PREOPERATIVE ANAEMIA SERVICE EVALUATION

Dr David Freeman, Consultant Anaesthetist,

Worcestershire Acute Hospitals NHS Trust

Dr Aled Morgan, Dr Pete Anderson, Dr Jana Chorvatova, Dr Laura Kocierz, Dr Sanjeev Kumar, Dr Neelesh Mohan, Dr Vinodhan Vyapury

AIMS

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- Determine the prevalence of anaemia in different patient surgical populations
- Determine the transfusion rate by operation group.
- Determine factors that are associated with an increased risk of allogenic blood transfusion.
- To produce recommendations to improve the perioperative pathway of patients at risk of anaemia and allogenic blood transfusion.

METHODS

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- Major elective surgery with a predicted blood loss of more than 500 mls.
- Operation groups
  - Obstetrics - Caesarean Section
  - Orthopaedics - Primary Hip, Primary Knee and Revision Hip & Knee arthroplasty
  - General Surgery - Laparoscopic & Open major colorectal bowel resection
  - Vascular - Open arterial vascular bypass & AAA repair
  - Urology – Nephrectomy, Cystectomy & Radical Prostatectomy

DEFINITION OF ANAEMIA

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Population	Normal Value g/l	Mild Anaemia g/l	Moderate Anaemia g/l	Severe Anaemia g/l
Adult Male	130 or higher	110 – 129	80 – 109	lower than 80
Adult Female (non-pregnant)	120 or higher	110 – 119	80 – 109	lower than 80
Adult Female (pregnant)	110 or higher	100 - 109	70 - 99	lower than 70

PREVALENCE OF PREOPERATIVE ANAEMIA

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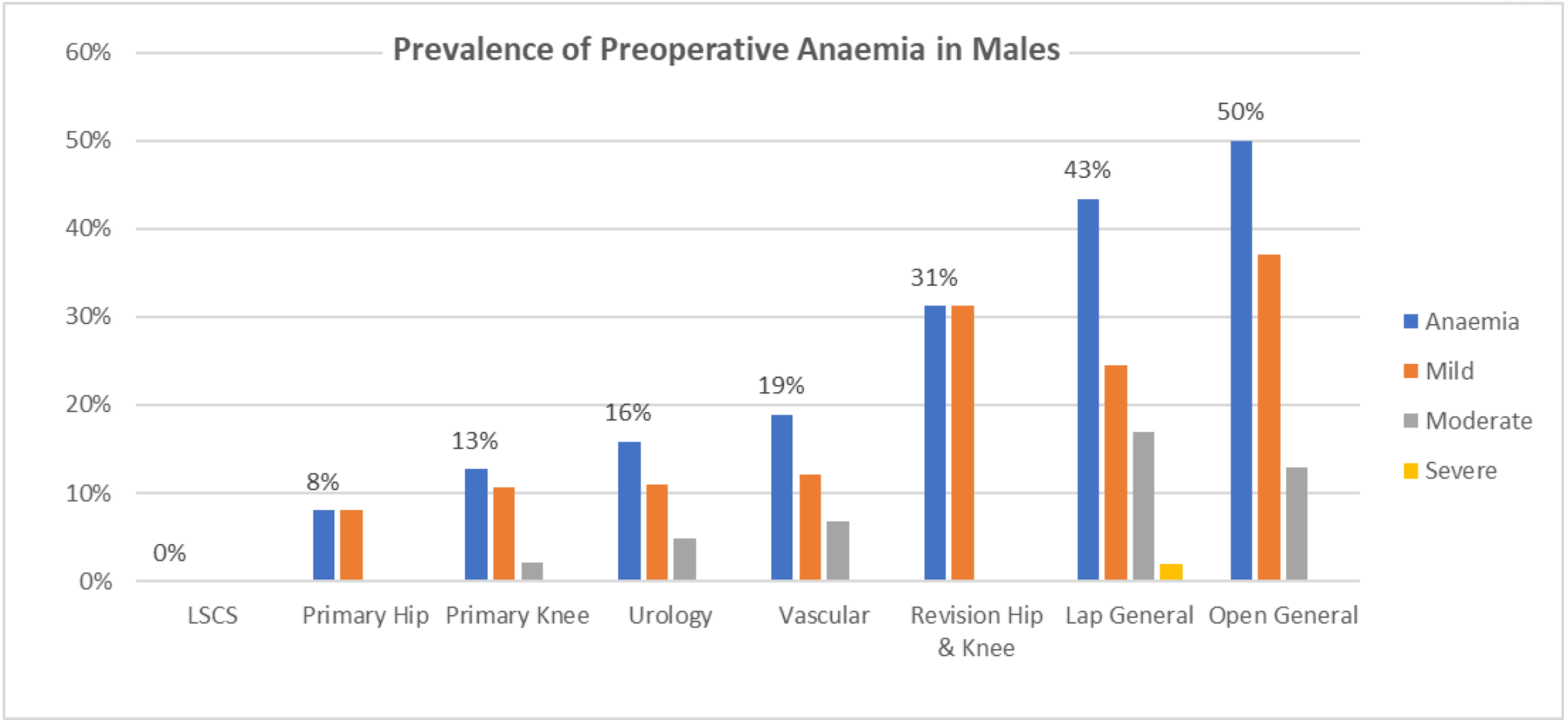

