

Heart murmurs are very common findings in paediatrics. 80% of children have heart murmurs at some point and the prevalence of congenital heart disease is about 1%^{1,2}. The majority of heart murmurs in childhood would be classified as innocent murmurs.

The 7 S -features of an innocent murmur: (See [Appendix](#))

1. Sensitive (changed with child's respiration)
2. Short duration
3. Single (no click or gallops)
4. Small (murmur limited to an area, not radiating)
5. Soft (low amplitude)
6. Sweet (not harsh)
7. Systolic

The presence of a heart murmur in a newborn should be investigated more carefully as there is a higher likelihood of structural heart disease. Indeed, approximately 1% of newborns have a heart murmur and of these about 31-86% have structural heart disease, even if asymptomatic³.

Therefore, any murmurs found in a neonate should be reviewed by a senior member of the medical team and the neonate should be kept as an inpatient for at least 24 hours.

If discharge is planned on the same day, a senior paediatrician should review the baby. It is of utmost importance to check the pulse oximetry in all neonates as part of the NIPE (See [Appendix](#)). Patients who screen positive should follow national guidelines ([BAPM](#), [NIPE](#)).

Steps to assessment on the postnatal unit once murmur detected

1. **History:**
 - First degree relative with CHD requiring intervention/surgery or active follow-up, SIDS, Sudden cardiac death
 - Antenatal history (exposure to drugs, alcohol and toxins in utero, infection, diabetes, SLE and preterm delivery)
 - Concerns about a syndrome - dysmorphic features or additional antenatal concerns
 - Prematurity
2. **Other symptoms:** Cyanosis, tachypnoea (worsened when feeding and sweating with feeds), poor weight gain, needing persistent respiratory support (sweating with feeds, feeding difficulty, poor weight gain).
3. **CVS examination:** Cyanosis, signs of poor perfusion, type and characteristics of murmur, femoral pulses, presence of hepatomegaly, respiratory distress without a clear lung issue.
4. **Pulse oximetry** (See [Appendix](#))

Additional assessment if murmur detected on the paediatric ward or by GP:

1. **History:**
Personal History (Genetic syndrome, Connective tissue disease, Kawasaki, Rheumatic Fever and frequent respiratory infections)
2. **Other symptoms:**
 - Current symptoms:

- i. **Cardiovascular** (Chest pain, palpitations, cyanosis, near syncope/syncope, palpitations),
- ii. **Respiratory** (Breathlessness on exertion, recurrent chest infections/ chronic cough),
- iii. **Constitutional** (faltering growth, fatigue, poor exercise tolerance, developmental delay).

3. Investigations:

- **Should I perform an ECG?**

While an ECG **may help** in the diagnosis of certain conditions such as an atrioventricular septal defect (left axis deviation), it does not help with the diagnosis of other significant congenital heart disease. A baseline ECG may be required in patients in heart failure to exclude tachy- or brady-arrhythmias as the cause of the heart failure but is not usually required in patients with only a heart murmur and whose heart rate is within normal limits.

- **Should I perform a chest Xray?**

A chest Xray is **not required** in the routine investigation of a patient with a heart murmur, unless there are clear signs of heart failure.

