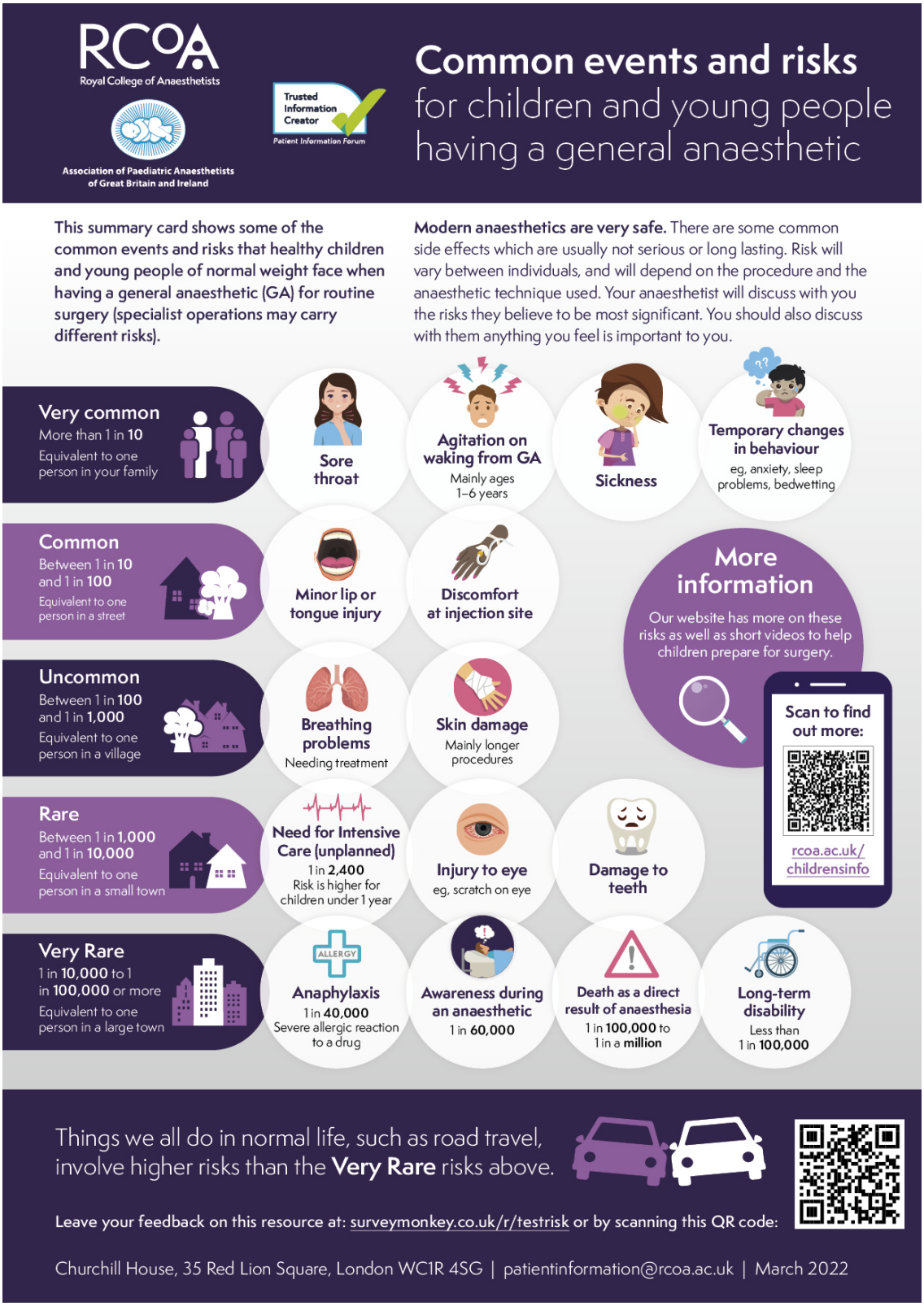

Welcome to the October 2022 paediatric edition of the CPOC newsletter in collaboration with The Association of Paediatric Anaesthetists of GB& Ireland (APAGBI).

We always welcome your thoughts on what you would like to see in our Newsletter. Contact us at cpoc@rcoa.ac.uk.




