Introducing Pulse Oximetry as a screen for Critical Congenital Heart Defects in the district general hospital setting.

Abumehdi M.R.1, Srirambhatla U.1, Jada K.2, Cane C.2, Wickham T.2

1North Central Thames Foundation School, London, UK, 2 Neonatal Unit, Barnet General Hospital, London, UK

Background
Critical congenital heart defects (CCHD’s) are associated with significant mortality and morbidity. Early diagnosis and treatment could reduce this significantly. Currently there is a diagnostic gap in identifying CCHDs even after prenatal screening and postnatal examination.

There is a growing body of evidence to suggest that it is a valid screening tool for identifying CCHDs, which is reflected by its uptake in many neonatal units.

Objectives
1. Demonstrate the feasibility of implementing pulse oximetry screening in a busy DGH setting.
2. Outline the financial and practical considerations.

Materials and methods
Inclusion Criteria:
• All newborn examinations performed by paediatricians in July/August 2014 included pulse oximetry screening.

Equipment used:
A portable pulse-oximeter with disposable wraps was used to measure pre-ductal and post-ductal saturations.

Outcomes were divided into three groups:
1. Both readings ≥ 95% - deemed negative.
2. Either reading between 90-94%, or >2% difference of saturations – deemed borderline positive.
3. Either saturation <90% - deemed positive.

Three borderline positive, or a positive test required comprehensive assessment and echocardiography.

Exclusion criteria:
• Midwife performed newborn examinations.
• Infants admitted to the neonatal intensive care ward.
• Pre-term infants (<37 weeks gestation)

Proposed management of a positive test.

Well Child

- History
- Clinical Examination
- ECG
- CXR
- Pulse oximetry

Unwell Child

- History
- Clinical Examination
- ECG
- CXR
- Pulse oximetry

Conclusion
1. Implementing pulse oximetry screening for CCHD is a simple and cost effective strategy.
2. No significant increase in the time taken for newborn examination.
3. It has a reassuring effect on doctors performing newborn examination.
4. As reported in other studies, delaying the screening until after 24 hours maximizes the specificity, which may explain all tests being negative.
5. There was no increase in demand for echocardiograms or admissions onto the neonatal unit.

Clinical Perspective
They study demonstrates that pulse oximetry can be implemented without significant increase in cost, time or admissions.

Results
• 170 infants had their pre and post ductal saturations measured over a 1-month period.
• Average time to testing was 38.6±27.5 hours.
• The average duration of the test was 3.98 (±3.41) minutes.
• All tests done over the trial period were negative.
• There was no increased burden on the echocardiography workload or SCBU admissions.
• Feedback from doctors, nurses and parents was positive.

Why screen for congenital heart disease in our hospital?
• Most common congenital defect and leading cause of death
• Those missed in postnatal period have a poorer prognosis.

Why screen for congenital heart disease: Increased morbidity and mortality from a late diagnosis of critical CHDs.

Early detection of non-critical CHDs
Detection of non-cardiac illness ie early onset sepsis and respiratory disease.
Early detection of the above may reduce time spent in intensive care and cost.
Better outcomes, less complications, shorter stay in hospital
Acceptable by parents
Recommended by UK national screening committee

References
5. Congenital Heart Disease Screening Program Implementing a Community Based Program - Martin G, Skandierud R, Arntzen K. Children’s Hospital of Pittsburgh, USA