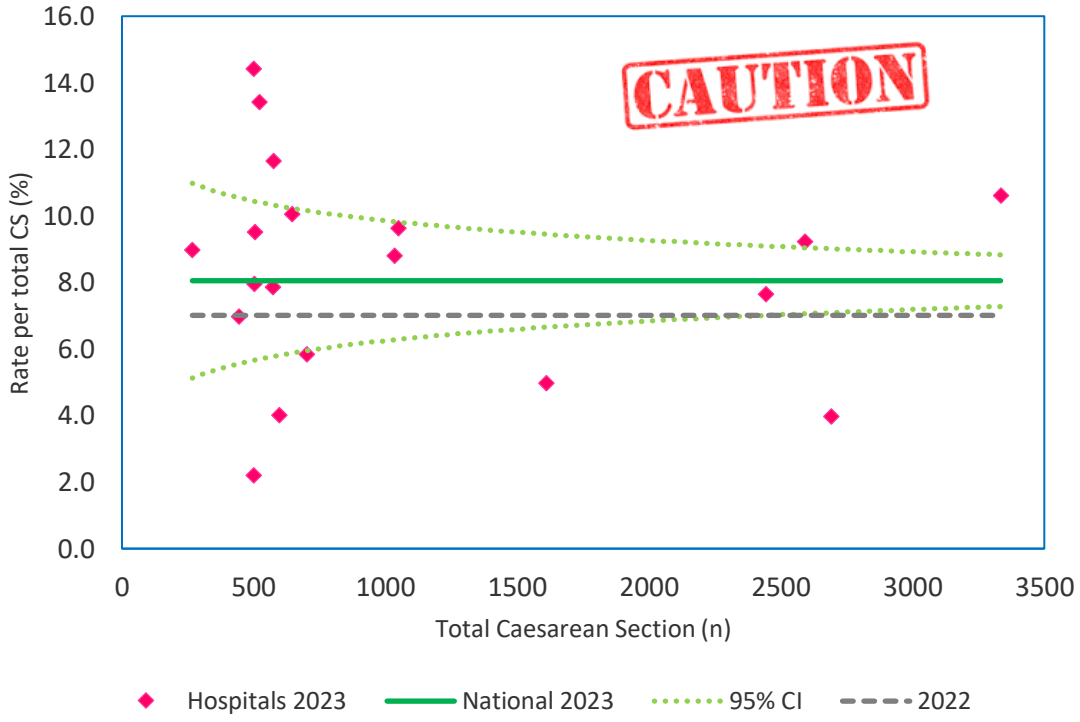
Definition Number of women with blood loss of ≥1,000mL following a vaginal delivery within 24 hours of delivery (or, where relevant, prior to discharge from the labour ward). Discount/exclude liquor from the measurement of blood loss. PPH is the most common form of major obstetric haemorrhage.



	2022	2023
Rates *(% total vaginal deliveries)*	4.7%	5.3%
95% CI	4.55-4.9%	5.0%-5.5%
Range	2.3%-8.1%	2.8%-7.5%
PPH per total vaginal deliveries (n)	1,544	1,707
Total vaginal deliveries (n)	32,875	32,481

PPH Caesarean section
(Refers to Metric #31 on the IMIS)

Definition — Number of women with blood loss of ≥1,000mL following Caesarean section delivery within 24 hours of delivery (or, where relevant, prior to discharge from the labour ward). Discount/exclude liquor from the measurement of blood loss. PPH is the most common form of major obstetric haemorrhage.



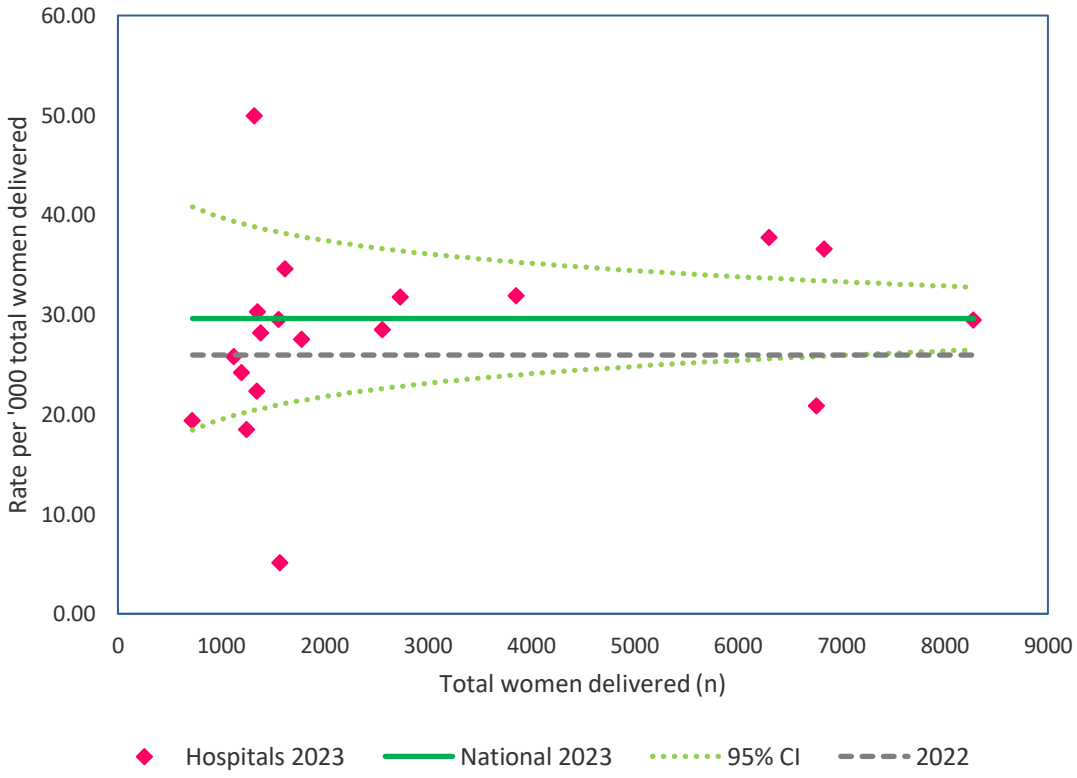
	2022	2023
Rates *(% total CS)*	7.0%	8.1%
95% CI	6.7%-7.4%	7.7%-8.4%
Range	2.3%-16.7%	2.2%-14.4%
PPH per total CS (n)	1,436	1,697
Total CS (n)	20,474	21,077

Obstetric blood transfusions

(Refers to Metric #22 on the IMIS)

Definition

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. Report number of obstetric patients receiving blood transfusions only (exclude gynaecology patients); 'obstetric' is defined as from the time of diagnosis of pregnancy (based on a positive pregnancy test). Such cases are rare. Count number of cases based on the general principle of hospital of delivery. In cases of ectopic pregnancy, count cases based on the hospital where women are treated for ectopic pregnancy. If a patient is transfused twice during her hospital stay, count her as ONE transfusion and count her on the date when she received the first transfusion.

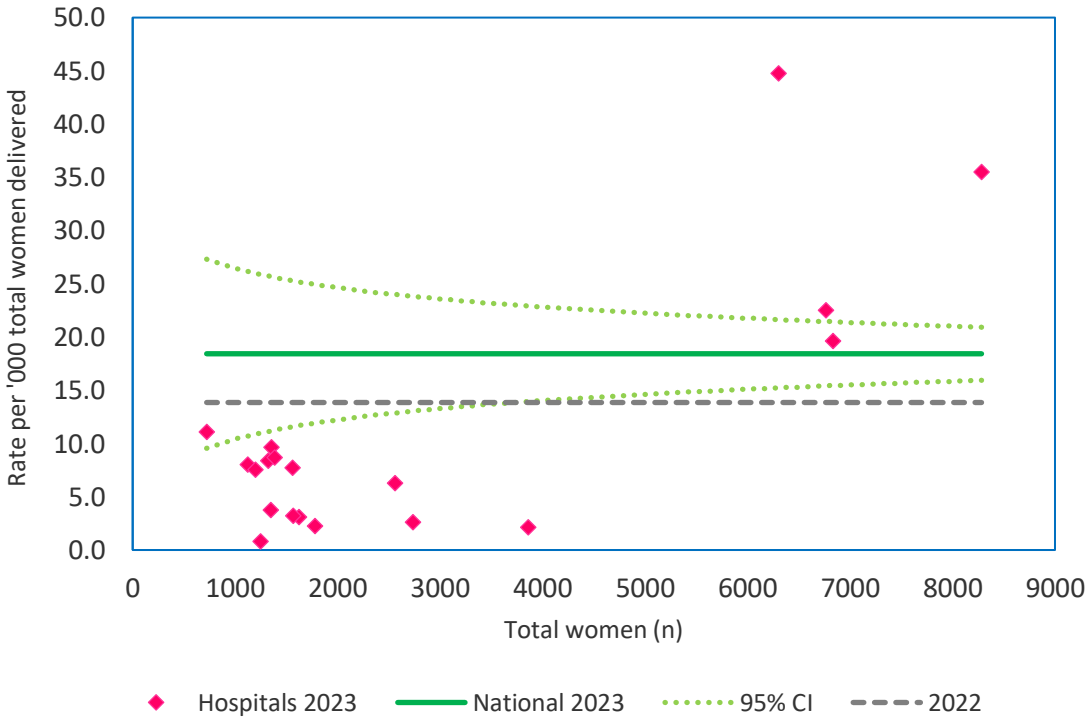


	2022	2023
Rate *(per total women delivered, %)*	25.95	29.61
95% CI	24.60-27.29	28.18-31.05
Range	13.32-43.69	5.10-49.96
Total OBT (n)	1,388	1,586
Total women delivered (n)	53,495	53,558

Maternal admissions for critical care (Level 2/Level 3)

(Refers to Metric #11 on the IMIS)

Definition — Total number of women transferred for critical care to Level 2 and/or Level 3 care facilities, i.e., ICU, HDU, or CCU (the specific names of the facilities may vary across hospitals). Transfers may include those within the same maternity hospital/unit or to another hospital/unit. In the event of a woman being transferred to another hospital/unit, these should be recorded by the hospital where she gives birth. There is no gestation parameter on this metric – it may include transfers from early pregnancy through post-natal re-admissions.



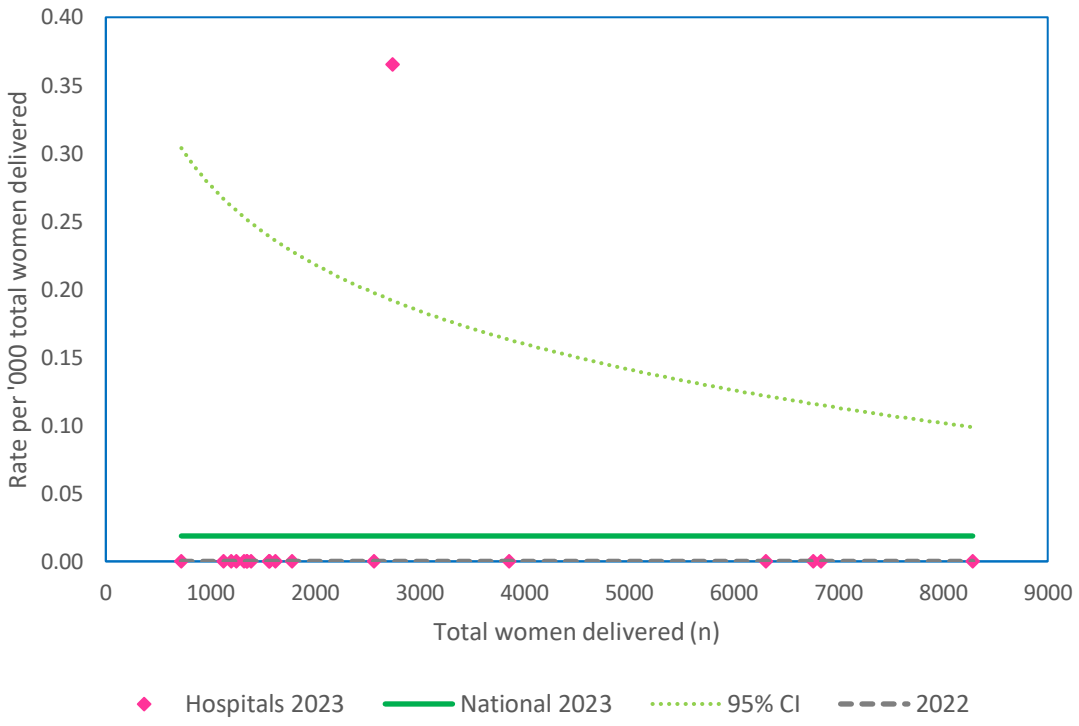
	2022	2023*
Rate *(per '000 women delivered)*	13.85	18.43
95% CI	12.86-14.84	17.29-19.57
Range	0.59-50.77	0.80-44.73
Total critical care admissions (n)	741	987
Total women delivered (n)	53,495	53,558