Providing accurate and accessible information about risk is an increasingly important part of our role as health professionals. To help anaesthetists with this, the Patient Information Group at the Royal College of Anaesthetists has produced an infographic for young people and parents.

This infographic was developed by anaesthetists from both district general hospitals and specialist centres, with input from parents and young people themselves. It has also been endorsed by the Association of Paediatric Anaesthetists.

More detailed written information is also available on the RCoA website along with videos and various age-appropriate story books and comic-style information leaflets.

More Information


# Surgery in Children Operational Delivery Networks (SiC ODNs)

Accelerated centralisation of children's surgery and reduced activity has required SiC ODNs to focus on maximising capacity and re-establishing children's surgery in network hospitals where elective paediatric activity had halted during C-19. Enhancing quality and efficiency by ensuring appropriate, consistent optimisation prior to anaesthesia is recognised as vital by SiC ODNs nationally, aligning perfectly with Children's Perioperative Care and GIRFT principles;

- ➞detection and optimisation of co-morbidities,
- ➞admission preparation including anxiety management and "waiting well"
- ➞ensuring appropriate infrastructure availability
- ➞sustainability
- ➞tackling health inequalities.

SiC ODNs, recognising the key role of Pre-Anaesthetic management, are considering the best way to deliver it; anaesthetic lead appointments complimenting surgical chairs, nurse training, screening and triage of patients to appropriate style and timing of Pre-assessment, information sharing, digital solutions making best use of human resource, theatre time and appointments are all high on the national agenda.

***Dr Maggie Babb, Consultant Paediatric Anaesthetist at Staffordshire Children's Hospital at Royal***

***Stoke, University Hospital of North Midlands, and Anaesthetic Lead for the West Midlands Surgery in Children ODN***

# RECOMMENDATIONS FOR STAFF INVOLVED WITH CHILDREN WITH ANAEMIA UNDERGOING SURGERY

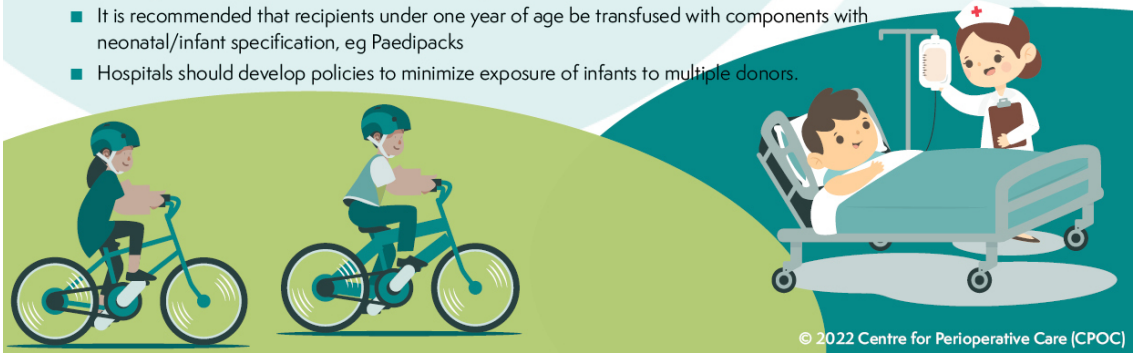
Guidelines specific to the perioperative management of paediatric patients undergoing surgery at risk of bleeding and transfusion are available, as are specific paediatric blood management strategies.[3,67,68,70]

Specific perioperative recommendations:

- Preoperative Hb should be optimised by treating iron deficiency anaemia (see Figure 13)
- Tranexamic acid should be considered in all children undergoing surgery where there is risk of significant bleeding (see detailed paediatric section for dosing)
- Red cell salvage should be considered in all children at risk of significant bleeding undergoing surgery, children undergoing cardiac surgery with cardiopulmonary bypass (CPB) and where transfusion may be required
- A postoperative Hb transfusion threshold of 70g/L should be used in stable patients without major comorbidity or bleeding
- For surgery in neonates, use the same transfusion triggers used for non-surgical neonates, but adjust according to level of respiratory support and post-natal age (see Figure 12)
- Transfusion volumes for non-bleeding infants and children should be calculated to take the post-transfusion Hb to no more than 20g/L above the transfusion threshold. The following calculation may be used:

$$\textit{Volume to transfuse}\ (\text{ml}) = \frac{\text{Desired Hb (g/l)} - \text{Actual Hb (g/l)} \times \text{Weight (kg)} \times \text{Factor}}{10}$$