PREVALENCE OF PREOPERATIVE ANAEMIA

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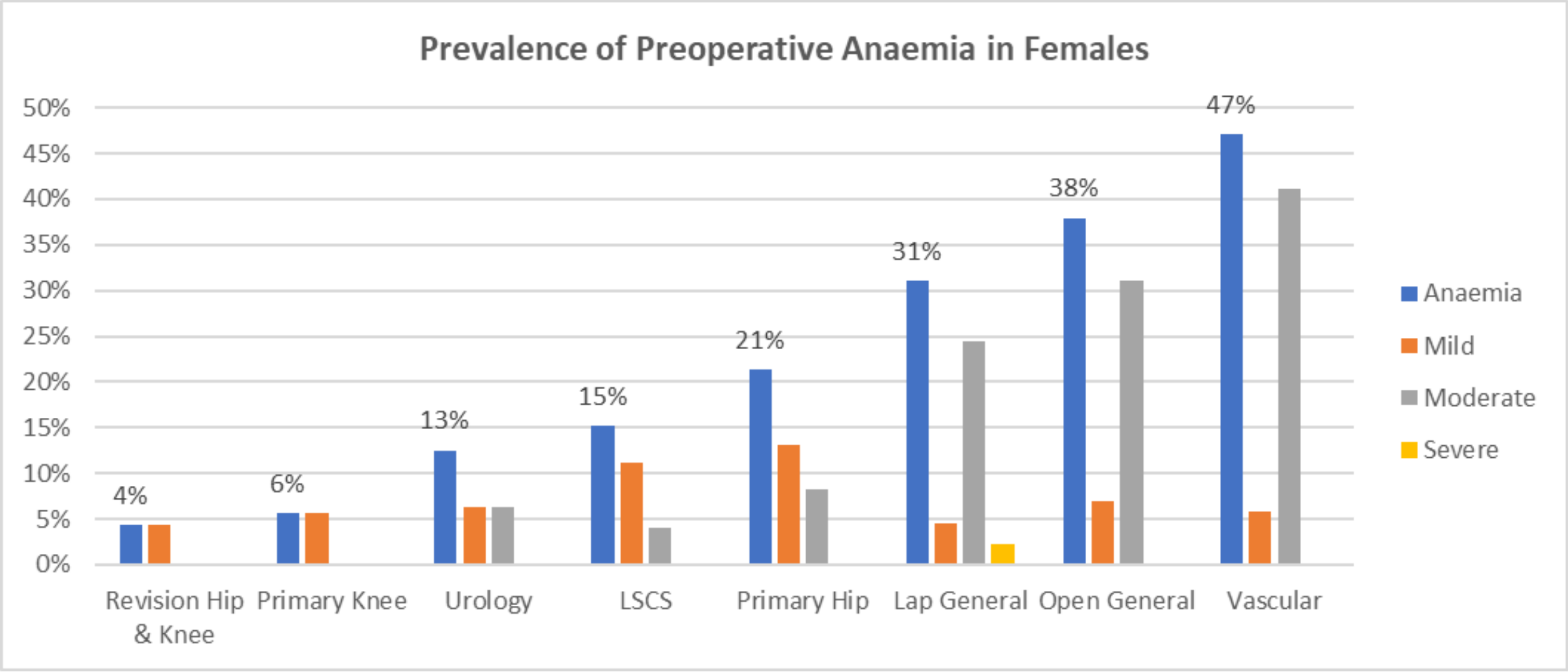