**Note: The increase in the national rate in 2023 is largely attributed to changes in data collection processes at two large maternity hospitals. Previous data at these hospitals were believed to under-counting the numbers of women in receipt of various forms of critical care.*

Miscarriage misdiagnosis

(Refers to Metric #32 on the IMIS)

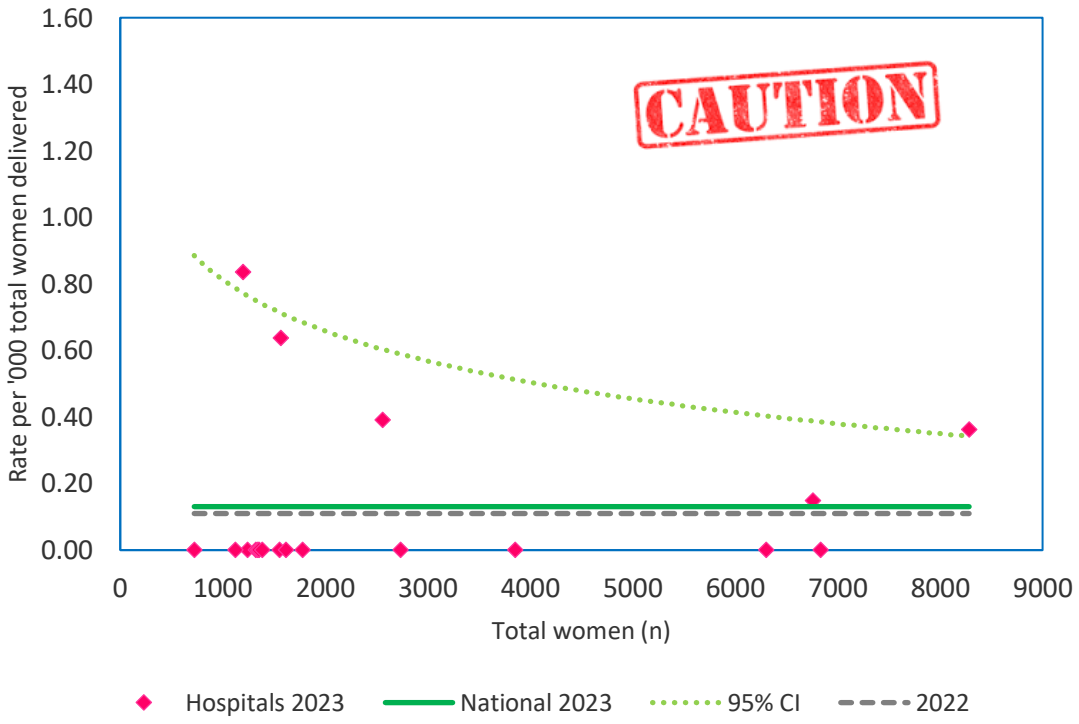
Definition Number of women diagnosed with a spontaneous miscarriage but a subsequent ultrasound confirms an ongoing pregnancy.



	2022	2023
Rates *(per '000 women delivered)*	0.00	0.02
95% CI	--	0.00-0.06
Total miscarriage misdiagnosis (n)	0	1
Total women delivered (n)	53,495	53,558

Retained swabs
(Refers to Metric #33 on the IMIS)

Definition Number of women with a swab (for cleansing and to absorb blood and other fluids) retained unintentionally in the vagina after a vaginal delivery.

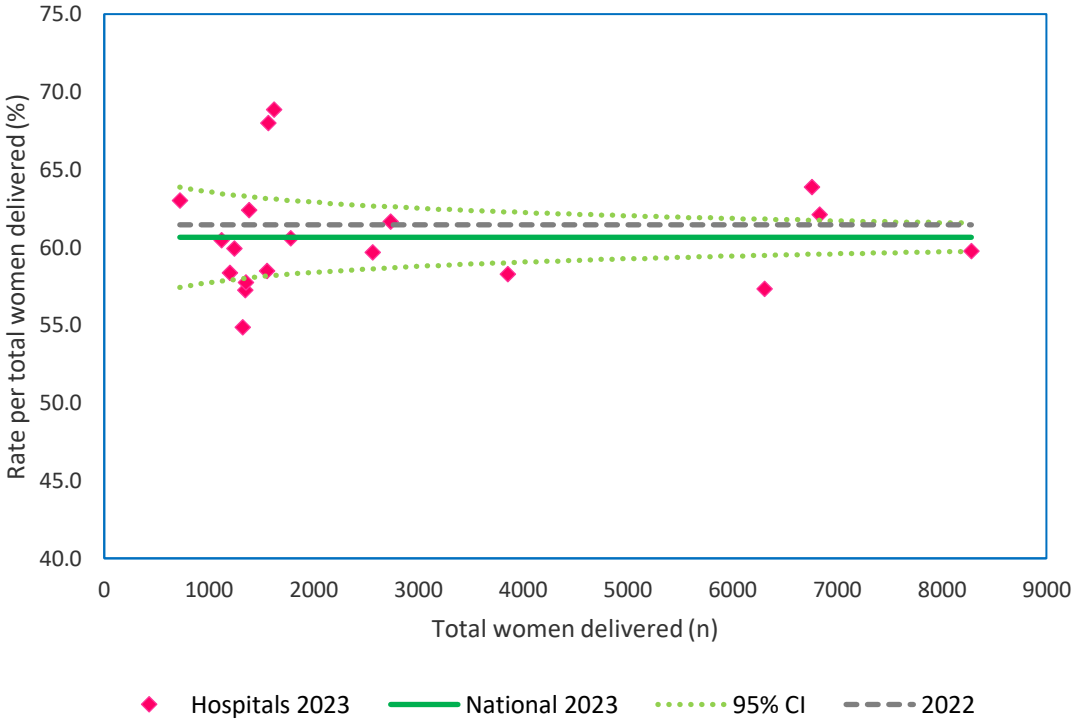


	2022	2023
Rates *(per '000 women delivered)*	0.11	0.13
95% CI	0.02-0.20	0.03-0.23
Total retained swabs (n)	6	7
Total women delivered (n)	53,495	53,558

IMIS 2023: Deliveries and Anaesthesia

Total vaginal deliveries

Derived metric, based on the difference between total number of women delivered less total Caesarean sections. (Note, this metric does not indicate Spontaneous vaginal deliveries.)



	2022	2023
Rates *(% total women delivered)*	61.5%	60.6%
95% CI	61.0%-61.9%	60.2%-61.1%
Range	46.3%-70.8%	54.9%-68.9%
Total vaginal deliveries (n)	32,875	32,481
Total women delivered (n)	53,495	53,558

Total operative vaginal delivery

(Refers to Metric #37 on the IMIS)

Definition

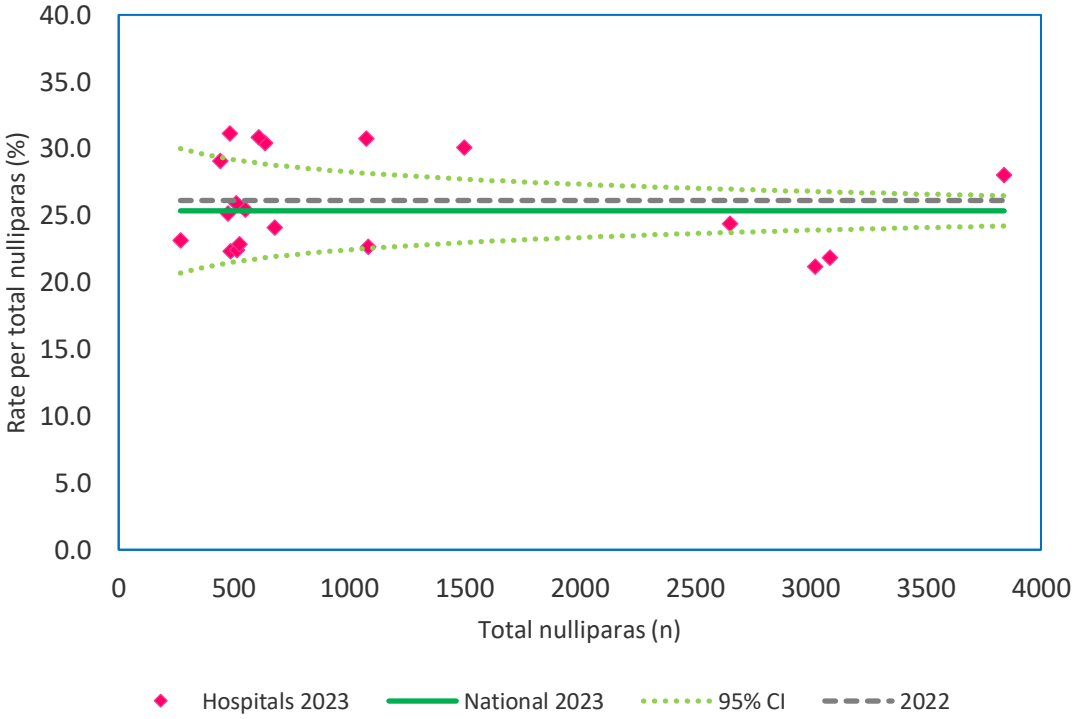
Number of women undergoing operative vaginal delivery (OVD), also known as instrumental or assisted vaginal delivery, including forceps delivery and vacuum extraction.

Include: 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.
Exclude: Failed forceps and failed vacuum extraction.

	2022	2023
Rates *(% total women delivered)*	13.5%	13.7%
95% CI	13.2%-13.8%	13.4%-14.0%
Range	10.3%-17.7%	11.0%-16.6%
Total OVD (n)	7,216	7,332
Total women delivered (n)	53,495	53,558

OVD among nulliparas

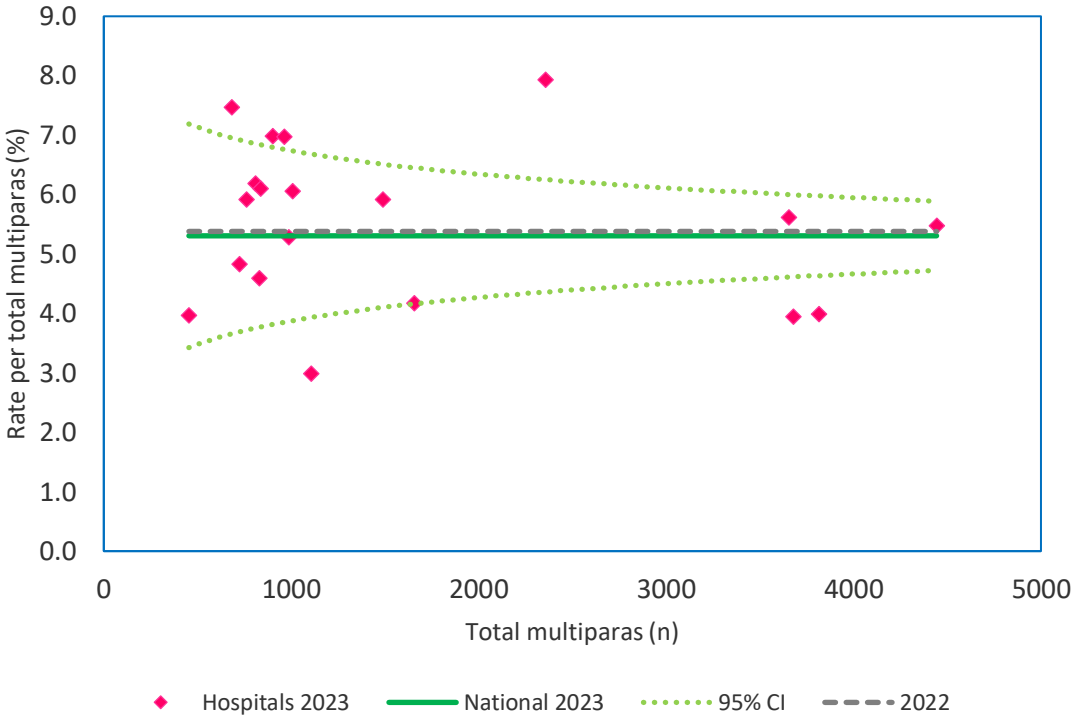
Definitions as before



	2022	2023
Rates *(% nulliparas)*	26.1%	25.3%
95% CI	25.5%-26.7%	24.8%-25.9%
Range	21.3%-34.4%	21.2%-31.1%
OVD among nulliparas (n)	5,544	5,679
Total nulliparas (n)	21,224	22,407