  It is reasonable to use a factor of 4 to avoid over-transfusion, but this should be assessed on an individual patient basis. 4ml/kg approximates to a one unit transfusion for a 70–80kg adult, typically giving an Hb increment of 10g/L[69]
- When using a restrictive red blood cell transfusion threshold, consider a threshold of 70g/L and a haemoglobin concentration target of 70–90g/L after transfusion
- There is insufficient evidence to make a recommendation regarding an appropriate transfusion threshold during cardiopulmonary bypass (CPB) for non-cyanotic or cyanotic patients
- For stable children with non-cyanotic heart disease, a restrictive transfusion threshold of 70g/L following CPB is recommended. There is insufficient evidence to make a recommendation for children with cyanotic heart disease
- In neonates (both cyanotic and non-cyanotic) or actively bleeding or unstable children following CPB, a higher Hb threshold may be appropriate, and signs of inadequate oxygen delivery can provide additional information to support transfusion
- Patients should be reassessed clinically and Hb checked after each unit of red blood cell they receive unless they are bleeding
- Where Hb monitoring is feasible and available, via point of care sampling or non-invasively, this should be used to ensure the smallest necessary volume is transfused over three to four hours, although more rapid rates should be used in hypovolaemia
- It is recommended that recipients under one year of age be transfused with components with neonatal/infant specification, eg Paedipacks
- Hospitals should develop policies to minimize exposure of infants to multiple donors.





**Full Anaemia Guideline**

# Guideline for the Management of Anaemia in the Perioperative Pathway

## Anaemia in children undergoing surgery

While most surgery for children and young people does not involve transfusion, some children undergo elective surgery with over a 10% risk of transfusion. Examples include in orthopaedics: femoral/pelvic osteotomies and scoliosis surgery; in urology: nephrectomies, and bladder reconstructions; in general surgery: anorectal reconstruction and bowel resections: and in neurosurgery: craniotomies and craniosynostosis procedures.

The number of medically complex children booked for these types of surgery is also increasing; comorbidities such as prematurity, maternal iron deficiency, rapid growth periods, cerebral palsy, inflammatory bowel disease, renal conditions and childhood cancers increase the incidence of preoperative anaemia. In conjunction with a relatively small circulating blood volume this increases the risk of requiring transfusion.

Anaemia may also be found incidentally in children undergoing emergency surgery, for example appendectomy and trauma. The principles outlined in Recommendations for staff admitting emergency patients for surgery should be used for children and young people.

There is growing evidence of adverse perioperative outcomes in neonatal and paediatric patients undergoing surgical procedures with preoperative anaemia. Work shows high rates of anaemia (24–32%), higher odds of requiring a blood transfusion and increased mortality in anaemic children.[125,126]

Iron deficiency is the leading cause of anaemia in all paediatric age groups (except in very preterm infants in the first weeks of life).[67] The causes of neonatal anaemia are preterm delivery before establishment of normal red cell and iron stores in the last trimester, expansion of blood volume with growth, bone marrow depression, and increased red cell destruction, eg infection or haemolytic disease.

Blood transfusion carries additional risks, the highest being Transfusion Associated Circulation Overload (TACO) which is an iatrogenic complication occurring in up to 1 in 100 transfusions. Neonates and infants are at risk of hyperkalaemia following blood transfusion. To reduce this risk 'fresh blood' is recommended in this group, see Figure 12. The recommendations section includes consideration of tranexamic acid. A dosing regimen of 10 to 30 mg/kg (maximum 1g) loading dose of tranexamic acid followed by 2 to 10 mg/kg/hour maintenance infusion rate for paediatric trauma and surgery has been recommended.[127,128] Future research should focus on determining the ideal tranexamic acid plasma therapeutic concentration for maximum efficacy and minimal side-effects.[127] Figure 13 summarises preoperative options for children with anaemia. Iron dosing regimens are available in the children's BNF. Common preparations are Sodium feredetate (Sytron) or Ferrous Fumarate (Galfer syrup). The therapeutic oral dose of elemental iron to treat deficiency is 3–6mg/kg (max 200mg) daily. The current recommendation is that it is given in two to three divided doses, although Hepcidin may down-regulate absorption in children as it does in adults.