FEMALE ANAEMIA < 130 G/L

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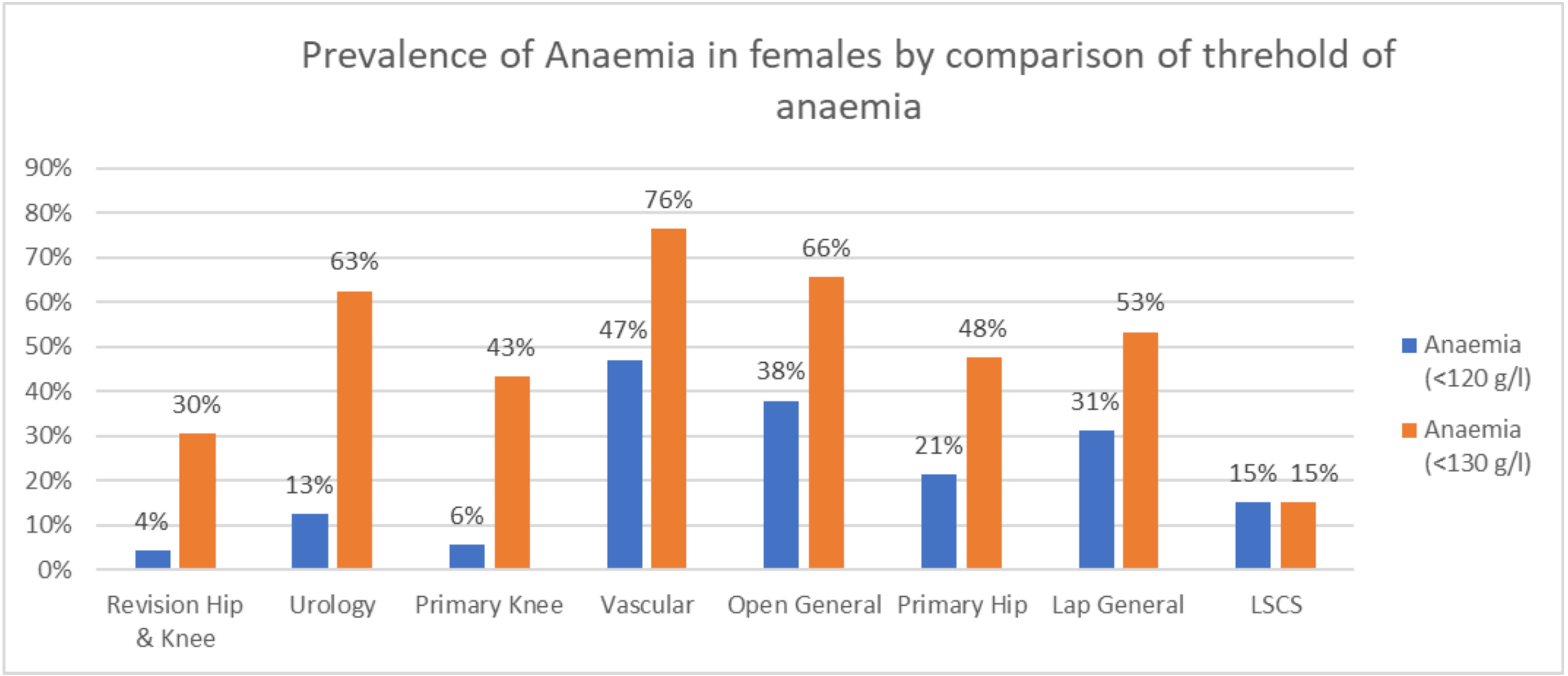

PREVALENCE OF PERIOPERATIVE BLOOD TRANSFUSION

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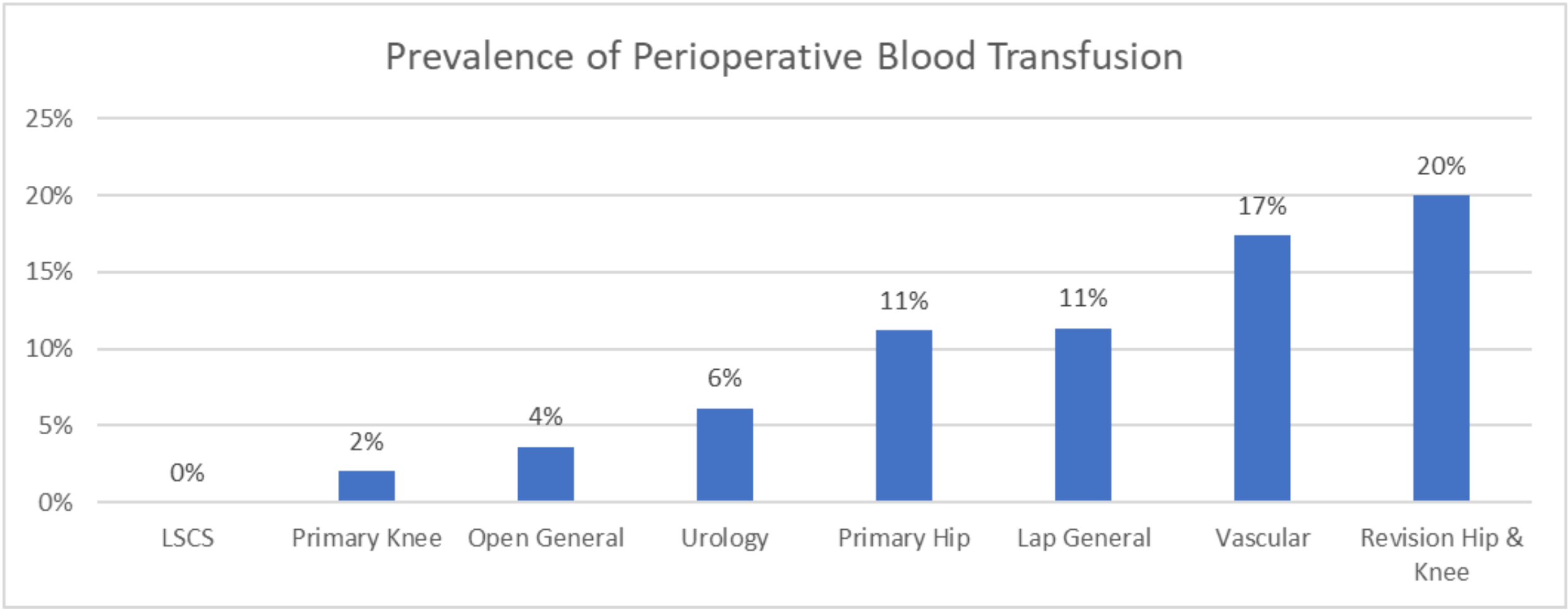

