



The ItOSS Prospective Population-Based Study Peripartum Hysterectomy

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The Italian Obstetric Surveillance System

ItOSS coordinates population-based studies on obstetric near misses and collaborates with the International Network of Obstetric of Survey System (INOSS) on multinational studies of rare, severe maternal morbidity conditions

Near miss (World Health Organization)

A woman who nearly died but survived a complication that occurred during pregnancy, childbirth, or within 42 days after the end of pregnancy

2014–2016

- Severe postpartum haemorrhage
- Uterine rupture
- Abnormally invasive placentation
- Postpartum hysterectomy

49% of national births

2017–2019

- Eclampsia
- Sepsis
- Amniotic fluid embolism
- Spontaneous haemoperitoneum

75% of national births

2020–2022

SARS-CoV-2 infection in pregnancy

100% of national births





The ongoing ItOSS study

National Ethics Committee (ISS) approval obtained on 24 October 2023.

STUDY DESIGN case-control, prospective, population-based study

STUDY PERIOD March 2024 – March 2026

HOW THE STUDY IS RUN

Reference clinicians have been identified in each facility (N=376)

14 training meetings were held to share the study protocol and the online data-entry procedure

Data were collected through the **LimeSurvey** platform, hosted on a secure ISS server



98%

of national births covered

THE STUDIED CONDITIONS

Hysterectomy

Re-laparotomy after caesarean section

Cardiomyopathy

Pulmonary embolism

4,256 population based controls

Women who gave birth without any of the studied conditions

Enrolled from all participating units





Peripartum hysterectomy

Case definition

Woman undergoing surgical removal of the uterus during pregnancy or within 42 days after the end of pregnancy

Incidence rate (N=384)

5.6 (5.1-6.2)

per 10,000 births (95%CI)

North: 4.8 (4.1-5.6) Centre: 5.0 (3.9-6.3) South: 7.3 (6.2-8.6)

2014-2016

6 Italian regions
(49% of national births)

10.9 (10.0-11.9)

per 10,000 births (95%CI)
Maraschini *et al.*, 2020



6.3 (5.5-7.2)

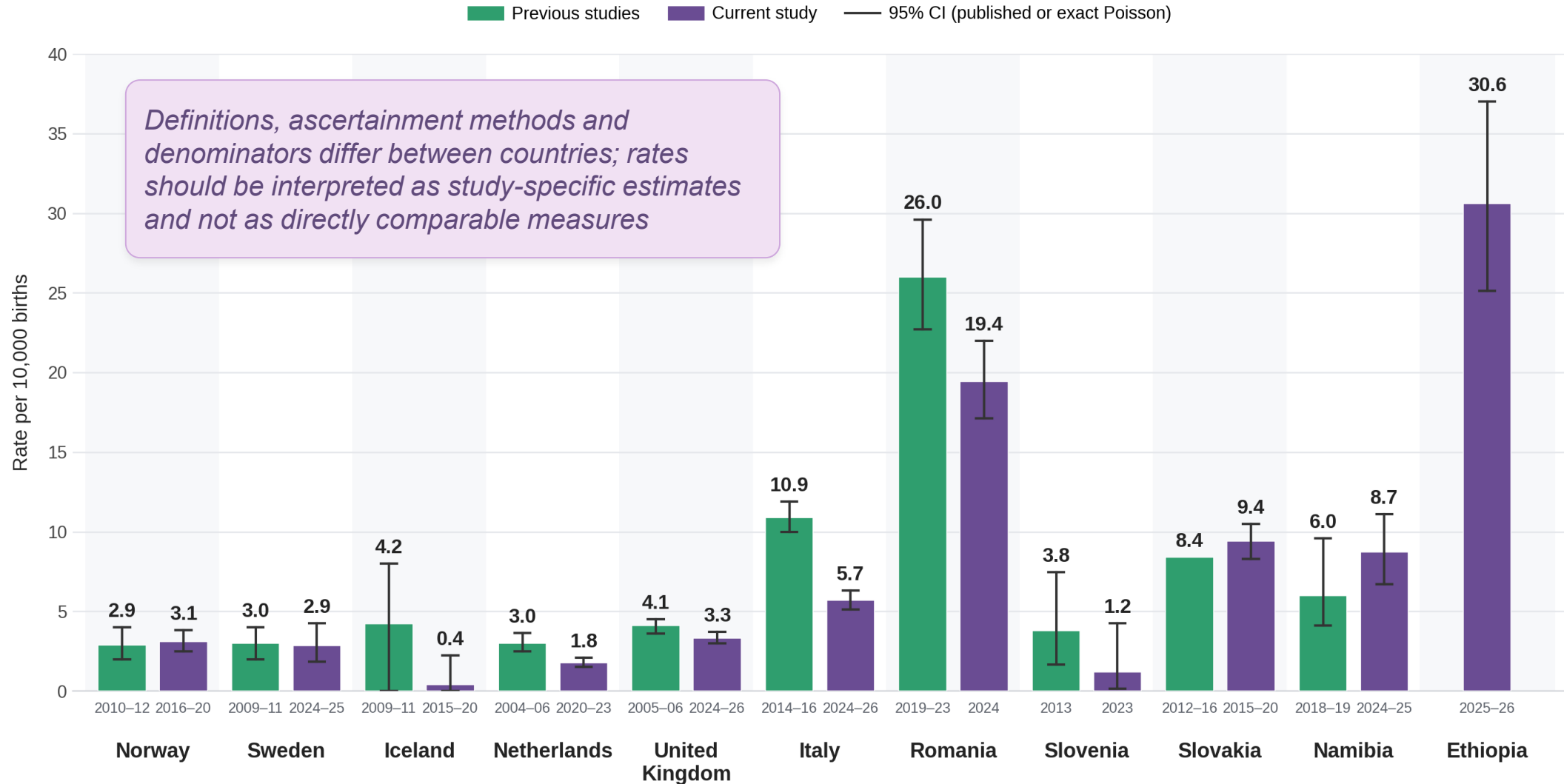
per 10,000 births (95%CI)