The Australian Blood Authority PBM guideline contains practical evidence-based advice and additional PBM strategies such as prevention of hypothermia and use of 'as-needed' rather than routine blood sampling.[129] There are studies suggesting that a high percentage of paediatric transfusion recipients receive only one transfusion during their admission, some of which may have been avoidable.[81,130]

As preventative medicine is becoming routine in preoperative care, it is worthwhile noting the potential association between iron deficiency in childhood and long-term adverse neurodevelopmental outcomes.[131]

**Figure 12** Suggested transfusion thresholds for preterm neonates[68]

| | Suggested transfusion threshold Hb (g/L) | | |
|---|---|---|---|
| **Postnatal age** | **Ventilated** | **On oxygen or Non-invasive Positive Pressure Ventilation (NIPVV)** | **Off oxygen** |
| First 24 hours | <120 | <120 | <100 |
| ≤ week 1 (day 1–7) | <120 | <100 | <100 |
| ≤ week 2 (day 8–14) | <100 | <95 | <75 or <85* |
| > Week 3 (day 15 onwards) | <100 | <85 | <75 or <85* |

Preterm is defined as <37 weeks gestational age at birth. This table also applies to very preterm neonates (<32 weeks).

*Depending on clinical situation.

Adapted from British Committee for Standards in Haematology (2016) Guidelines on transfusion for fetuses, neonates and older children[68]

**Figure 13** Management of children with anaemia preoperatively[129]

| Ferritin <20 mcg/L | Ferritin 20–50 mcg/L | Ferritin >50 mcg/L |
|---|---|---|
| **Iron deficiency anaemia** | **Possible iron deficiency anaemia** | **Unlikely iron deficiency anaemia** |
| Review clinical history and identify cause.<br>Start treatment:<br>■ oral iron 3–6mg/kg/day of elemental iron<br>**Address causes** of dietary iron deficiency:<br>■ increase dietary iron<br>■ if <1 year of age, cease cow's milk and use an infant formula<br>■ if 1 to 2 years of age, reduce cow's milk to <500mL daily<br>Assess haematological response within two to four weeks.<br>Continue treatment for three months after Hb recovery.<br>If oral iron is ineffective or is not tolerated, **consider other causes of anaemia** and use of IV. iron. | Review and **address any causes** of iron deficiency:<br>■ increase dietary iron<br>■ if <1 year of age, cease cow's milk and use an infant formula<br>■ if 1 to 2 years of age, reduce cow's milk to <500mL daily<br>Correlate with MCV/MCH and CRP.<br>Consider therapeutic trial of iron:<br>■ oral iron 3mg/kg/day of elemental iron<br>■ Assess haematological response within two to four weeks.<br>If anaemia persists, **consider other causes:**<br>■ Thalassaemia and other haemoglobinpathies<br>■ anaemia of chronic disease<br>■ haemolytic anaemia<br>■ B12 deficiency<br>■ folate deficiency<br>■ other | Correlate with MCH/MCV and CRP Ferritin may be elevated in the setting of inflammation. However, iron deficiency may still be present, particularly where TSAT <20%.<br>**Consider other causes** of anaemia:<br>■ Thalassaemia and other haemoglobinpathies<br>■ anaemia of chronic disease<br>■ haemolytic anaemia<br>■ B12 deficiency<br>■ folate deficiency<br>■ other |

*This algorithm applies to all patients, including those undergoing procedures in which substantial blood loss is anticipated.*

*The reference ranges are based on criteria from the Royal College of Pathologists of Australasia, and they may require local adaptation.*

*Note Monofer® is unlicensed in <18yrs and Ferinject® <14 years.*



## More Information


APAGBI

Preassessment services for adults are well-established and valued within the adult surgical pathway, preparing and optimising patients for elective procedures. The benefits for children and young people have not been similarly recognised and hence this has not translated to a similar and equitable development of paediatric preassessment services. This has resulted in significant variation in the standards and availability of paediatric preassessment services for children around the UK.

Children have significantly different emotional needs, physical needs and comorbidities requiring skilled assessment and preparation for their procedure. An expert panel of clinicians with experience in delivering paediatric preassessment services have written, for the first time, a best practice document to give clear guidance on establishing and delivering this service. It is hoped this will significantly improve the availability and quality of this important service for children and parents.
Read the full APAGBI guidance.