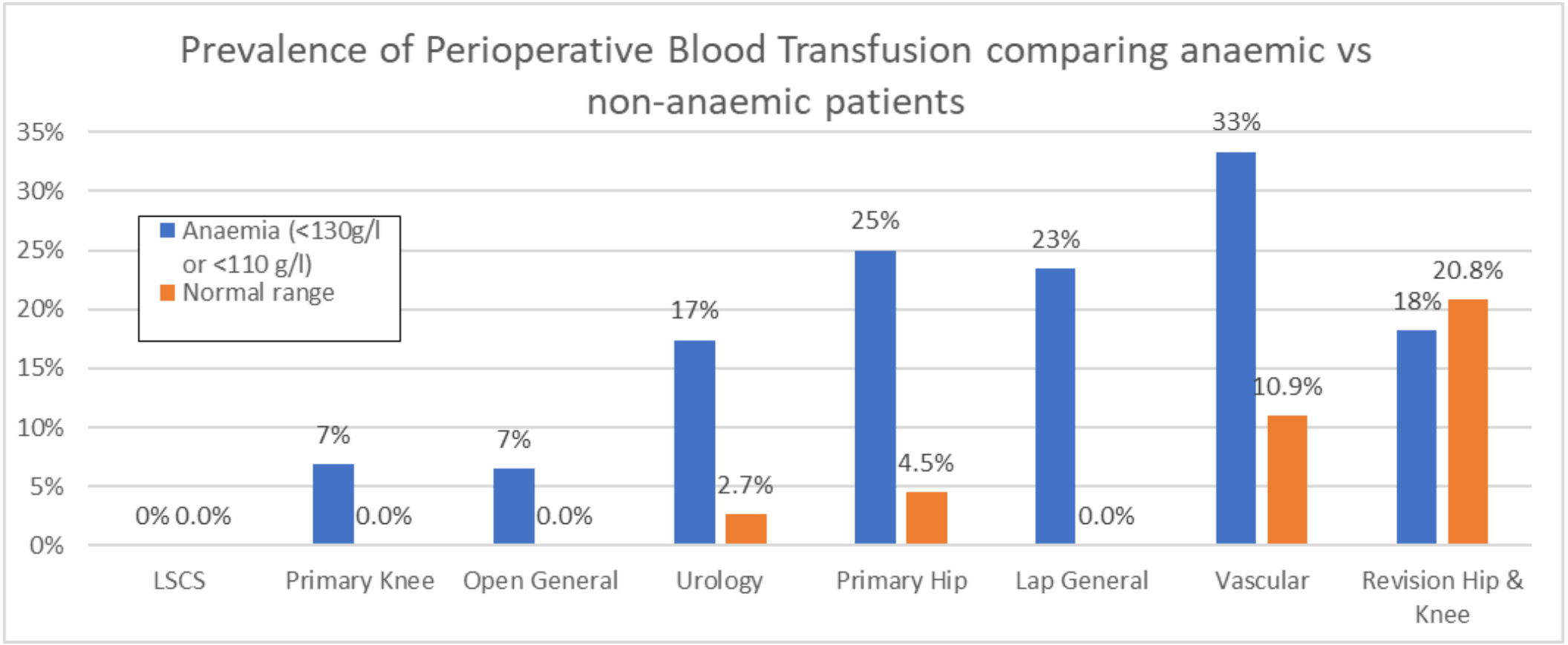

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	Odds Ratio	95% CI	p value	Relative Risk	95% CI	p value	NNT (harm)	NNT (harm) CI
Urology	7.7	1.31 to 45.2	0.024	6.5	1.3 to 33.3	0.0243	6.8	25.6 to 3.9(Harm)
Primary Hip	7.0	1.7 to 28.6	0.0067	5.5	1.6 to 19.4	0.0079	4.9	12.9 to 3.0 (Harm)
Lap General	31.8	1.8 to 557	0.0179	24.4	1.5 to 403	0.0255	4.4	9.1 to 2.9 (Harm)
Vascular	4.1	1.3 to 12.5	0.0141	3.0	1.3 to 7.3	0.013	4.5	16.9 to 2.5 (Harm)