Peripartum hysterectomy among a selection of INOSS countries

Preliminary data





Socio-demographic characteristics

Risks for hysterectomy

	Cases (N=365)		Controls (N=730)		Crude odds ratio
	N	%	N	%	(95% confidence interval)
Maternal age, mean (standard deviation)	36.9 (5.7)		32.9 (5.4)		
Maternal age class					
< 35 years	119	32.6	435	59.6	Reference
≥ 35 years	246	67.4	295	40.4	3.05 (2.34-3.97)
< 40 years	248	67.9	655	89.7	Reference
≥ 40 years	117	32.1	75	10.3	4.12 (2.98-5.70)
Citizenship					
Italian	278	76.2	586	80.3	Reference
Foreign	87	23.8	140	19.2	1.31 (0.97-1.77)
Educational level					
High (university degree)	94	25.8	220	30.1	Reference
Low (up to upper-secondary school)	214	58.6	404	55.3	1.24 (0.92-1.66)
Not known	57	15.6	106	14.5	1.36 (0.91-2.04)





Reproductive and obstetric history

Risks for hysterectomy

	Cases (N=365)		Controls (N=730)		Crude odds ratio
	N	%	N	%	(95% confidence interval)
Parity					
Nulliparous	113	31.0	370	50.7	Reference
Multiparous	252	69.0	357	48.9	2.31 (1.77-3.01)
1 previous birth	106	29.0	247	33.8	1.41 (1.03-1.92)
≥ 2 previous births	146	40.0	110	15.1	4.35 (3.14-6.01)
Assisted Reproductive Technology	75	20.5	41	5.6	4.32 (2.88-6.48)
Multiple pregnancy	27	7.4	13	1.8	4.41 (2.25-8.65)
Previous caesarean section					
None	176	48.2	634	86.8	Reference
At least one	189	51.8	93	12.7	7.32 (5.43-9.87)
1 previous caesarean section	88	24.1	77	10.5	4.12 (2.91-5.83)
≥ 2 previous caesarean sections	101	27.7	16	2.2	22.7 (13.1-39.5)
Previous uterine surgery (caesarean section excluded)	101	27.7	73	10.0	3.42 (2.45-4.78)





The current pregnancy

Risks for hysterectomy

	Cases (N=365)		Controls (N=730)		Crude odds ratio
	N	%	N	%	(95% confidence interval)
Complications during pregnancy					
At least one complication	258	70.7	247	33.8	4.67 (3.55-6.13)
Gestational diabetes	63	17.3	76	10.4	1.79 (1.25-2.56)
Gestational hypertension	18	4.9	31	4.2	1.16 (0.64-2.11)
Pre-eclampsia	10	2.7	9	1.2	2.24 (0.90-5.56)
Placenta praevia	96	26.3	4	0.5	64.3 (23.4-176.6)
Fetal growth restriction	17	4.7	33	4.5	1.03 (0.56-1.87)
Fibroids	15	4.1	2	0.3	15.5 (3.53-68.3)
Preterm prelabour rupture of membranes	21	5.8	31	4.2	1.37 (0.78-2.48)
Anticoagulant or antiplatelet drug use in pregnancy	69	18.9	66	9.0	2.32 (1.61-3.34)
Gestational age at birth					
≥ 37 weeks	188	51.5	649	88.9	Reference
< 37 weeks	172	47.1	66	9.0	9.00 (6.49-12.5)





