Clinical Guideline

# RED FLAG SYSTEM TO DETERMINE RISK FOR CHILDREN WITH CONGENITAL HEART DISEASE UNDERGOING ANY PROCEDURE UNDER GENERAL ANAESTHESIA

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| **SETTING** | Bristol Royal Hospital for Children |
| **FOR STAFF** | Medical staff |
| **PATIENTS** | Children with congenital heart disease |

## Guidance

The purpose of this system is to facilitate communication between surgical, cardiology and anaesthetic teams to ensure that patients receive optimal perioperative care.

Where doubt exists, it is advisable to discuss a case in good time with a cardiac anaesthetist (the on-call consultant may be contacted through switchboard).

## Acronyms

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| AV valve | Atrioventricular valve |
| BT shunt | Blalock-Taussig shunt |
| P/CAVSD | Partial/Complete atrioventricular septal defect |
| CHD | Congenital heart disease |
| MAPCA | Major aortopulmonary collateral artery |
| PA | Pulmonary artery |
| PICU | Paediatric intensive care unit |
| PDA | Patent ductus arteriosus |
| RV | Right ventricle |
| RVOTO | Right ventricular outflow tract obstruction |
| TCPC | Total cavopulmonary connection |
| TGA | Transposition of the great arteries |
| VSD | Ventricular septal defect |

# RED FLAGS

Higher risk conditions which will usually be anaesthetised by a cardiac anaesthetist

- Univentricular heart prior to Glenn procedure (including children with BT or Sano shunt or a PDA stent or patients with bilateral PA bands)
- Severe cardiomyopathy requiring induction of anaesthesia (eg Hickmann line in / out) or ventilated on PICU - eg FS < 10%, &/or on inotropic support &/or admitted acutely &/or ventilated
- Pulmonary hypertension (at least half-systemic PA pressure) including patients on multiple systemic medical therapies such as prostacyclin (enteral or parenteral)
- Spelling Tetralogy of Fallot
- Pulmonary atresia/VSD/MAPCAs – prior to satisfactory correction
- Patients with suspected or confirmed William's syndrome or elastin gene mutation (unless they have no supravalvar AS or branch PA stenosis **and** have had at least one entirely uneventful GA at BCH - in which case they become amber).
- Temporary pacemaker dependence following cardiac surgery
- Severe Ebstein's anomaly
- Ventricular arrhythmias related to long-QT syndrome, Brugada or catecholaminergic polymorphic ventricular tachycardia
- Neonates with a prostin-dependent circulation
- All neonates or infants who have been listed for cardiac surgery

# AMBER FLAGS

Potentially higher risk cases which would benefit from discussion with a cardiac anaesthetist or consultant with experience in anaesthetising children with complex CHD.

Note – many referrals for advice or discussion are for patients who attract an 'amber' flag in whom case details may be particularly relevant, important or worth investigating. The cardiac anaesthetic group are very happy for colleagues to have a low threshold for requesting advice in these cases

- Stable cardiomyopathy (or previous history of heart failure) with good functional status receiving outpatient treatment
- Significant / severe left heart obstructive lesions (such as Shone's complex, hypertrophic cardiomyopathy, subaortic obstruction or significant aortic stenosis with a velocity > 4 m/s)
- Patients with complex cyanotic lesions and 'normal' saturations less than 75%
- Significant pulmonary stenosis or RVOTO (defined as RV pressure in excess of 75% systemic pressure)
- Patients with corrected CAVSD with severe AV valve dysfunction or stenosis
- Any patient with valve regurgitation graded as severe
- Patients with metallic valve prostheses
- Patients with significant arrhythmia requiring hospitalisation
- Single ventricle patients post Glenn or TCPC/Fontan
- Patients with a pulmonary artery band
- All other patients on the waiting list for cardiac surgery or a catheter-based intervention (including patients with a patent ductus arteriosus)
- Patients who have had a heart transplant
- Patients (other than the pulmonary hypertensive patients who are RED FLAG) with elevated PA pressure with stable status / RV function / outpatient management

| GREEN FLAGS |
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| No need routinely to discuss, but referrals for discussion and/or advice are absolutely welcome |
| ▪ Corrected PDA / ASD / VSD / coarctation / PAVSD / CAVSD (assuming satisfactory repair)<br>▪ Corrected TGA with normal functional status and no significant ECHO abnormalities<br>▪ Corrected Fallot's tetralogy with good functional status (even if there is moderate to severe pulmonary valve regurgitation)<br>▪ Repaired pulmonary atresia or Truncus Arteriosus with good functional status, normal heart function and a satisfactory RV to PA conduit (even in the presence of pulmonary regurgitation)<br>▪ Simple arrhythmias without medical management or the need for electrophysiology study and/ or ablation<br>▪ Outpatients with a previous history of Kawasaki's who have had reassuring follow-up coronary imaging and have normal ventricular function |

**Table A**

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| **REFERENCES** | |
| **RELATED DOCUMENTS AND PAGES** | |
| **AUTHORISING BODY** | Paeds Surgical Governance |
| **SAFETY** | |
| **QUERIES AND CONTACT** | Consultant Paediatric Cardiac Anaesthetist |
| **AUDIT REQUIREMNTS** | None |

| Plan Elements | Plan Details |
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| **The Dissemination Lead is:** | Dr Richard Beringer |
| **Is this document: A – replacing the same titled, expired guideline, B – replacing an alternative guideline, C – a new Guideline:** | A |
| **If answer above is B: Alternative documentation this guideline will replace (if applicable):** | |
| **This document is to be disseminated to:** | Department of Paediatric Anaesthesia |
| **Method of dissemination:** | email |
| **Is training required and how will this be delivered:** | NA |

**Document Change Control**

| Date of Version | Version Number | Lead for Revisions | Type of Revision | Description of Revision |
|---|---|---|---|---|
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