OVD among multiparas

Definitions as before

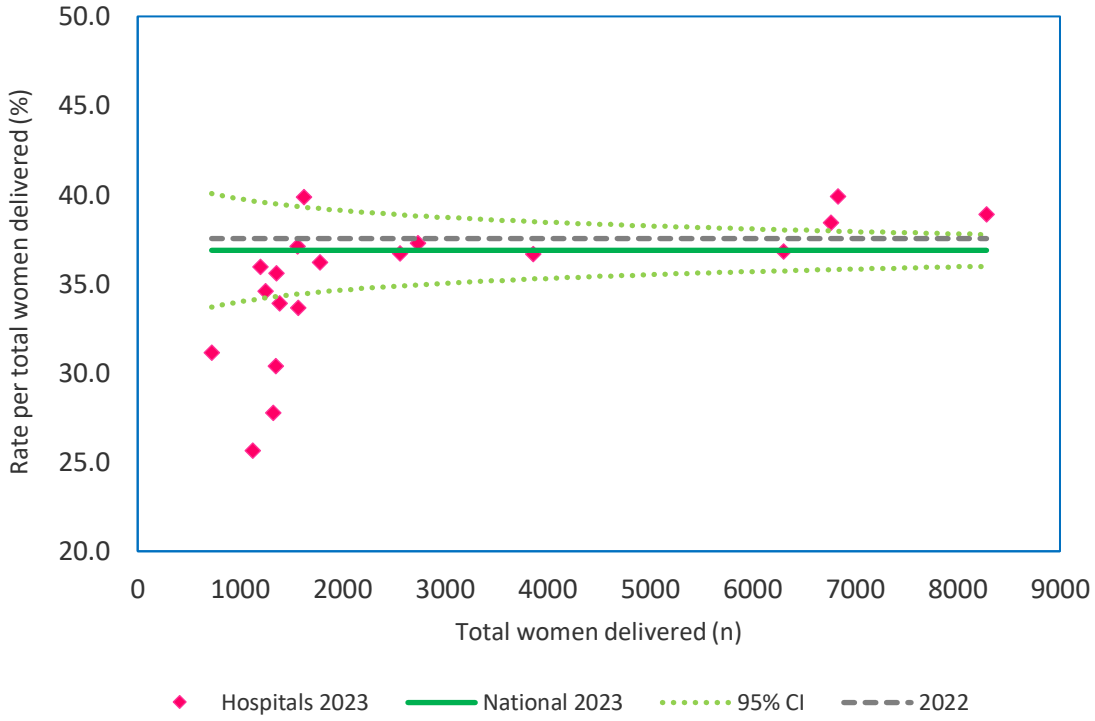


	2022	2023
Rates *(% multiparas)*	5.4%	5.3%
95% CI	5.1%-5.6%	5.1%-5.6%
Range	3.4%-7.7%	3.0%-7.9%
OVD among multiparas (n)	1,736	1,653
Total multiparas (n)	32,271	31,153

Total Induction of labour (IOL)

(Refers to Metric #38 on the IMIS)

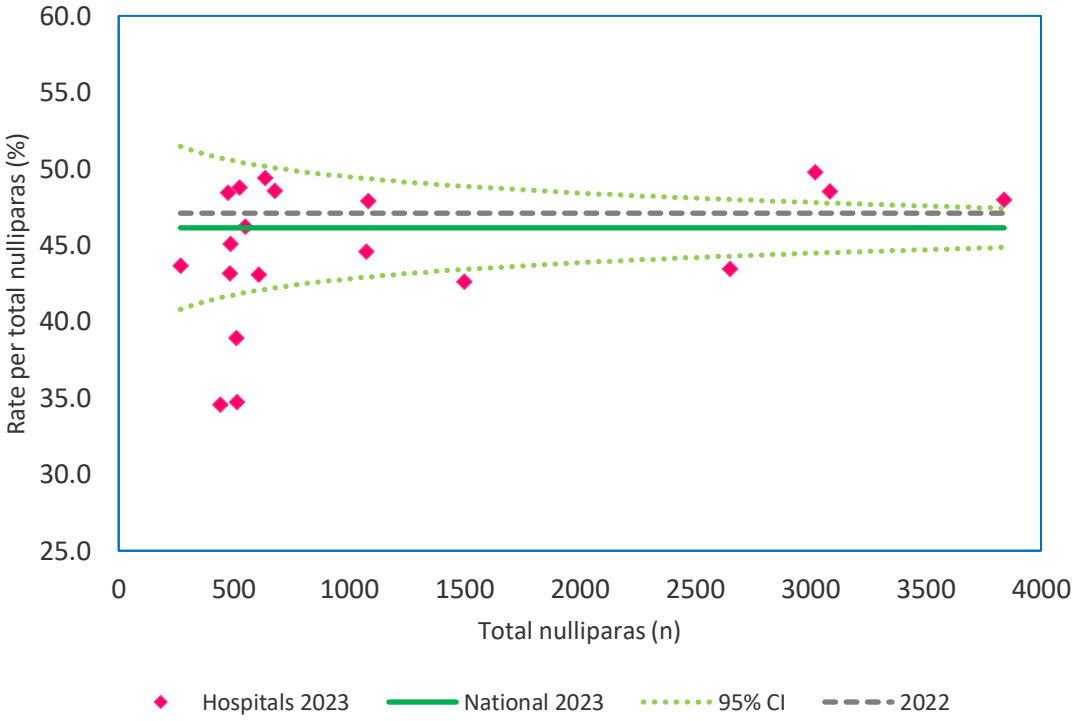
Definition Number of women undergoing induction of labour (IoL), including medical IoL with oxytocin or prostaglandin or other, surgical IoL by artificial rupture of membranes or other; and synchronous medical and surgical IoL.



	2022	2023
Rates *(% total women delivered)*	37.5%	36.9%
95% CI	37.1%-38.0%	36.5%-37.3%
Range	27.8%-43.7%	25.7%-39.9%
Total IOL (n)	20,081	19,753
Total women delivered (n)	53,495	53,558

IOL among nulliparas

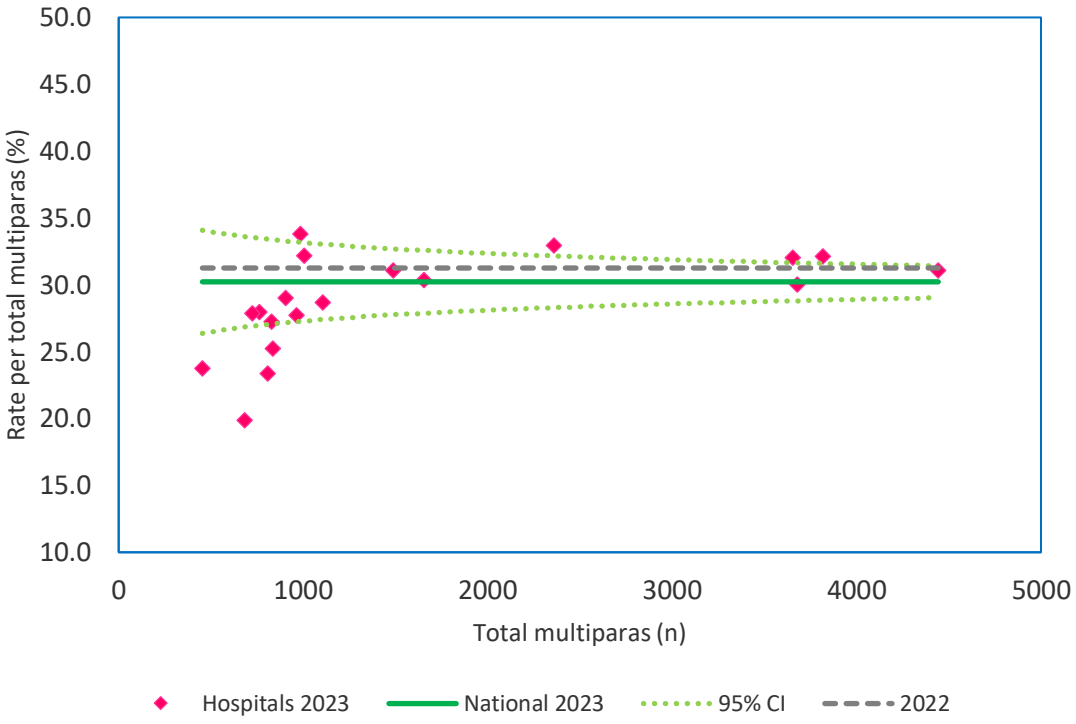
Definitions as before



	2022	2023
Rate *(% nulliparas)*	47.1%	46.1%
95% CI	46.4%-47.8%	45.5%-46.8%
Range	33.7%-52.9%	34.6%-49.8%
IOL among nulliparas (n)	9,994	10,336
Total nulliparas (n)	21,224	22,407

IOL among multiparas

Definitions as before

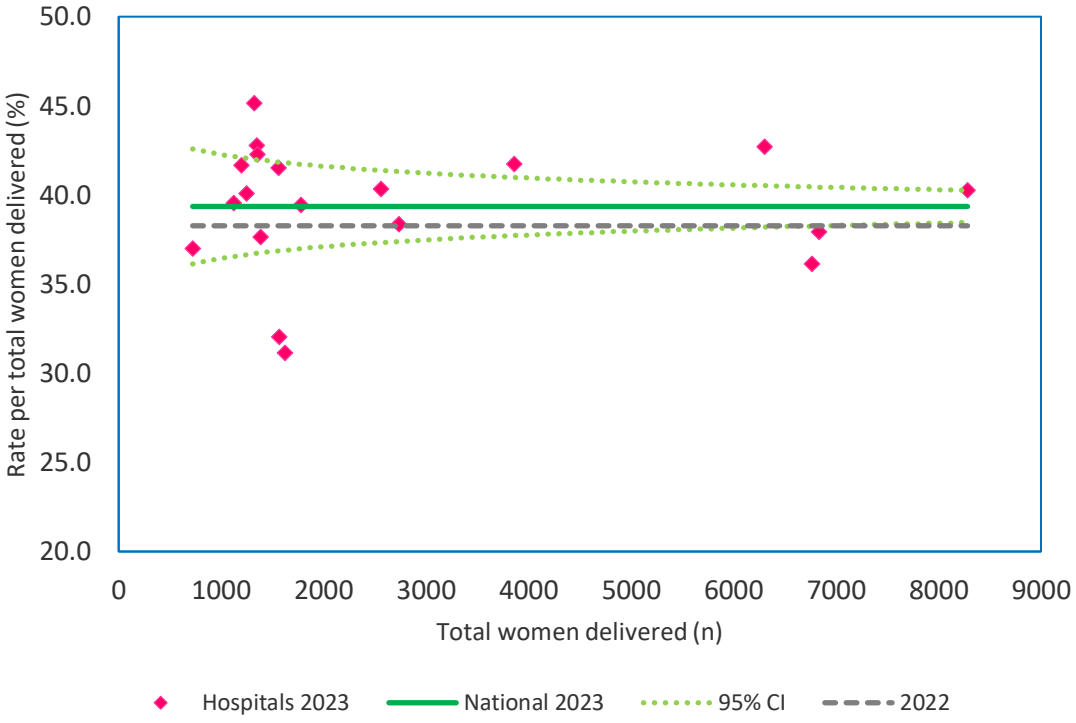


	2022	2023
Rate *(% multiparas)*	31.3%	30.2%
95% CI	30.8%-31.8%	29.7%-30.7%
Range	20.1%-37.9%	19.9%-33.8%
IOL among multiparas (n)	10,087	9,417
Total multiparas (n)	32,271	31,151

Total Caesarean sections

(Refers to Metric #39 on the IMIS)