Mode of birth and findings at CS

Risks for hysterectomy

	Cases (N=365)		Controls (N=730)		Crude odds ratio
	N	%	N	%	(95% confidence interval)
Mode of birth					
Vaginal birth	55	15.1	512	70.1	Reference
Spontaneous	35	9.6	352	48.2	
Induced	11	3.0	135	18.5	
Operative (vacuum or forceps)	9	2.5	25	3.4	
Caesarean section	310	84.9	218	29.9	13.2 (9.54-18.4)
Emergency or urgent	127	34.8	97	13.3	
Planned	183	50.1	121	16.6	
Conditions noted at CS (cases N=310; controls N=218)					
At least one condition	261	84.2	21	9.6	49.7 (28.9-85.6)
Adhesions	44	14.2	2	0.9	17.8 (4.26-74.2)
Uterine atony	96	31.0	4	1.8	23.9 (8.63-66.1)
Placenta praevia major	66	21.3	2	0.9	29.1 (7.04-120.1)
Placenta accreta spectrum	124	40.0	1	0.5	144.0 (19.9-1040.5)
Placental abruption	15	4.8	5	2.3	2.16 (0.77-6.02)
Postpartum haemorrhage (≥ 1,000 ml)	215	58.9	8	1.1	130.2 (62.9-269.5)





Risk for hysterectomy

(⚠ planned hysterectomy excluded)

Variable	Adjusted odds ratio (95% CI)
Maternal age ≥ 35 years	2.13 (1.20–3.78)
Previous CS	
None	Reference
1	1.56 (0.97–2.50)
≥ 2	4.03 (2.00–8.10)
Assisted Reproductive Technology	4.30 (2.58–7.17)
Multiple pregnancy	1.25 (0.55–2.84)
Placenta praevia	9.84 (2.98–32.4)
Suspected placenta accreta	4.24 (0.49–36.6)
Fibroids in pregnancy	11.2 (2.31–54.7)
Gestational age at birth	
≥ 37 w	Reference
32–36 w	1.68 (0.98–2.86)
≤ 31 w	2.90 (1.13–7.45)
Caesarean section vs vaginal birth	4.29 (2.84–6.50)

Adjusted odds ratio from a multivariable logistic regression model including all variables shown in the table