- **Should I perform a 4 limb blood pressure?**

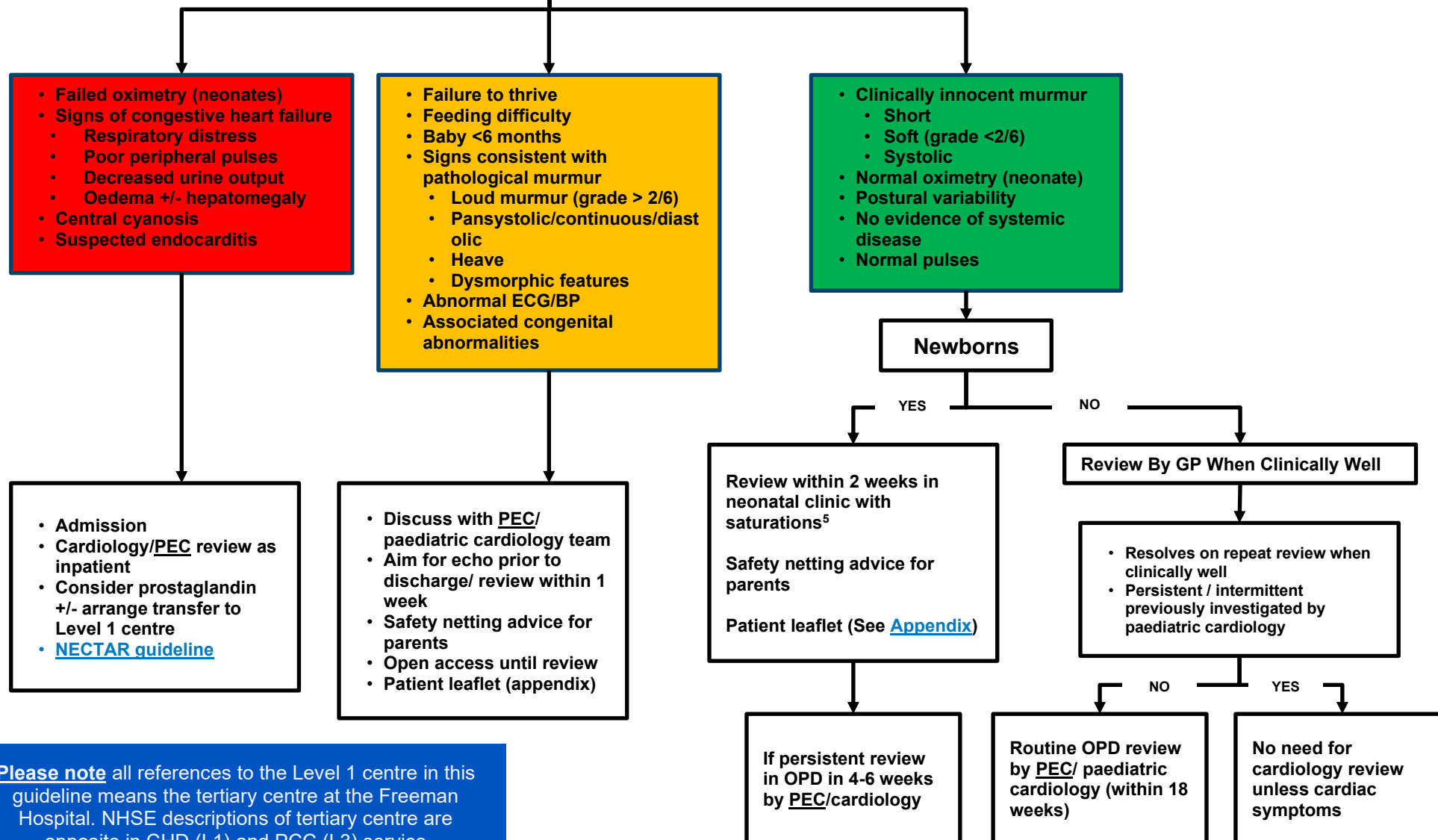
While 4 limb blood pressure has been shown to poorly correlate with a diagnosis of coarctation of the aorta / arch abnormalities in newborns, it may be a useful adjunct in the assessment of any child where coarctation is suspected (weak/absent femoral pulses).

- **Echocardiogram**

This is the gold standard for a definitive diagnosis. However unnecessary echocardiograms may lead to detection of otherwise normal variants such as a closing patent foramen ovale and patent ductus arteriosus. Therefore, a rational approach is required before requesting an echocardiogram.

Murmur

Newborns should be kept in hospital and reviewed at >24 hours of age by member of senior medical team



Please note all references to the Level 1 centre in this guideline means the tertiary centre at the Freeman Hospital. NHSE descriptions of tertiary centre are opposite in CHD (L1) and PCC (L3) service specifications.

Appendix:

1. Pulse oximetry is routinely used as a screening tool for CHD. A failed oximetry test is when lower limb saturations are <95% / Pre and post ductal saturation difference is more than 3% (less relevant once the child is older)
2. PEC: Paediatrician with Expertise in Cardiology
3. Patient leaflet: <https://www.pecsig.co.uk/media/leaflets-chfed/chfed-nipe.pdf>
4. Examples of innocent murmurs
(https://www.infantjournal.co.uk/journal_article.html?id=7320)
 - a. Stills murmur: Has a musical or vibratory quality and best heard at the left lower sternal edge. Can have postural variation and amplified during fever and exercise. More commonly heard in younger children
 - b. Pulmonary flow murmurs usually heard in the left upper sternal edge
 - c. Neonatal branch pulmonary artery murmur: soft murmur heard better in preterm infants in the left upper sternal edge. Will often resolve by 6 months
 - d. Venous hum: Continuous murmur heard in the supraclavicular fossa. Resolves when supine or occlusion of the jugular vein
5. NECTAR guideline [Neonatal-collapse.pdf](#)

Reference:

1. Ford B, Lara S, Park J. Heart Murmurs in Children: Evaluation and Management. Am Fam Physician. 2022 Mar 1;105(3):250-261. PMID: 35289571.
2. Liu Y, Chen S, Zühlke L, Black GC, Choy MK, Li N, Keavney BD. Global birth prevalence of congenital heart defects 1970-2017: updated systematic review and meta-analysis of 260 studies. Int J Epidemiol. 2019 Apr 1;48(2):455-463. doi: 10.1093/ije/dyz009. PMID: 30783674; PMCID: PMC6469300.
3. Frank, J.E. and Jacobe, K.M. (2011) *Evaluation and management of heart murmurs in children*, *American Family Physician*. Available at: <https://www.aafp.org/pubs/afp/issues/2011/1001/p793.html> (Accessed: 25 May 2024).
4. https://www.infantjournal.co.uk/journal_article.html?id=7320.
5. BCCA referral guidelines for accessing congenital cardiac services – fetal, paediatric and adult [BCCA Referral Guidelines For Accessing Congeni.pdf](#)

DOCUMENT HISTORY	
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