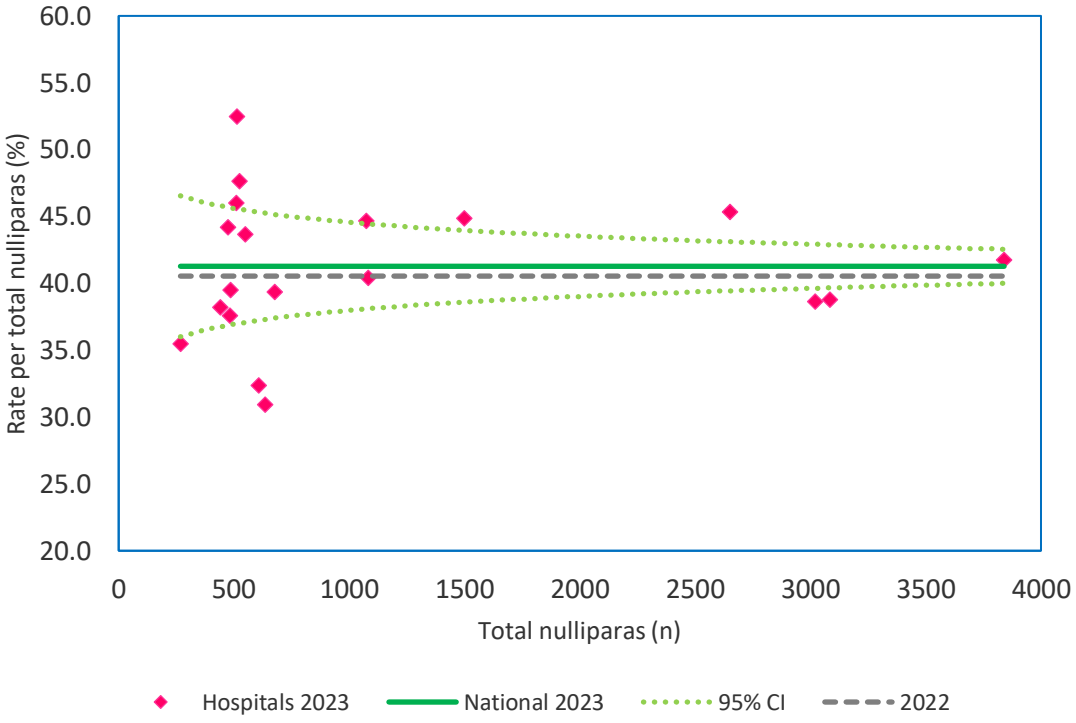
Definition Number of women giving birth by Caesarean section, including elective classical Caesarean section, emergency classical Caesarean section, elective lower segment Caesarean section, and emergency lower segment, Caesarean section.



	2022	2023
Rate *(% total women delivered)*	38.3%	39.4%
95% CI	37.9%-38.7%	38.9%-39.8%
Range	29.2%-43.1%	31.1%-45.1%
Total CS (n)	20,474	21,077
Total women delivered (n)	53,495	53,558

CS among nulliparas

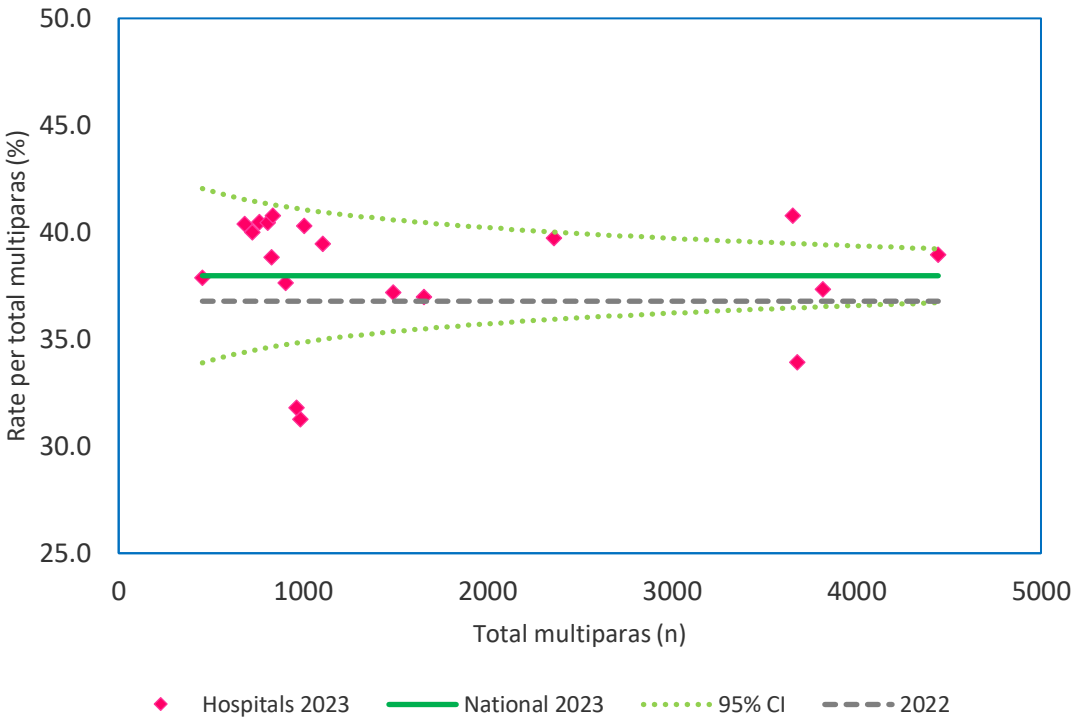
Definitions as before



	2022	2023
Rate *(% nulliparas)*	40.5%	41.3%
95% CI	39.9%-41.2%	40.6%-41.9%
Range	27.5%-48.6%	30.9%-52.4%
CS among nulliparas (n)	8,604	9,248
Total nulliparas (n)	21,224	22,407

CS among multiparas

Definitions as before



	2022	2023
Rate *(% multiparas)*	36.8%	38.0%
95% CI	36.3%-37.3%	37.4%-38.5%
Range	30.3%-42.8%	31.3%-40.8%
CS among multiparas (n)	11,870	11,829
Total multiparas (n)	32,271	31,151

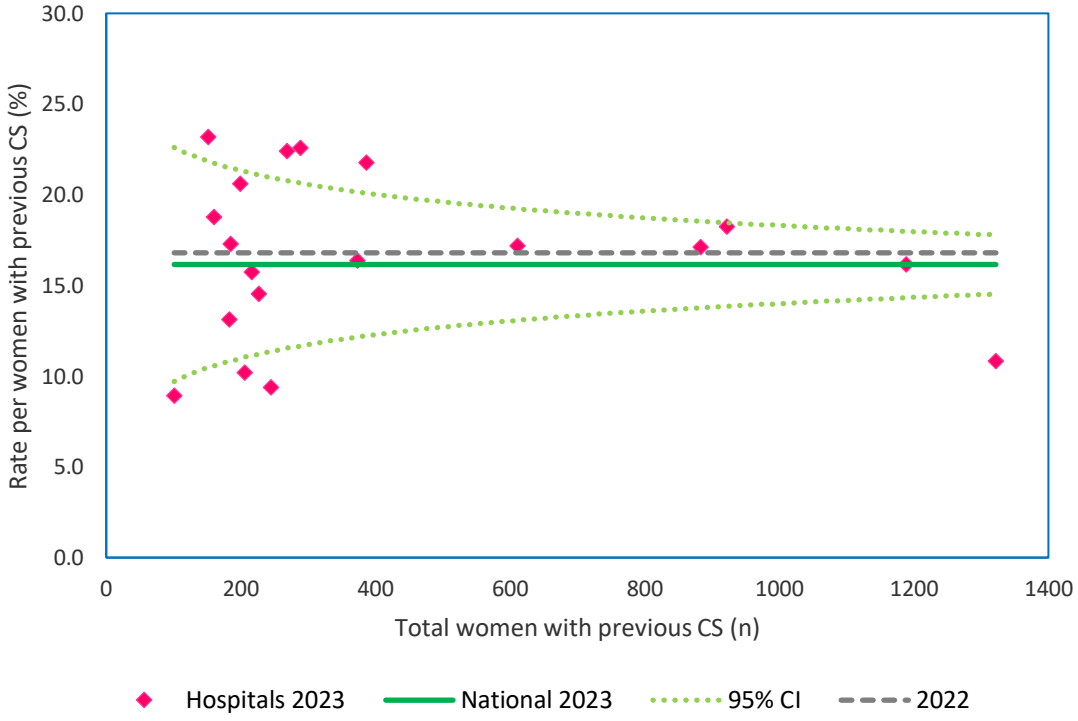
VBAC

(Refers to Metrics #40 and #41 on the IMIS)

Definition

Successful vaginal delivery after one previous Caesarean section (not failed VBAC). Delivery through the birth canal in a pregnancy subsequent to one in which delivery was by Caesarean section (VBAC). The previous CS may or may not have been directly prior to the current pregnancy.

Denominator: Number of women who had one (or more) previous Caesarean section. The previous CS may or may not have been directly prior to the current pregnancy.



	2022*	2023
Rate *(% women with previous CS)*	16.8%	16.2%
95% CI	16.0%-17.6%	15.4%-17.0%
Range	8.6%-39.7%	8.9%-23.2%
VBAC (n)	1,307	1,311
Total women with previous CS (n)	7,777	8,115

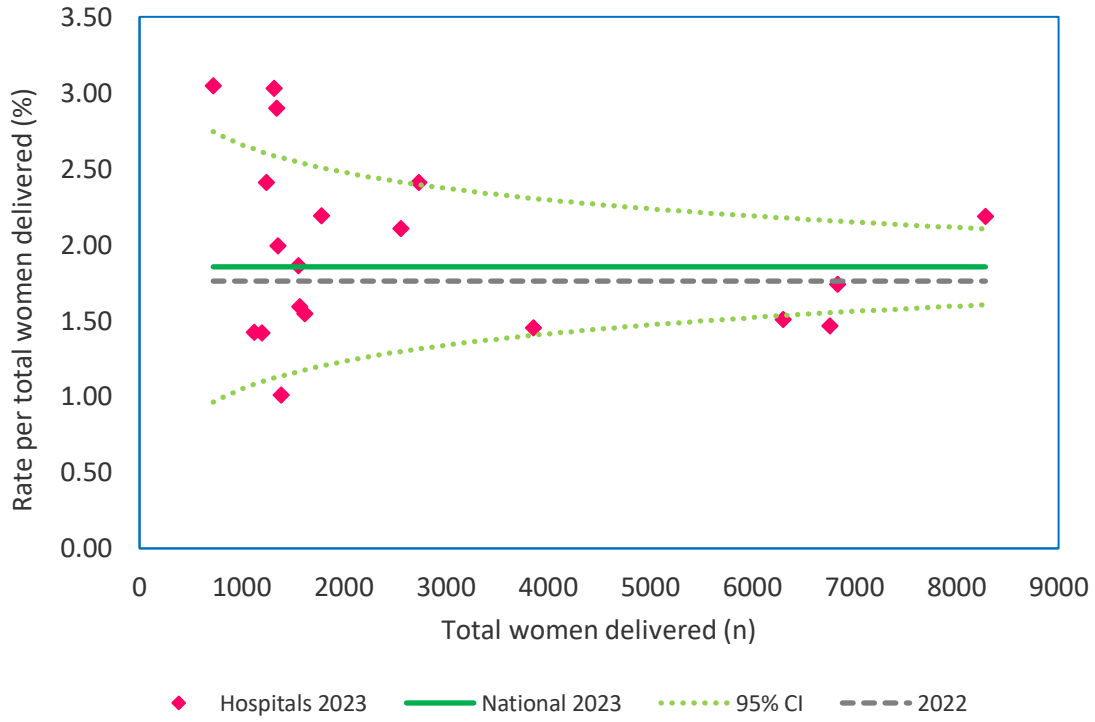
**Data from units were amended subsequent to the publication of the IMIS 2022 National Report.*

General anaesthetic for Caesarean section

(Refers to Metric #35 on the IMIS)

Definition Number of women who underwent a Caesarean section and were administered a general anaesthetic (GA), including primary GA and also conversion to GA from regional anaesthetic (epidural or spinal).