***Dr Simon Courtman, President Elect APAGBI***


Centre for Perioperative Care
Association of Anaesthetists
Welcome
Dr Matthew Davies
President
Association of Anaesthetists
Board Representative

The Welsh Perioperative Medicine Society presents the opportunity for multidisciplinary networking and sharing of ideas.

TICKETS

wpoms2022.eventbrite.co.uk

PRICE
Consultants
£100
Trainees/SAS/Nurses
£50
For payment details refer to the Eventbrite page.

PARKING

FREE Onsite Parking

VENUE

Cardiff Village Hotel
29 Pendwyallt Rd, Cardiff,
CF14 7EF

Please book early to secure a place and avoid disappointment.
5 CPD points applied for.

# W-POMS

## WELSH PERIOPERATIVE CONFERENCE

The Welsh Perioperative Medicine Conference

**THURSDAY 24TH NOVEMBER 2022**

The Village Hotel, Cardiff
Pendwyallt Rd. Cardiff, CF14 7EF

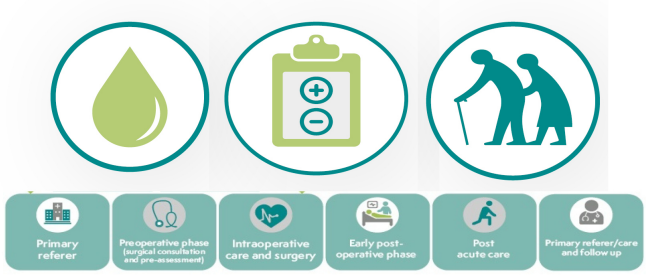
**PROGRAMME**

| | |
|---|---|
| 08:50 - 09:00 | Welcome and Introduction |
| 09:00 - 09:45 | Recent Updates in Perioperative Medicine<br>*Dr Anthony Funnell, POW Hospital, Bridgend* |
| 09:45 -10:30 | The Role of Prehabilitation in Perioperative Medicine<br>*Dr John Whittle, University College London Hospital and Mr Motivator* |
| 10:30 - 10:45 | Anaemia Update: New CPOC Guidelines and the All Wales Pathway<br>*Dr Caroline Evans, UHW, Cardiff* |
| ***10:45 - 11.00*** | ***Coffee*** |
| 11:00 - 12:00 | Setting Up a Prehabilitation Service in South Wales<br>*Dr Rhidian Jones, Bridgend Hospital* |
| 12:00 - 12:15 | Updates in Perioperative Education and the 2021 RCOA Curriculum<br>*Welsh School of Anaesthesia* |
| 12:15 - 13:00 | Trainee Oral Presentations |
| ***13:00 - 13.30*** | ***Lunch*** |
| 13:30 - 14:30 | What is POPS?<br>*Dr Jugdeep Dhesi and Dr Jude Partridge, Guys & St Thomas'* |
| 14:30 - 14:45 | The DREAMS Vision<br>*Dr Matt Oliver, University College London Hospital* |
| 14:45 - 15:00 | Any DREAM Will Do<br>*Critical Care Outreach Team for Morriston Hospital* |
| 15:00 - 15:30 | Introducing an All Wales 'Enhanced Postoperative Care Training Programme'<br>*Ms Carolina Britton, University College London Hospital* |
| ***15:30 - 15:45*** | ***Coffee*** |
| ***15:45 - 16.45*** | ***Workshops*** |
| ***16:45 - 17:00*** | ***Trainee Presentations and Closing*** |

**Full Programme and Information**

# Centre for Perioperative Care Guidelines

WWW.CPOC.ORG.UK




Frailty Guideline

Day Surgery

Diabetes Guideline

Timing of Surgery

Anaemia Guideline

Enhanced Care

CPOC is a partnership between:

Royal College of Anaesthetists | Royal College of Surgeons of England | Royal College of Physicians | Royal College of Nursing | AfPP The Association for Perioperative Practice

Royal College of General Practitioners | RCPCH Royal College of Paediatrics and Child Health | Association of Anaesthetists | Faculty of Public Health | CODP College of Operating Department Practitioners

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