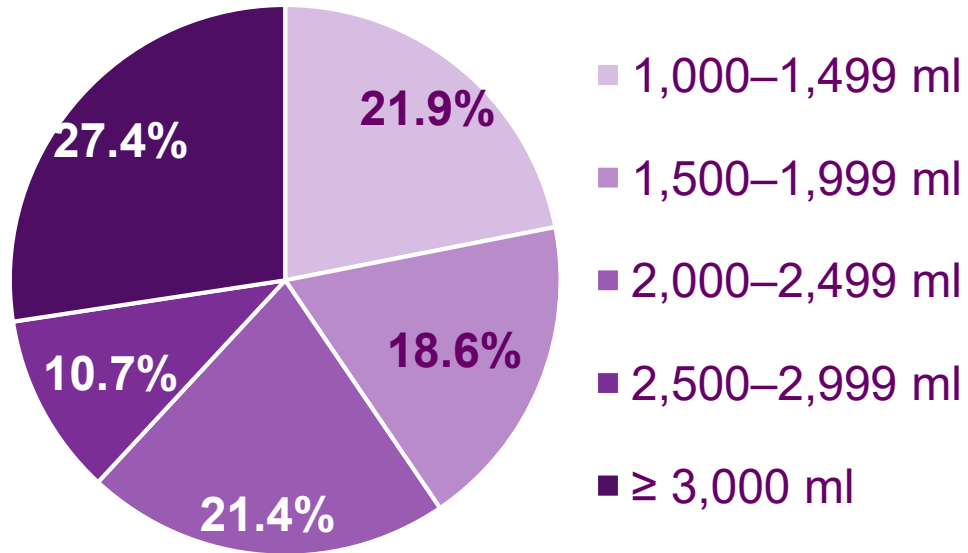




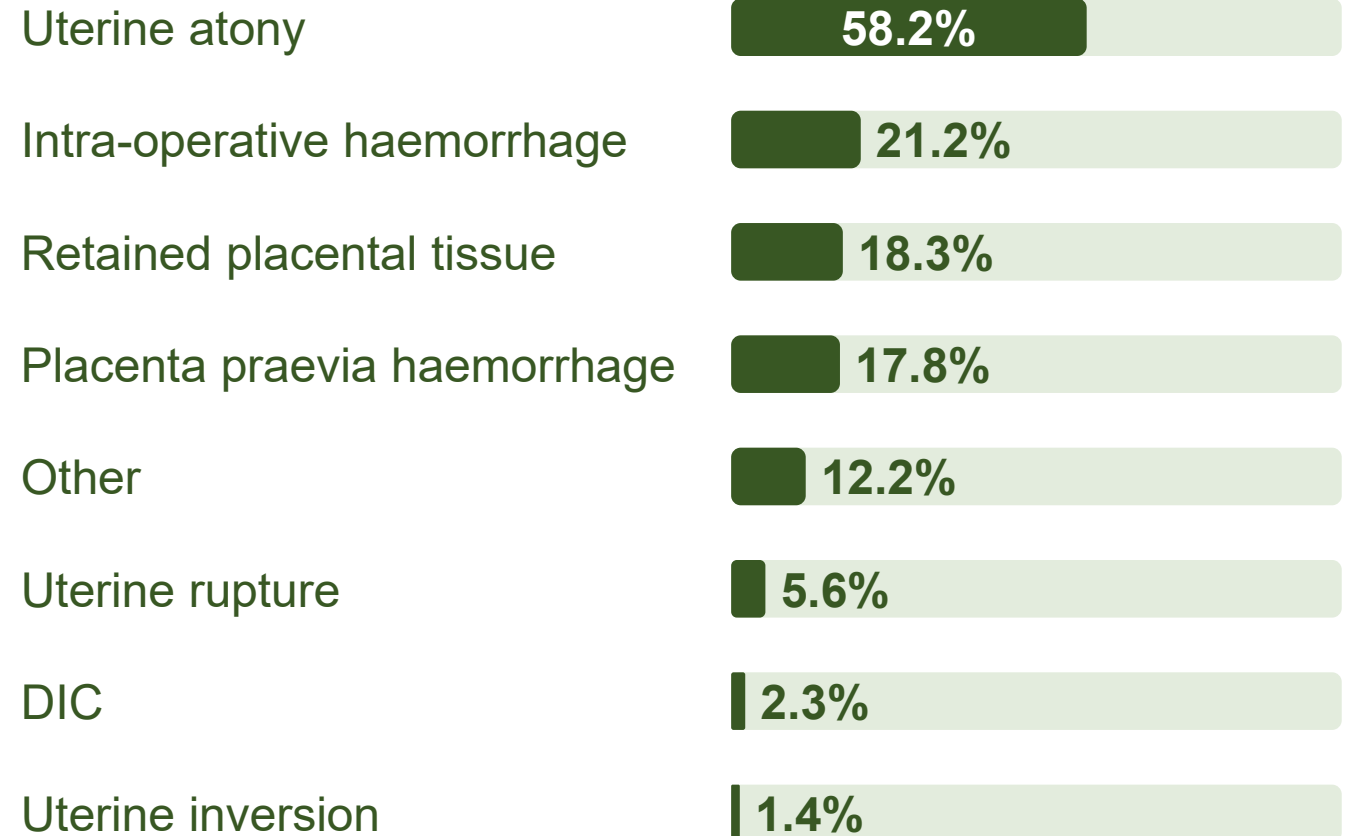
The haemorrhagic event before hysterectomy (cases only)

Blood loss $\geq 1,000$ ml (n=215;

58.9%)