PREOPERATIVE FERRITIN STUDIES

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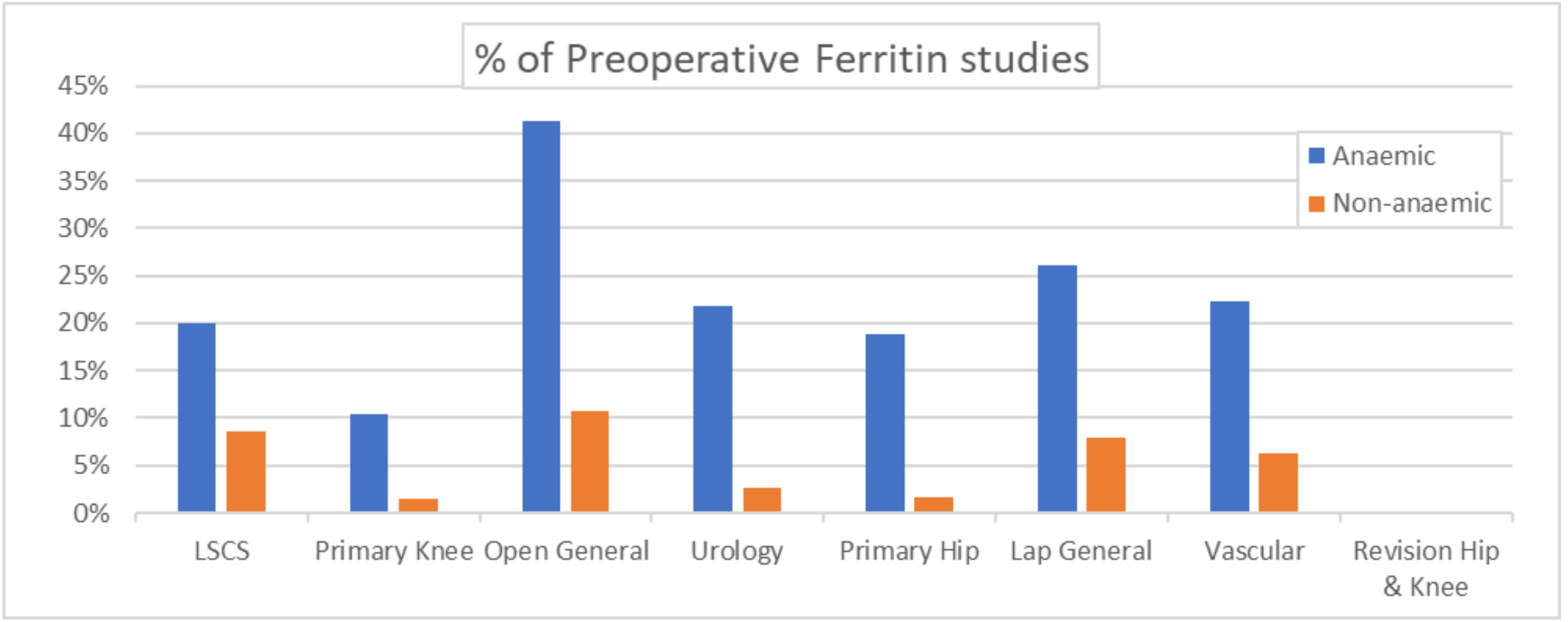

PREOPERATIVE IRON SUPPLEMENTATION

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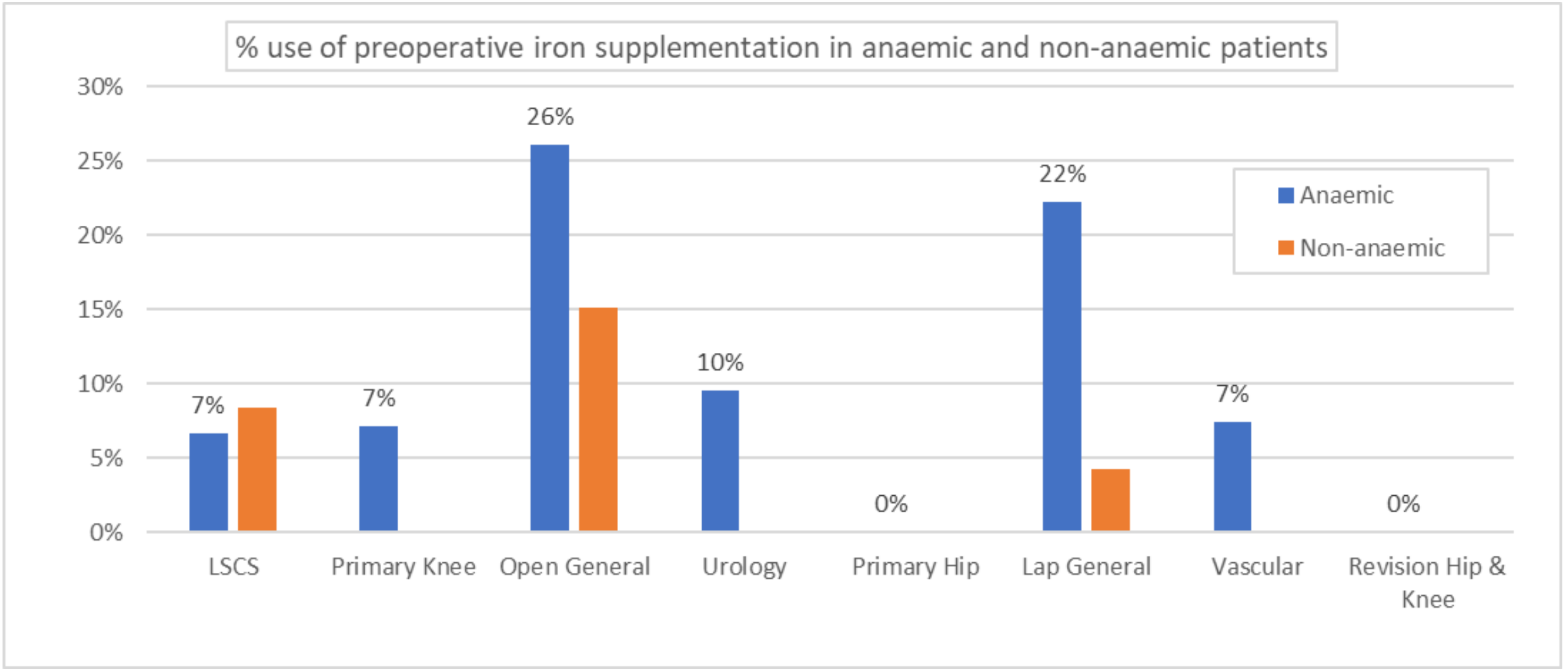