(Per total women delivered)

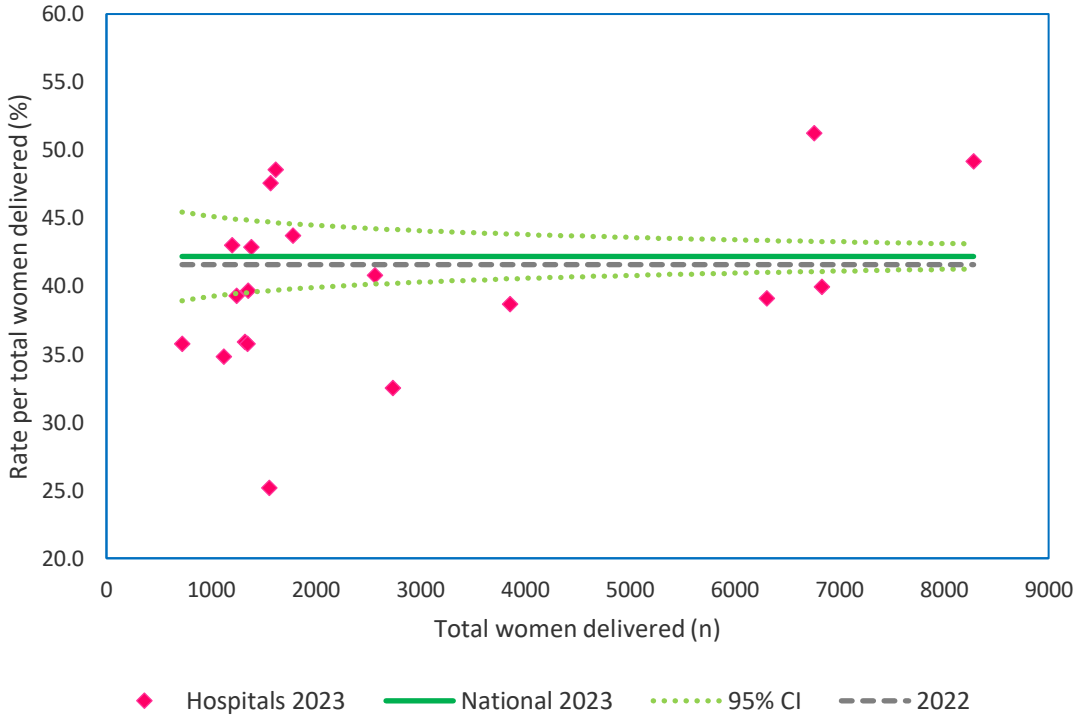


	2022	2023
Rates *(per total women delivered (%))*	1.8%	1.9%
95% CI	1.7%-1.9%	1.7%-2.0%
Range	1.0%-3.3%	1.0%-3.1%
Total GA for CS (n)	944	993
Total women delivered (n)	53,495	53,558

Labour epidural

(Refers to Metric #36 on the IMIS)

Definition — Number of women for whom labour epidurals were administered, including Neuraxial block during labour and Neuraxial block during labour and delivery procedure. Does not refer to spinal anaesthesia.



	2022	2023
Rates *(% per total women delivered)**	41.6%	42.2%
95% CI	41.2%-42.0%	41.8%-42.6%
Range	20.8%-52.3%	25.2%-51.2%
Total labour epidurals (n)	22,244	22,592
Total women delivered (n)	53,495	53,558

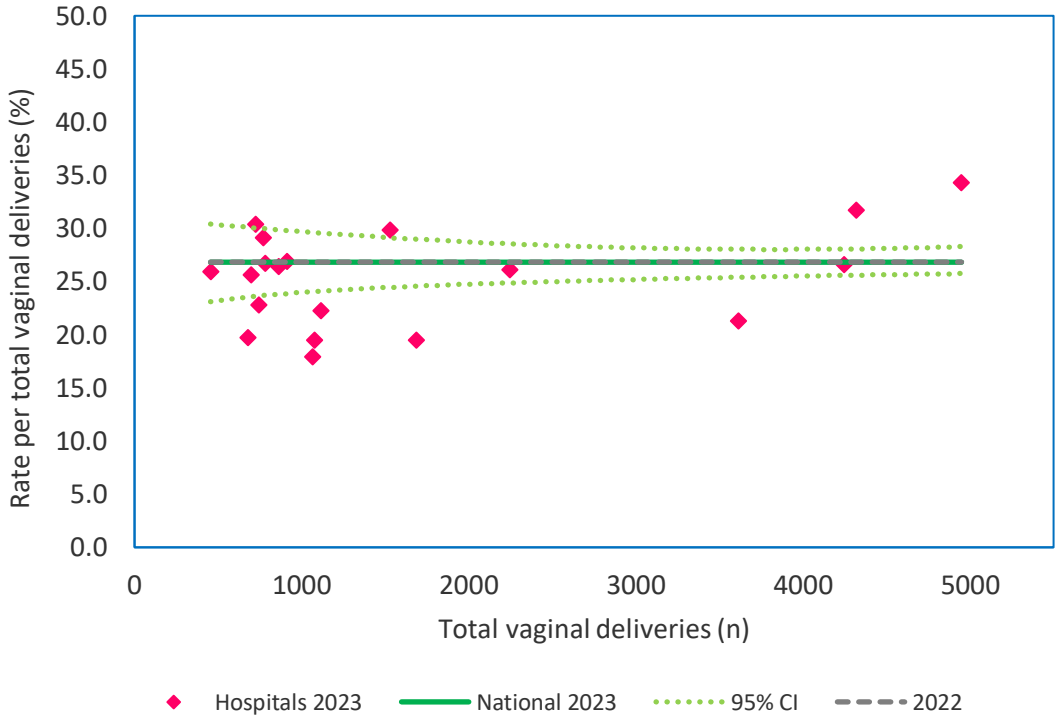
**Note: The base 'per total women delivered' is a proxy denominator for total women in labour*

Episiotomy

(Refers to Metric #34 on the IMIS)

Definition

Number of women undergoing episiotomy procedures. Episiotomy is a surgical cut made at the opening of the vagina during childbirth, to aid a difficult delivery and prevent rupture of tissues. The procedure may be performed by a midwife or obstetrician, usually during second stage of labour. Usually performed under local anaesthetic and requires suturing after delivery.



	2022	2023
Rates *(per total vaginal deliveries (%)*	26.8%	26.8%
95% CI	26.4%-27.3%	26.3%-27.3%
Range	18.8%-31.9%	17.9%-34.3%
Total episiotomies (n)	8,820	8,712
Total vaginal deliveries (n)	32,875	32,481

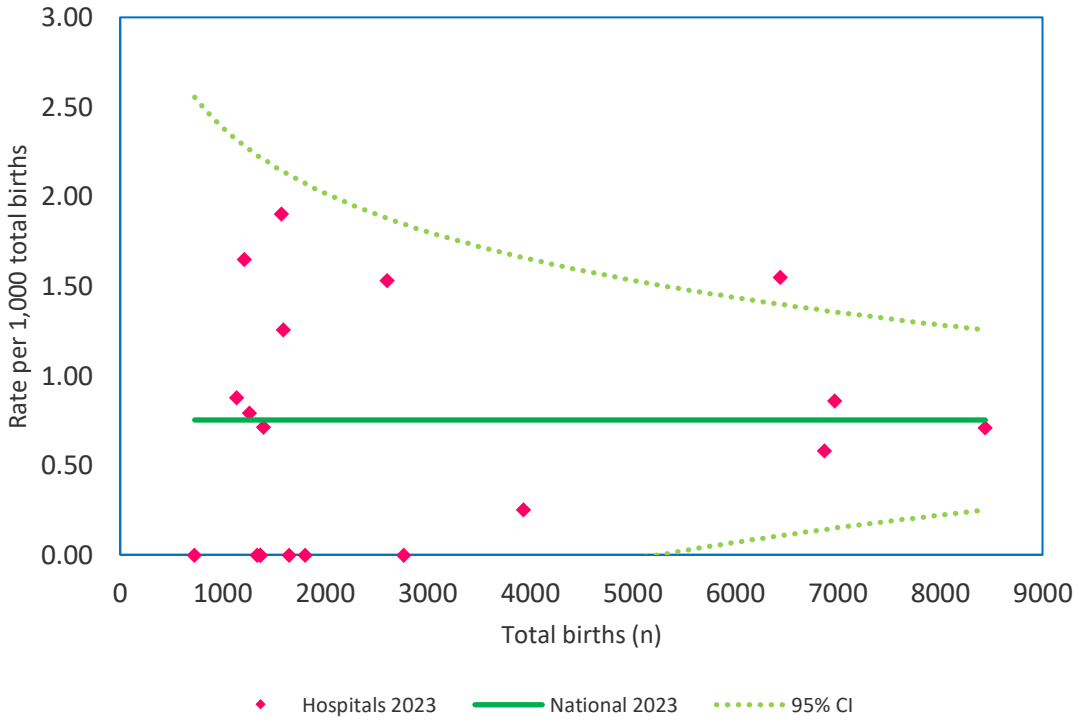
IMIS 2023: Neonatal metrics

Brachial plexus injury

(Refers to Metric #14 on the IMIS)

Definition Babies diagnosed with Obstetric Brachial Plexus Injury two weeks after birth. The diagnosis is a neurological injury to the brachial plexus roots involving some or all of the cervical nerves C5, C6, C7, C8, T1 (these nerves supply the muscles to upper limb and hand). The most common injury involves C5, C6, C7 roots leading to absent shoulder flexion, elbow flexion, forearm supination, wrist extension, and fingers extension. The word 'obstetric' must be included: this differentiates it from other congenital anomalies to the nerve roots.

1. The condition should be initially called 'reduced movement of the upper limb' until the diagnosis is confirmed.
2. Note whether or not there had been shoulder dystocia.
3. X-rays should be performed to exclude a fracture of the clavicle or humerus.
4. Any infant with 'reduced upper limb movement' should be reviewed by a paediatric registrar/consultant and a physiotherapist (if available).
5. There should be an interval of two weeks before confirming diagnosis of BPI to allow any transient problem to resolve.



	2023
Rate *(per '000 total births)*	0.75
95% CI	0.52-0.98
Range	0.00-1.90
Total BPI (n)	41
Total births (n)	54,488

Note: The definition for BPI was updated in 2023.

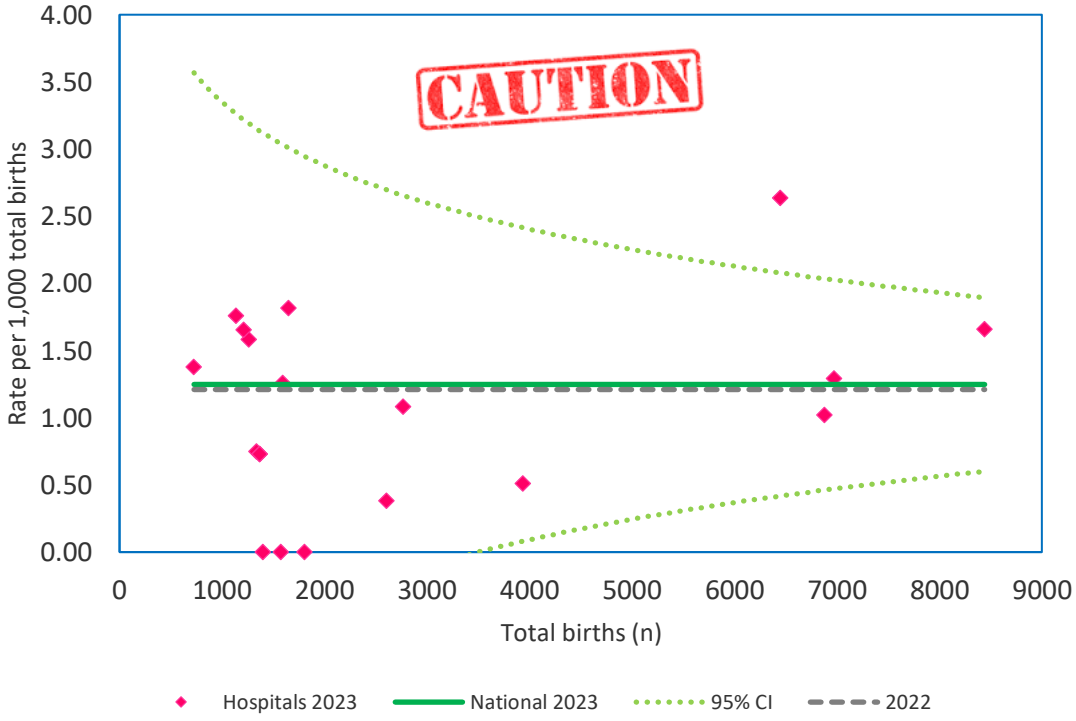
Neonatal encephalopathy

(Refers to Metric #15 on the IMIS)

Definition

Number of babies diagnosed with NE (moderate or severe). NE is a clinical condition in term (or late preterm) infants at ≥34 weeks' gestation. It is defined by abnormal neurological behaviour with the onset occurring at or shortly after birth. NE is manifested by difficulty with initiating and maintaining respiration, abnormal level of consciousness, depression of tone and reflexes, poor suck and swallow, and often seizures.

Note: A subgroup of infants with NE may be assigned a diagnosis of hypoxic ischaemic encephalopathy (HIE). HIE is the most common cause of NE, but not all NE has a HIE.

