- Over 50% of corrected perinatal mortality in the West Midlands is associated with FGR
- FGR is associated with inequalities, being 50% higher in the most deprived areas
- Of stillbirths with FGR, 86% are potentially avoidable with better care
- Appropriate antenatal investigation for FGR reduces perinatal mortality; however:
- Currently, antenatal detection of FGR is only 15 to 30%

The purpose of this paper is to summarise the evidence and rationale for monitoring FGR, and outline the Perinatal Institute's regional strategy for this key quality indicator of maternity services.

1. Relevance to perinatal and infant mortality and morbidity

FGR is responsible for the largest category of perinatal deaths. If congenital anomalies are excluded, FGR precedes over 50% stillbirths [1] and 42% of early neonatal deaths [2]. It is furthermore associated with perinatal morbidity, including fetal distress during labour, and increases the risk of cerebral palsy [3,4]. Most instances of FGR are due to placental insufficiency.

2. Lessons learnt about avoidability

The avoidability of deaths due to FGR have been a recurrent theme in CESDI reports [5]. In the 2007 report of the B&BC Confidential Enquiry of Stillbirths with FGR (which excluded babies with congenital anomalies and prematurity <30 weeks), 86% of deaths were found to have been preventable with better care [6].

3. Assessment and management of FGR

The cornerstone of the assessment of fetal wellbeing is the antenatal detection of the small for gestational age (SGA) baby, and referral for investigation to see whether it is pathologically small, i.e. FGR. This is done mainly by ultrasound scan (to check the size of the baby and its growth up to this date) and umbilical artery Doppler (to assess the function of the placenta). In most instances, such investigations are re-assuring; however in a small proportion of cases, they show that the baby is at risk because it is FGR. While an FGR baby is still in the womb, it has a 5-11 fold increased risk of dying [7]. There is no effective intrauterine treatment; instead, management consist of timely delivery of the baby in the best possible condition, by induction of labour or delivery by Caesarean section.

4. Benefits of investigations

Cochrane reviews of randomised trials have shown that referral of the at risk baby for Doppler investigation leads to a reduction in perinatal mortality, without increasing neonatal mortality because some babies need to be delivered prematurely [8]. The key is that these at-risk babies are detected and delivered at the right time from an unfavourable intrauterine environment.

5. High and low risk

These Doppler investigations are however only effective in reducing perinatal mortality in 'high risk' cases, e.g. if there is maternal hypertension/pre-eclampsia, or if the baby is small for gestational age on ultrasound, suggesting FGR. [8]. Therefore, the key is to detect those pregnancies where the baby is at risk, and refer them for investigation. This is done by checking the mother's well being including her blood pressure, and the baby's growth by serial measurement of fundal height.

6. Screening by fundal height measurement

Serial measurement and plotting is recommended by NICE guidelines [9], and the use of customised charts is recommended by the RCOG [10]. A controlled trial has shown that when midwives are properly trained in fundal height measurement and plotting on customised charts, with appropriate channels for referral, the antenatal detection of the FGR baby was increased significantly to 48%, without increasing the overall workload and investigations.

7. Serial assessment by ultrasound scan

For women who are already high risk on the basis of past history, or complications in the current pregnancy, or where fundal height measurement is not possible (e.g. when they are too obese), serial measurement by ultrasound scan is recommended. The WM Regional Ultrasound Group has recently drawn up a best practice protocol for serial scanning [11]. In part, these recommendations were based on lessons learnt from the B&BC confidential enquiry into stillbirths with FGR, which showed that many high risk women failed to receive serial scans.

8. FGR rates and detection in the West Midlands

FGR is linked to social deprivation which is high in the West Midlands. On the basis data we collected for the B&BC project, 15-18% of babies are born FGR (<10th customised centile) [12], up to 50% higher than elsewhere in the UK. Soon to be published data from the B&BC project has also shown that only a minority of babies born FGR are detected to be small antenatally, and that as many as 70-85% are missed. Audits in several maternity units have shown that there were problems at every step of the clinical pathway, including fundal height, plotting, referral, and scans. They have also shown that with different management, FGR would have been detected antenatally.

9. Key problems and actions

We have identified and are acting on several key problems which hinder improvement:

	Problem	Action
9.1	Many midwives and doctors are not trained in correct measurement and plotting of fundal height.	PI has started weekly training workshops in Birmingham as well as in maternity units around the region. The programme will be supplemented with a rolling SGA audit.
9.2	Many women are not receiving good continuity of carer, even though this is an important factor for maternal and fetal well being.	Providers are asked to reconfigure services to ensure that there is good continuity of carer which will also improve accuracy in serial assessment of fetal growth.
9.3	There is an acute shortage of ultrasound resources in WM, which has led to unsafe scan protocols for monitoring high risk pregnancy	Best practice protocols have been developed. For their implementation, commissioners are asked to provide enhanced resources for ultrasound services
9.4	There is a lack of trained ultrasound staff in the WM.	PI and RUG have developed proposals with the SHA and Deanery for a 3 year training programme to increase staffing levels

10. Implication

Fetal growth restriction is the largest and most preventable category of perinatal mortality. Its timely detection is

- vital for patient **safety**; babies are the clients of the NHS with the longest life expectancy
- an indicator of **effectiveness** of maternity care across community and acute services
- important for **equity** of service provision, focussing on the need to address inequalities
- essential for **maternal engagement** and decision making about appropriate care.

Antenatal identification of the at-risk baby is central to the West Midlands Investing for Health programme on reducing perinatal and infant mortality. The WM data collection project will allow benchmarking and monitoring of year on year progress.

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