TRANEXAMIC ACID

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- Mainly used in Orthopaedics
- Some use in LSCS, Urology and Vascular
- Orthopaedic use a little lower than expected
  - Primary Knee (62%)
  - Primary Hip (68%)
  - Revision Hip & Knee (69%)
- Evidence that not using TXA is associated with harm (perioperative blood transfusion)
  - Primary Hip OR 13.3, NNT (harm) = 3.8 (p value <0.05)

INTRAOPERATIVE CELL SALVAGE

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- Mainly used in Vascular (36%), some use in Urology (17%)
- Also used in LSCS (3 cases)

- Not used in orthopaedic surgery

- 3 cell salvage machines
  - Obstetrics at WRH
  - Main theatres WRH
  - Main theatres ALX

PRE-DISCHARGE ANAEMIA

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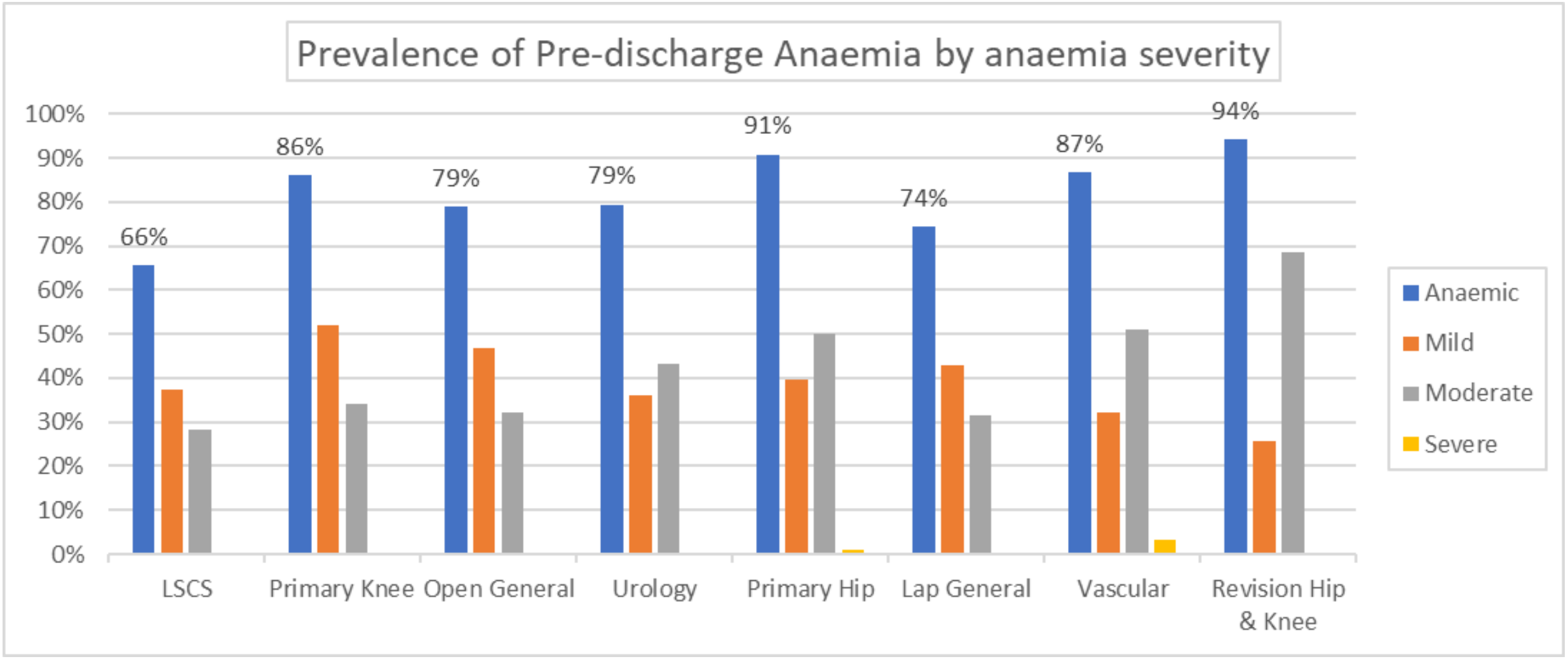

PRE-DISCHARGE HAEMOGLOBIN (AVERAGE)