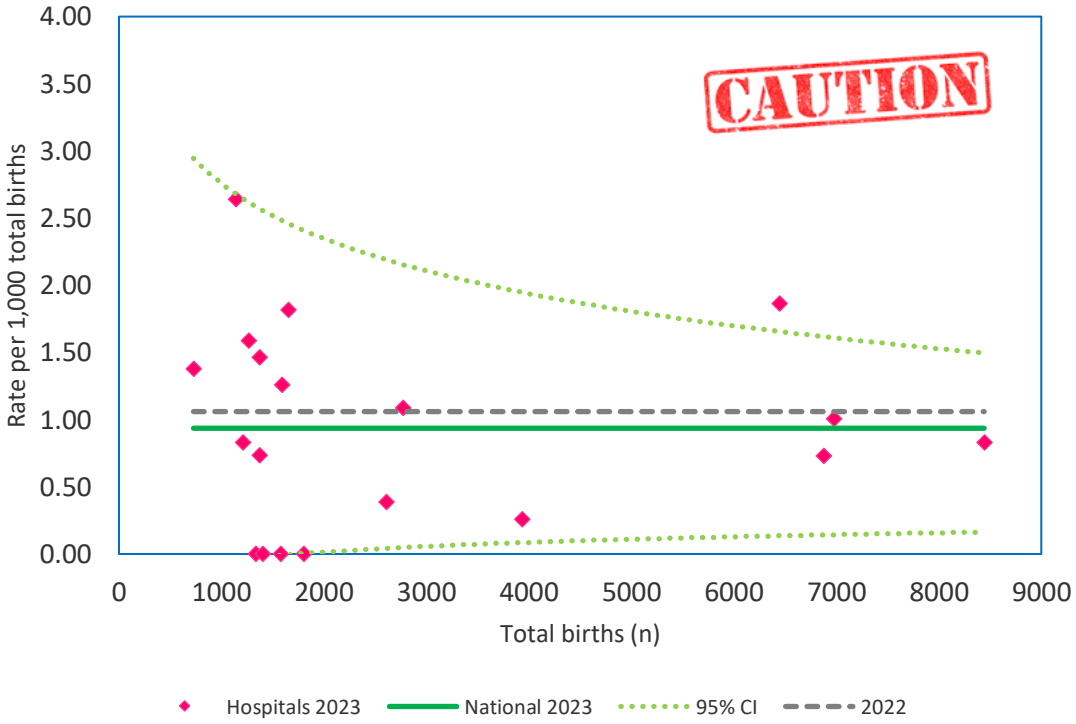


	2022	2023
Rate *(per '000 total births)*	1.21	1.25
95% CI	0.92-1.50	0.95-1.54
Range	0.00-3.14	0.00-2.64
Total NE (n)	66	68
Total births (n)	54,467	54,488

Whole body neonatal cooling (Inborn)

(Refers to Metric #16 on the IMIS)

Definition The metric refers to active/whole body neonatal cooling (not passive), or neonatal therapeutic hypothermia, administered during the current birth episode as a treatment for NE. The inclusion criteria are documented in the Neonatal Therapeutic Hypothermia in Ireland (2018: 13).



	2022	2023
Rate *(per '000 total births)*	1.06	0.94
95% CI	0.79-1.34	0.68-1.19
Range	0.00-2.79	0.00-2.64
Total WBNC (n)	58	51*
Total births (n)	54,467	54,488

**Note: One baby who was cooled at a tertiary hospital was a 'free' birth (i.e., the woman did not attend any hospital antenatally; she gave birth at home without medical assistance; she and her baby were ambulanced to the hospital.)*

With the exception of the one 'free' birth, the data refer to babies born in *the 19 hospitals units. For the purposes of the IMIS, different data collection rules apply for the four tertiary maternity hospitals in Dublin and Cork and the 15 smaller maternity units due to the transfer arrangements.*

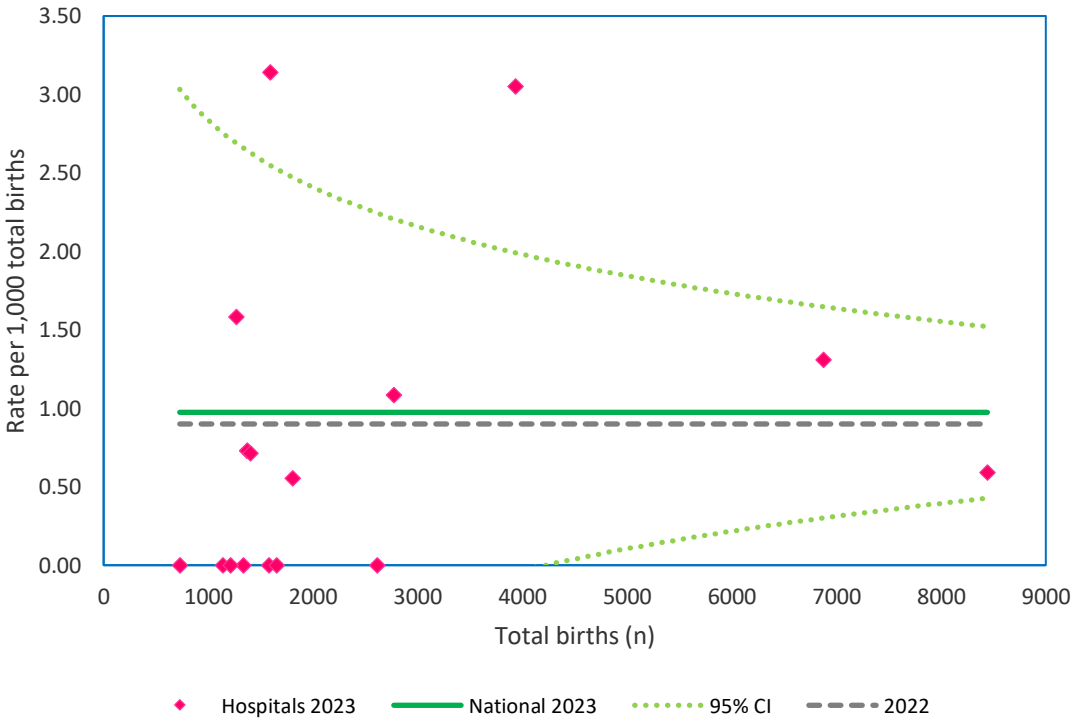
Neonatal bacteraemia (early-onset)

(Refers to Metric #21 on the IMIS)

Definition

For the purposes of the IMIS, diagnosis of bacteraemia refers to early-onset clinically significant bacteraemia in neonates (defined as **<72 hours** of age). Diagnosis of bacteraemia is based on ONE positive blood culture for a recognised bacterial pathogen. This would include Group B Streptococcus, E.coli, S.aureus, and any other organisms considered clinically significant by the consultant microbiologist. It would exclude contaminants such as Coagulase negative Staphylococci and Streptococcus viridians. If any doubt regarding what constitutes a recognised bacterial pathogen, please discuss with consultant microbiologist at the hospital.

For the purposes of the IMIS, the definition of neonatal bacteraemia does not include recognised pathogens cultured from cerebrospinal fluid. Exclude cases of blood culture contamination (e.g. skin contaminants).



	2022*	2023*
Rate *(per '000 total births)*	0.90	0.97
95% CI	0.61-1.19	0.67-1.28
Range	0.00-2.51	0.00-3.15
Total neonatal bacteraemia (n)	37	40
Total births (n)	41,014	41,068

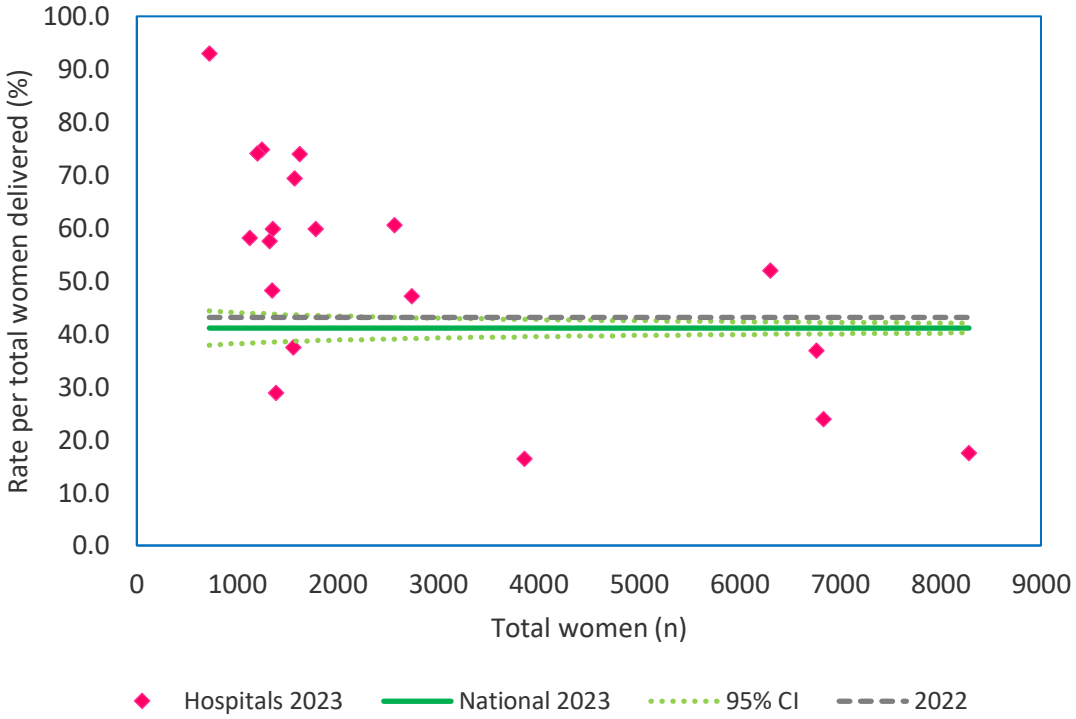
** Missing data from CUMH and Coombe Maternity Hospital in 2022 and 2023*

NOTE: This metric will be discontinued in 2024

IMIS 2023: Antenatal care

EPAU first visits
(Refers to Metric #10 on the IMIS)

Definition Number of first visits to the Early Pregnancy Assessment Unit (EPAU) occurring during the current month (do not count the combined number of first and return visits).

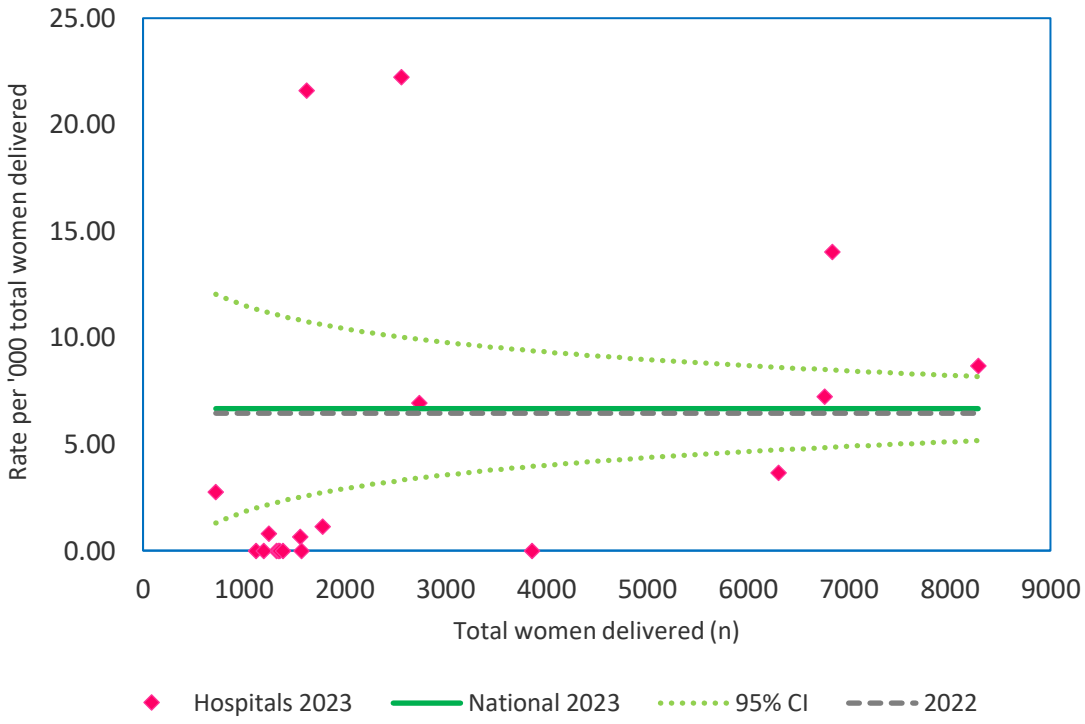


	2022	2023
Rate *(% of total women delivered)*	43.1%	41.1%
95% CI	42.7%-43.5%	40.7%-41.5%
Range	9.5%-88.9%	16.3%-92.9%
Total EPAU first visits (n)	23,051	22,004
Total women delivered (n)	53,495	53,558

In-utero transfers admitted

(Refers to Metric #12 on the IMIS)

Definition Number of women with a fetus in-utero admitted into the hospital after being transferred from another hospital *in the fetal interest*, during the current birth episode.

