

Description

Monitoring Matters 2: Fetal Physiology: Stable Baseline/Normal Variability

Natalie Potts, Fetal Monitoring Lead Midwife – Sherwood Forest Hospitals NHS Foundation Trust

She/her

Published in The Practising Midwife Volume 29 Issue 6 November 2026, Page 29

https://doi.org/10.55975/ONZI4545

As a Fetal Monitoring Lead Midwife, I am often asked which cardiotocography (CTG) feature provides the greatest reassurance regarding foetal wellbeing in labour. Despite limited evidence for the effectiveness of CTG monitoring, for improving outcomes, it continues to be offered as a way to monitor maternal and foetal wellbeing in complex labour and birth.[1] While all CTG monitoring characteristics should be assessed systematically and alongside a broader holistic assessment of maternal and foetal wellbeing, a stable foetal heart (FH) baseline rate and normal FH variability remain strong indicators of foetal wellbeing and an adequately oxygenated foetus with intact neurological function.[2]

The foetus possesses effective physiological adaptations that enable the endurance of transient reductions in oxygenation associated with labour. Through mechanisms including enhanced oxygen transport and cardiovascular compensation, blood flow is redistributed to vital organs when oxygen availability decreases. As long as these adaptive responses remain intact, foetal wellbeing is reflected by a stable baseline heart rate and normal baseline variability.[3]

Variability refers to the subtle fluctuations in the foetal heart rate (FHR) around the baseline. These oscillations are not random; they are generated by the continuous interaction between the sympathetic and parasympathetic branches of the autonomic nervous system. This delicate balance creates the 5 and 25 beats per minute (bpm).[4]

The presence of normal variability provides important insight into foetal physiology. It demonstrates that oxygen is being adequately delivered from the placenta, the myocardium is functioning effectively, and the foetal central nervous system remains responsive. In clinical practice, a foetus displaying normal variability is highly unlikely to be experiencing significant hypoxia or metabolic acidosis.[3] Consequently, variability is often considered a real-time reflection of foetal reserve and adaptive capacity.

Equally important is the baseline FHR, defined as the average heart rate measured over a 10-minute period, excluding accelerations, decelerations and periods of marked variability. A stable baseline within the normal range suggests that the foetus is maintaining cardiovascular homeostasis and effectively meeting its metabolic demands. A normal baseline lies between 110 and 160 bpm.[4] Baseline rate is influenced by gestational age, medications, foetal behavioural state and autonomic nervous system activity. It is important to recognise that not all baseline rates below 110 bpm indicate foetal compromise. In postmature foetuses, increasing maturation of the parasympathetic nervous system may result in a lower resting foetal heart rate.[4]

When normal variability is combined with a stable baseline rate, clinicians can be reassured that foetal compensatory mechanisms are functioning appropriately. During labour, uterine contractions result in transient reductions in uteroplacental perfusion and foetal oxygen transfer, often manifesting as decelerations on the cardiotocograph. Healthy foetuses accommodate these physiological challenges through cardiovascular adaptation, maintaining normal variability despite brief fluctuations in oxygen availability. This ability to maintain variability reflects resilience and effective autonomic control.[6]

Modern CTG interpretation increasingly promotes a physiological approach rather than simple pattern recognition. Understanding why variability occurs enables clinicians to assess whether a foetus is compensating effectively or showing signs of deterioration. Normal variability accompanied by a stable baseline remains one of the clearest indicators of foetal wellbeing. As a Fetal Monitoring Lead Midwife, I advocate that CTG interpretation should never occur in isolation. Achieving gold-standard care requires a comprehensive assessment of the wider clinical picture, incorporating maternal, foetal and intrapartum factors and informed choice to support safe, individualised and evidence-based decision-making. **TPM**

References

1. Fox D. Freedom to move, freedom to choose. Pract Midwife Aust. 2026;4(4):22-26. doi.org/10.55975/RTPD7383.
2. Cunningham FG, Leveno KJ, Bloom SL, Dashe JS, Hoffman BL, Casey BM, Spong CY. Williams Obstetrics. 26th ed. McGraw Hill; 2022.
3. Lear CA, Galinsky R, Bennet L, Gunn AJ. The effects of fetal hypoxia on the fetus and newborn. J Physiol. 2016;594(5):1219-1230.
4. Ayres-de-Campos D, Spong CY, Chandraharan E; FIGO Intrapartum Fetal Monitoring Expert Consensus Panel. FIGO consensus guidelines on intrapartum fetal monitoring: Cardiotocography. Int J Gynaecol Obstet. 2015;131(1):13-24. doi.org/10.1016/j.ijgo.2015.06.020.
5. Fetal Monitoring in Labour. NICE guideline (NG229). NICE. https:// www.nice.org.uk/guidance/ng229. Updated March 25, 2026.
6. Gibb D, Arulkumaran S. Fetal Monitoring in Practice. 4th ed. Elsevier; 2017.

Category

1. Editorial
2. TPM Articles
3. TPM Journal

Tags

1. 2026
2. fetal monitoring
3. physiology

Date Created
9th November 2026