Main cause of PPH





Management of the haemorrhagic event

93.4%

Medical treatment

69.0%

Surgical treatment

94.4%

At least one treatment

Oxytocics

87.8%

Tranexamic acid

82.2%

Uterine tamponade

42.7%

Local sutures

18.8%

Haemostatic uterine sutures

2.7%





The indication for hysterectomy

90.7%

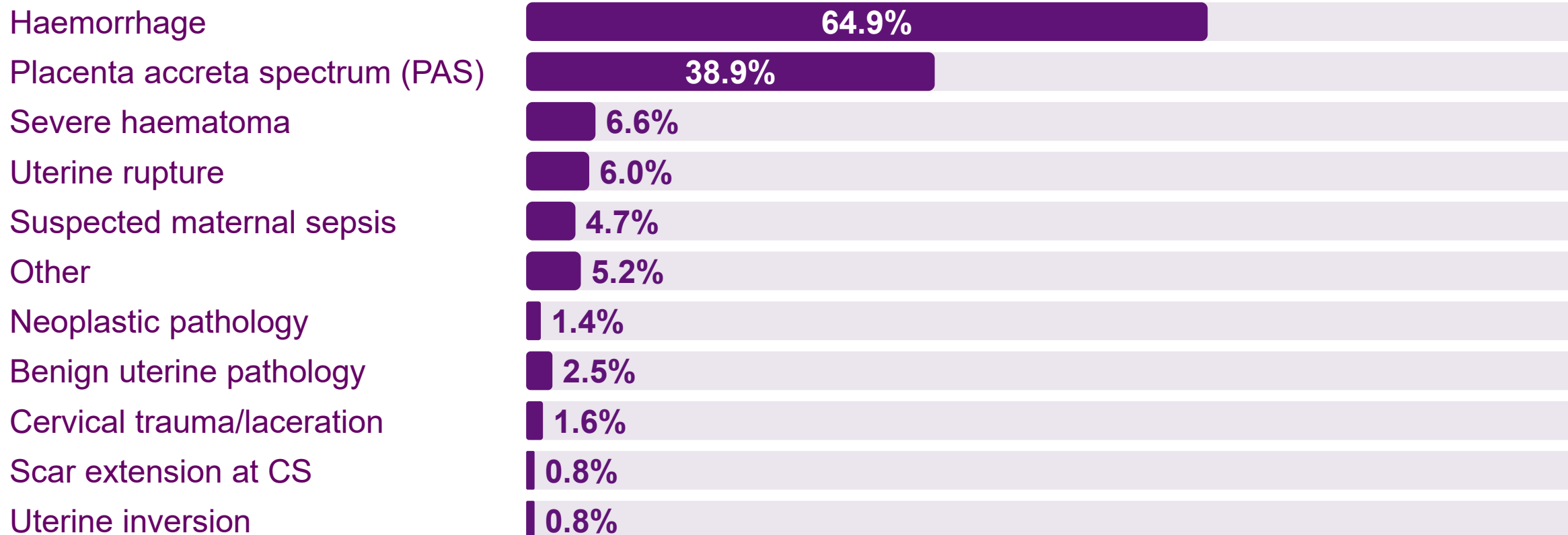
Haemorrhagic causes

4.9%

Septic causes

6.6%

Other causes





The hysterectomy

20.3%

Planned

78.1%

Emergency

4 MISSING

34.2%

Subtotal

65.5%

Total

1 MISSING

Organ injury during hysterectomy

8.5% bladder

1.1% ureter

0.5% bowel

1.4% other

Complications following hysterectomy (9.6%)

3.8% re-laparotomy

6.0% others (bladder/ureteric injury, fever, and anaemia/haemorrhage)

Transfusions

82.7% $\geq$ 1 unit blood/RBC **12.3%** platelets

45.1% $\geq$ 4 units blood/RBC **75.1%** IV fluids

50.1% plasma





Maternal and fetal-neonatal outcomes

Severe maternal morbidity

CASES

14.0% (51/365)

CONTROLS

0.4% (3/730)

Maternal ICU admission

CASES

55.3% (202/365)

CONTROLS

0.1% (1/730)

3 maternal deaths (0.8%)

No maternal deaths among controls

Intrauterine death

CASES

1.3% (5/393)

CONTROLS

0.4% (3/744)

NICU admission

CASES

30.8% (121/393)

CONTROLS

7.0% (52/744)

Neonatal morbidity

CASES

10.7% (42/393)

CONTROLS

2.8% (21/744)





Concluding remarks

- 1 The peripartum hysterectomy rate in Italy has **nearly halved over the past decade** (10.9 → 5.6/10,000), narrowing the gap with European countries with enhanced obstetric surveillance system
- 2 **Geographic heterogeneity**, with Southern regions with higher rates of hysterectomy
- 3 **Haemorrhage** remains the overwhelming driver (90.7% of indications), chiefly placenta accreta spectrum and uterine atony
- 4 Three maternal deaths were recorded (0.8%), confirming that peripartum hysterectomy remains a marker of extreme maternal morbidity
- 5 Findings support strengthening antenatal PAS-detection pathways and early multidisciplinary planning for women with major risk factors (previous caesarean sections, ART pregnancies, placenta praevia)

THANK YOU!