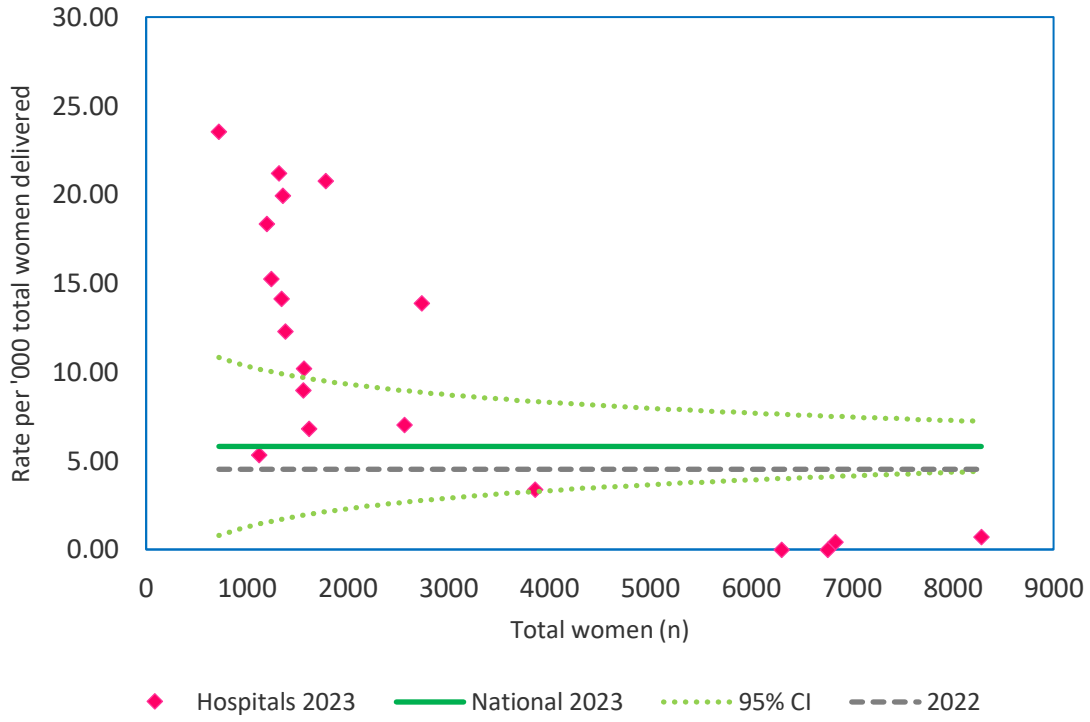


	2022	2023
Rate *(per '000 women delivered)*	6.45	6.67
95% CI	5.77-7.13	5.98-7.35
Range	0.00-18.96	0.00-22.25
In-utero transfers admitted (n)	345	357
Total women delivered (n)	53,495	53,558

In-utero transfers sent out

(Refers to Metric #13 on the IMIS)

Definition Number of women with a fetus in-utero transferred out of the hospital to another hospital *in the fetal interest*, during the current birth episode (refers to transfers of inpatients only, not outpatients.)



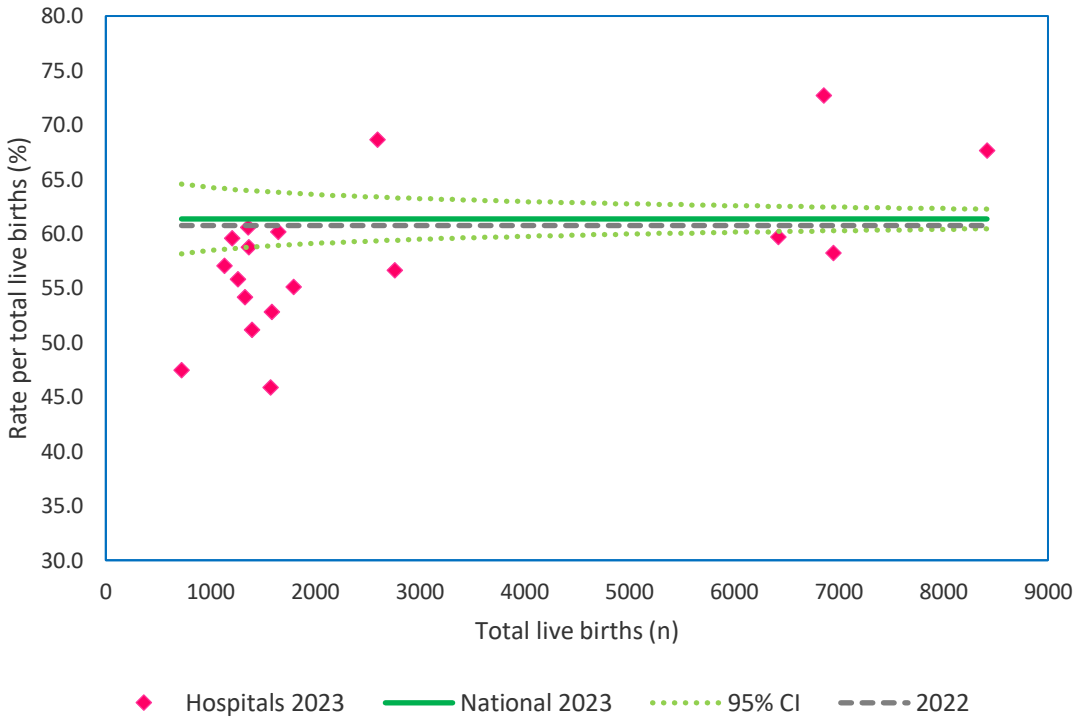
	2022	2023
Rate *(per '000 women delivered)*	4.52	5.81
95% CI	3.96-5.09	5.16-6.45
Range	0.00-21.13	0.00-23.55
In-utero transfers sent out (n)	242	311
Total women delivered (n)	53,495	53,558

IMIS 2023: Breastfeeding

Any Breastfeeding (BF) since birth/on discharge

(Refers to Metric #18 and Metric #19 on the IMIS)

Derived variable based on numbers of babies exclusively and non-exclusively breastfed prior to discharge from the hospital/unit.

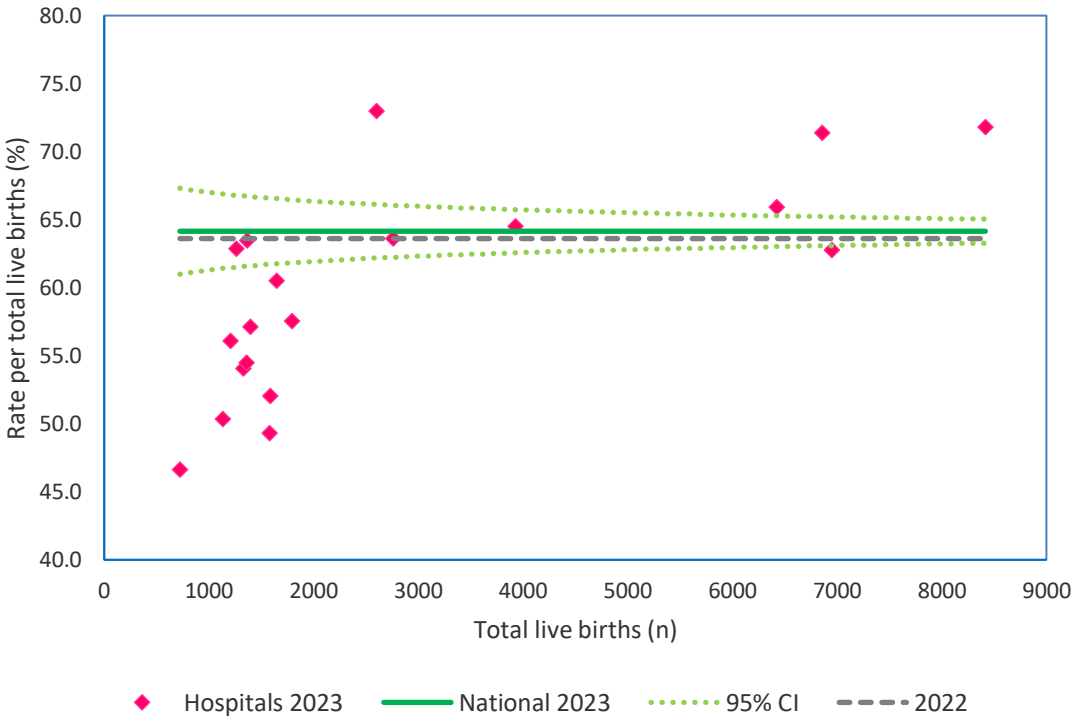


	2022*	2023*
Rate *(% total live births)*	60.8%	61.4%
95% CI	60.3%-61.2%	60.9%-61.8%
Range	45.05-73.2%	45.9%-72.7%
Any BF (n)	30,584	30,916
Total live births (n)	50,344	50,389

**Missing data from UMHL in 2022 and 2023*

Breastfeeding initiated
(Refers to Metric #17 on the IMIS)

Definition Number of babies breastfed at first feed following birth, i.e., direct from the breast or expressed. Include babies transferred to NICU whose first feed after birth is EBM/Donor milk. Include babies transferred to NICU who are given IV fluids/TPN initially and then given breastmilk as their first feed.



	2022	2023
Rate *(% total live births)*	63.6%	64.2%
95% CI	63.2%-64.0%	63.8%-64.6%
Range	45.2%-70.5%	46.6%-72.9%
Total BF initiated (n)	34,505	34,843
Total live births (n)	54,243	54,315

Appendices

Appendix 1. IMIS data collection form (2023)

IMIS 2023			Previous year		Current year	
			Month	YTD	Month	YTD
DEMOGRAPHICS	1.	Total women delivered (n)				
	2.	Total nulliparas (n)				
	3.	Total multiparas (n)				
	4.	Total births (n)				
	5.	Total live births (n)				
	6.	Total multiple births (n)				
	7.	Maternal death (n)				
	8.	Total perinatal death (n)				
	9.	Adjusted perinatal death (n)				
HOSPITAL ACTIVITIES	10.	EPAU first visits (n)				
	11.	Maternal transfers (n)				
	12.	In-utero transfers admitted (n)				
	13.	In-utero transfers sent out (n)				
NEONATAL METRICS	14.	Brachial plexus injury (n)				
	15.	Neonatal encephalopathy (n)				
	16.	Whole body neonatal cooling (n)				
BREASTFEEDING	17.	BF initiated (n)				
	18.	BF exclusively on discharge (n)				
	19.	BF non-exclusively on discharge (n)				
LABORATORY	20.	Maternal bacteraemia (n)				
	21.	Neonatal bacteraemia (n)				
	22.	Obstetric blood transfusions (n)				
OBSTETRIC RISKS	23.	Maternal sepsis (n)				
	24.	Ectopic pregnancy (n)				
	25.	Eclampsia (n)				
	26.	Uterine rupture (n)				
	27.	Peripartum hysterectomy (n)				
	28.	Pulmonary embolism (n)				
	29.	Perineal tears (3^{rd} / 4^{th} degree) (n)				
	30.	PPH vaginal delivery (n)				
	31.	PPH Caesarean section (n)				
	32.	Miscarriage misdiagnosis (n)				
	33.	Retained swabs (n)				
	34.	Episiotomy (n)				
DELIVERIES	35.	General anaesthetic for CS (n)				
	36.	Labour epidural (n)				
	37.	Operative vaginal delivery (n)				
	38.	Induction of labour (n)				
	39.	Caesarean section (n)				
	40.	VBAC (n)				
	41.	One previous CS (n)				

Appendix 2. IMIS Officers/Teams in the 19 maternity hospitals/units

Cavan General Hospital Ms Karen Malocca, CNM2; Dr Rukhsana Majeed; Lisa Brady

Cork University Maternity Hospital Claire Everard, Quality & Risk Manager; Dr Mairéad O'Riordan, Consultant

Coombe Maternity Hospital Julie Sloane, Data Analyst, Ms Emma McNamee, IT Systems Manager

Our Lady of Lourdes Hospital, Drogheda Ms Maeve Gaynor, Acting CMM3 MN-CMS

Galway University Hospital Ms Claire Greaney, CMM2 IT & Data Management; Ms Anne-Marie Grealish, ADOM