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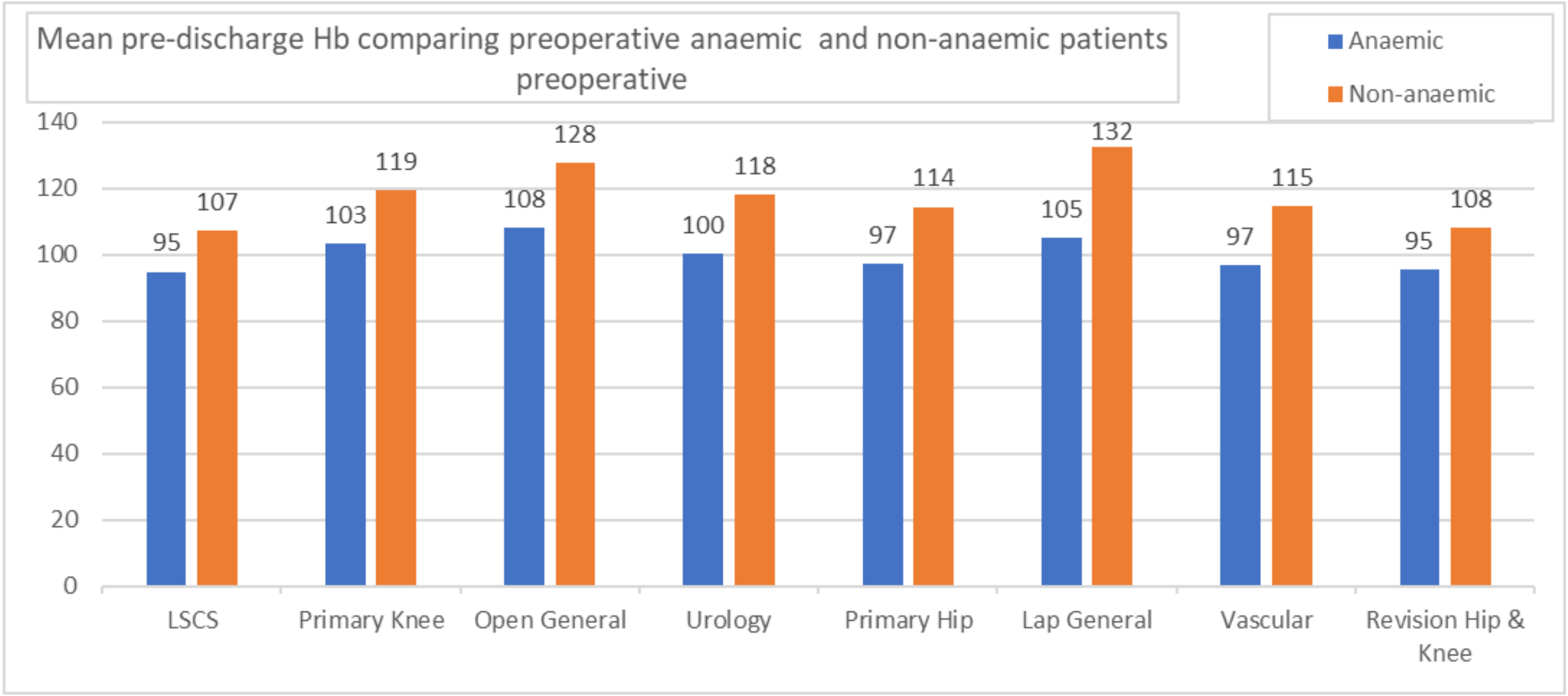
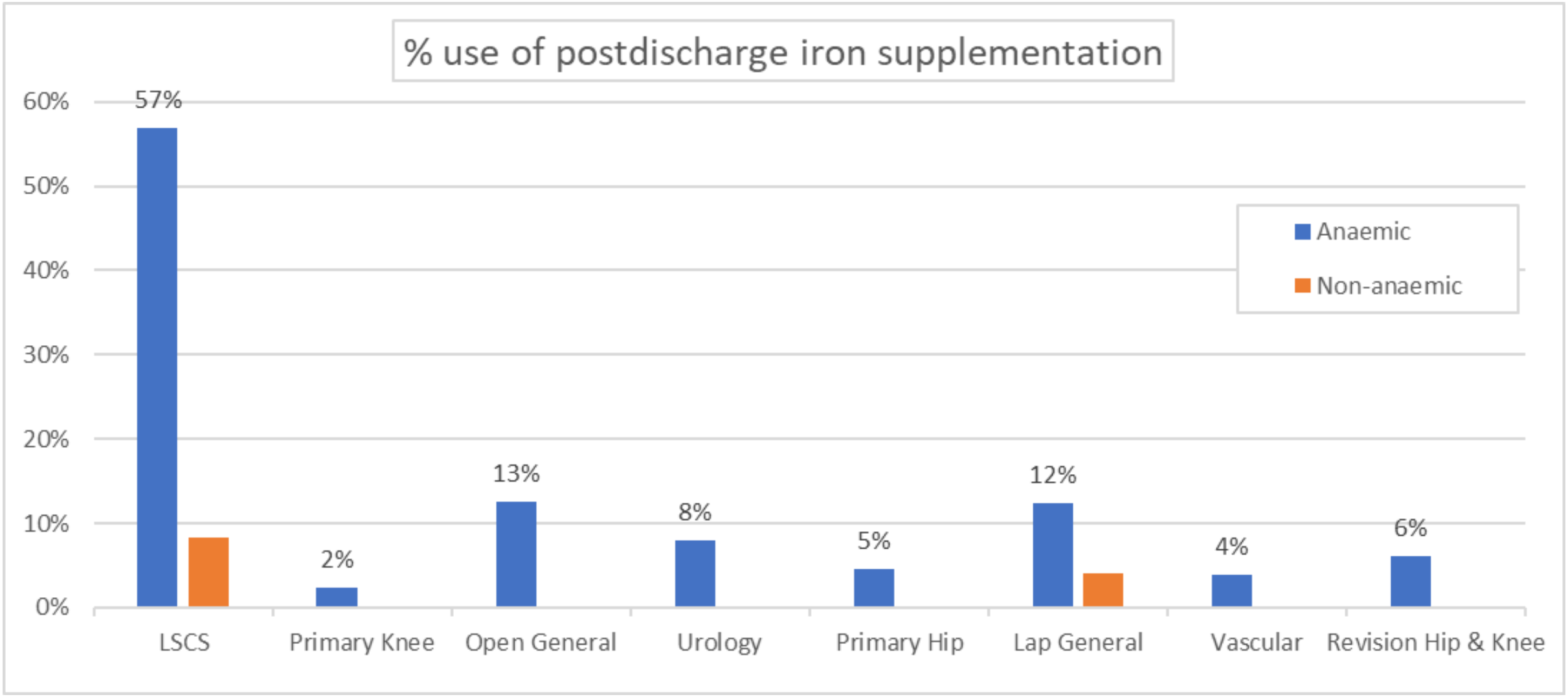