University Hospital Kerry Ms Mary Stack-Courtney, CNM3; Ms Mairéad Griffin, MNCMS-Local Project Support; Ms Sandra O'Connor, Director of Midwifery

St Luke's Hospital, Kilkenny Ann Margaret Hogan, Director of Midwifery; Kayla Thornton

Letterkenny University Hospital Ms Evelyn Smith, Director of Midwifery; Ms Marion Doogan, ADOM, Ms Mary Lynch CMM3; Ms Alison Johnston CNM IT & Data Management

University Maternity Hospital Limerick Mr Stephen Culligan, Senior Maternity Data Analyst; Caroline Dickinson

Mayo General Hospital Andrea McGrail, Director of Nursing & Midwifery; Jacinta Byrne CMM2

Midland Regional Hospital, Mullingar Marie Corbett, Director of Midwifery; Maureen Revilles ADOM

National Maternity Hospital, Dublin Fionnuala Byrne, Information Officer

Portiuncula University Hospital Sheila Melvin, IT Midwife; Deirdre Naughton DOM

Midland Regional Hospital, Portlaoise Ita Kinsella, ADOM

Rotunda Hospital, Dublin Kathy Conway, Clinical Activity Reporting Manager

Sligo University Hospital Geraldine O'Brien CMM2; Ita Morahan CMM3

Tipperary University Hospital Maggie Dowling, Director of Midwifery; Colette Kivlehan CMM2

University Hospital Waterford Paula Curtin, Director of Midwifery

Wexford General Hospital Helen McLoughlin, Director of Midwifery; Norma Doyle ADOM

Appendix 3. IMIS Implementation Guidelines

1. The IMIS is designed to capture and measure clinicial activities in the maternity unit. It is intended for within-hospital use: the data will be collected by hospital staff within the maternity hospital/unit and reviewed by senior hospital managers.
2. The IMIS should be based entirely on data sourced directly from maternity units.
3. Monthly completion of the IMIS is mandatory for the 19 maternity units.
4. The IMIS is approved by the National Implementation Group HSE/HIQA Maternity Services Investigations and is aligned with national recommendations in the Investigation Report of the HSE National Incident Management Team (2012); HIQA Investigation Report (2012); Report of Chief Medical Officer on Perinatal Deaths 2006-date (February 2014), Safety Incident Management Policy (June 2014), Review by Dr Peter Boylan (June 2015), the National Maternity Strategy 2016-2026, and the HSE Maternity Clinical Complaints Review (May 2016).
5. The IMIS Officers in all 19 maternity units were nominated to work part-time on implementing the IMIS, whilst continuing with their other existing roles. The IMIS Officer should have access to maternity hospital/unit data files and should be accustomed to dealing with data within the hospital/unit.

IMIS Monthly data collection and reporting

6. The reporting period is the calendar month (i.e., from first to last day of the month).
7. The monthly report should be completed by the 20th day of the following month.
8. The IMIS Officers should send a monthly IMIS report to senior managers in their hospital/unit:
    - Chief Executive Officer or Master
    - Clinical Director(s), as appropriate
    - Director of Midwifery/Nursing
9. Senior managers should review the monthly IMIS. If they have concerns arising from the IMIS, these should be discussed with the clinical staff and, if appropriate, reported to the Hospital Board or equivalent. In the event of concerns with national implications arising, these should be reported to the head of HSE Acute Hospitals Division via NWIHP.

IMIS Annual reporting

10. The annual IMIS data should be completed by **end of February** of the following year.
11. The QA Officer should send the annual IMIS data to the following people:
    a) Senior managers of the hospital (as above)
    b) NWIHP Programme Director
    c) IMIS Project Manager
12. Staff at the NWIHP will check and verify annual data in collaboration with staff at maternity hospitals/units.
13. The NWIHP will prepare IMIS reports and disseminate to maternity hospitals/units and relevant organisations.
14. If senior managers of the hospitals have concerns arising from the annual IMIS data, these should be discussed and escalated as above.
15. Reviews of the IMIS format will be conducted by the NWIHP and changes introduced on an annual basis.

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 as a management instrument for quality improvement 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.

   '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.' (National Recommendation N16)

   '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.' (National Recommendation N17)

3. **HSE Midland Regional Hospital, Portlaoise, Report of Chief Medical Officer on Perinatal Deaths 2006-date (2014):**

   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 National 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) (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) (O.R.10)
- A National Patient Safety Surveillance system should be established by HIQA (O.R.11)

4. HSE NIMT, 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 Report of the investigation into the safety, quality and standards of services provided by the Health Service Executive to patients in the Midland Regional Hospital, Portlaoise (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. Boylan P. Report, 'A Review of 28 Maternity Case Notes' (June 2015)

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.'

7. 'Creating a better future together', National Maternity Strategy 2016-2026 (2017)

Action: Measurement and analysis for quality improvement and safety will occur at national, network and service level, based on an agreed minimum dataset (Action 4.14.5).

8. HSE Maternity Clinical Complaints Review (May 2017)

The final report of the Maternity Clinical Complaints Review concluded a review process commissioned by the HSE in 2014. The report reviewed complaints received from patients and their families and outlined recommendations for all maternity services nationally.
Recommendation: 'External oversight should be provided in order to assure the public of the quality of maternal services. The National Women and Infants Health Programme (NWIHP) should develop a model to ensure external oversight is applied across each hospital group. The Irish Maternity Indicator System (IMIS) currently provides information for local scrutiny of clinical maternity activity. The NWIHP will expand the role of IMIS to provide for Group and National level oversight, as well as local.'

9. HSE National Maternity Strategy Implementation Plan (October 2017)

Developed by the National Women and Infants Health Programme (NWIHP) in 2017, the Implementation Plan stipulates that the IMIS will be the agreed measurement instrument for quality improvement and safety at national, network and service level and the IMIS will form part of the standing agenda for monthly meetings with the maternity networks.

Appendix 5. IMIS data and methods

Data

The IMIS 2023 data were provided by IMIS Officers, or nominated personnel at all maternity hospitals/units, following review and approval by hospital senior management. They were checked and verified by the NWIHP. Comparative national data for the national longitudinal trends were drawn from the National Perinatal Reporting System (NPRS)[1] and the Hospital In-Patient Enquiry system (HIPE).[2]

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 intervals at 95% levels were calculated and customised funnel charts designed for the IMIS indicators.

Funnel charts

Funnel charts are useful where observations for different hospitals are based on varying sample sizes. They 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 were 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.

The funnel-shaped confidence limits indicate that, as sample sizes decrease, an observation must be further from the national rate 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.

Caution is advised where small values are concerned.

Maternity hospitals/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 variations at the hospital level before action is taken.

Several funnel plots in the IMIS National Reports show evidence of a phenomenon known as overdispersion (Spiegelhalter 2005).[3] This overdispersion is not an unusual phenomenon in health data and, in fact, can be useful in model specification (Birkmeyer 2001).[4] Overdispersion occurs when a greater level of variability is demonstrated than can be explained by chance and the existence of a small number of outlying maternity hospitals/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

1 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.

2 The HIPE provides demographic, administrative, and clinical data on inpatient and day-case discharges from publicly-funded acute hospitals in Ireland.

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

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

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.

Interpreting a funnel plot:

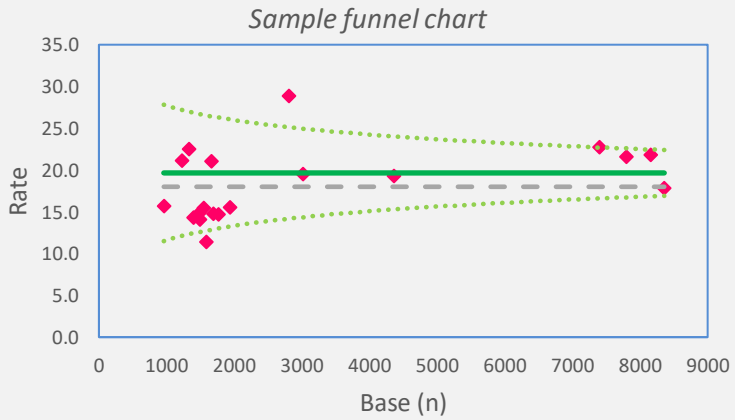
Diamond-shaped markers represent the 19 maternity hospitals/units.

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

The vertical axis measures the frequency of the outcome, usually expressed as a percentage rate or rate per thousand ('000) women delivered or births. The diamonds placed higher up on the chart represent maternity units with higher rates of an outcome.

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

The dotted curved green lines constitute the statistical reference range or 95% confidence limits for the current year. The reference range defines what is regarded as the 'normal', or typical, range. Anything beyond the range is 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.



Appendix 6. Maternity hospitals/units in Republic of Ireland (n=19)

Appendix 7. HSE Maternity Networks *(as of 2023)*

Ireland East	National Maternity Hospital, Dublin
	Midland Hospital Mullingar
	St Luke's Hospital, Kilkenny
	Wexford General Hospital
RCSI	Rotunda Hospital, Dublin
	Cavan General Hospital
	Our Lady of Lourdes Hospital, Drogheda
Dublin Midlands	Coombe Maternity Hospital, Dublin
	Midland Regional Hospital Portlaoise
University Limerick	University Maternity Hospital Limerick
South/South West	Cork University Maternity Hospital
	Tipperary University Hospital
	University Hospital Kerry
	University Hospital Waterford
Saolta	University Hospital Galway
	Letterkenny University Hospital
	Mayo University Hospital
	Portiuncula University Hospital
	Sligo University Hospital

Appendix 8. Relevant data sources/agencies

The following offices collect and provide health- and hospital-related data, including data on maternity and perinatal activities, in ROI:

BNF01 Birth Notification Form
Four-part form completed by staff at maternity hospitals/units for each live birth and stillbirth and returned to the HPO for distribution to CSO, GRO, and NPRS.

CSO Central Statistics Office
Ireland's national statistical office provides vital statistics, including births, stillbirths, and deaths.

GRO General Register Office
Central civil repository for records including births, stillbirths, and deaths in Ireland.

HIPE Hospital In-Patient Enquiry system
A health information system designed to collect demographic, clinical, and administrative data on hospital day cases and in-patients as well as deaths from acute hospitals nationally. The HIPE is the only source of morbidity statistics available nationally for acute hospital services. All acute public hospitals participate in HIPE, reporting on over 1.5 million records annually.

IMIS Irish Maternity Indicator System
The IMIS is a standardised data-based management tool for individual maternity hospitals/units and national analysis. Data are collected and reviewed monthly. National reports are published annually.

MSS Maternity Safety Statement
Initiated by the Department of Health, the MSS is published for all maternity hospitals/units on a monthly basis and is intended to provide assurance that maternity services are delivered in an environment that promotes open disclosure. Completion and publication of the MSS is included in the Key Performance Indicators in the HSE National Service Plan.

NPEC National Perinatal Epidemiology Centre, University College Cork
The NPEC collaborates with maternity services and publishes annual data on perinatal mortality and severe maternal morbidity using a range of research methodologies and drawing on the HIPE data.

NPRS National Perinatal Reporting System
Based on data derived from the BNF01, the NPRS provides national statistics on perinatal events, in particular data on pregnancy outcomes, perinatal mortality, and important aspects of perinatal care.

NWIHP National Women and Infants Health Programme
Established in 2017, the NWIHP leads the management, organisation, and delivery of maternity, gynaecology and neonatal services in line with the National Maternity Strategy. The NWIHP is overseeing development of maternity networks and has responsibility for allocating development funding for maternity services.

Appendix 9. Glossary and Abbreviations

ACHI	Australian Classification of Health Interventions
BPI	Brachial plexus injury
CA	Congenital anomaly
CS	Caesarean section
ECDC	European Centre for Disease Prevention and Control
EPAU	Early Pregnancy Assessment Units
GA	General anaesthetic
HIE	Hypoxic ischaemic encephalopathy
HIPE	Hospital In-Patient Enquiry system
HIQA	Health Information and Quality Authority
HPO	Healthcare Pricing Office
HSE	Health Services Executive
ICD	International Classification of Diseases
IMIS	Irish Maternity Indicator System
IOL	Induction of labour
NCG	National Clinical Guideline
NE	Neonatal encephalopathy
NPEC	National Perinatal Epidemiology Centre
NPRS	National Perinatal Reporting System
NWIHP	National Women and Infants Health Programme
OVD	Operative vaginal delivery
PPH	Postpartum haemorrhage
QA	Quality Assurance
WBNC	Whole body neonatal cooling
WHO	World Health Organisation

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Irish Maternity Indicator System (IMIS)

National Report 2023

National Women and Infants Health Programme

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