PRE-DISCHARGE IRON SUPPLEMENTATION

Worcestershire Acute Hospitals NHS Trust



ADDITIONAL INFORMATION

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- Timing of the diagnosis of preoperative anaemia too late in their pathway and often less than 7 days before planned operation.
- Laboratory reference range for haemoglobin
  - Males 135 to 180 g/l
  - Female 115 to 164 g/l
- Ferritin reference range documented as 13 to 200 mcg/l
- Wide variation in post-discharge oral iron dosing

CONCLUSIONS

Worcestershire Acute Hospitals NHS Trust

1 Preoperative Anaemia is common

Overall 25.1% for males & 30.9% females
(increasing to 62.1% using 130 g/l)

Preassessment too close to operation

Preoperative assessment of haemoglobin status often done too close to planned operation date

8% Blood Transfusion

0% LSCS,
2 % Primary Knee, 4% Open General,
6% Urology,
11% Primary Hip, 11% Lap General
17% Vascular & 20% Revision hip & knee

Risk of blood transfusion associated with preoperative anaemia

Relative risk varied from 3.0 (vascular) to 24.4 (laparoscopic general)

CONCLUSIONS

Worcestershire Acute Hospitals NHS Trust

Preoperative iron supplementation

Considering high prevalence of preoperative anaemia, preoperative iron supplementation was low

Tranexamic acid use

Tranexamic acid used in orthopaedic operations predominately, with a lower than expected % use.

In primary hip arthroplasty tranexamic acid non-use shown to be associated with increase risk of perioperative blood transfusion.

Intraoperative Cell salvage

Used in LSCS, Urology and Vascular and not in Primary Hip or Revision Hip & Knee arthroplasty despite associated with high blood loss surgery.

Postoperative iron supplementation

Overall a high pre-discharge anaemia rate (86%) with a significant proportion of patients with moderate pre-discharge anaemia (45.3%).

Despite this, a low rate of iron supplementation post discharge (12.3% of anaemic patients). Except the LSCS operation group.

PLAN OF ACTION

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1) Set the threshold Hb for diagnosis of anaemia as < 130 g/l in males & females & < 110 g/l in pregnant females.
2) Set the diagnosis of iron deficiency anaemia to Ferritin < 30 mcg/l or 30 – 100 mcg/l with a Transferrin saturation of <20%.
3) Quality improvement project to assess, diagnose and treat patients with anaemia at the earliest opportunity.
4) Quality improvement project to increase the use of iron supplementation;
   - Early dosing of oral iron of a fixed regime, trial to see effect, IV iron if required.

PLAN OF ACTION

Worcestershire Acute Hospitals NHS Trust

5) Quality improvement project to increase use of intraoperative Tranexamic acid in Orthopaedics, LSCS and Urology.

6) Quality improvement project to increase use of intraoperative Cell Salvage in Orthopaedics and Urology.

7) Quality improvement project to increase use of routine diagnosis of pre-discharge anaemia and standardised dosing of oral iron supplementation.

SUMMARY

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- Extensive service evaluation of preoperative anaemia in major surgery
- Pre-operative anaemia is common and associated with perioperative blood transfusion.
- Aspects of perioperative care with room for improvement
- Opportunities for quality improvement projects.