



Identifying Intrapartum Fetal Early Warning Signs (FEWS) and why we need it?

Dr Manjula Samyraj, Dr Sofia Lekka

North West Anglia NHS Foundation Trust, Peterborough, United Kingdom



OBJECTIVE

Within our trust, which handles approximately 6000 deliveries annually, a significant number of babies born with suspected Hypoxic Ischaemic Encephalopathy (HIE) were observed at Peterborough City Hospital. In response, an internal review prompted an external evaluation to investigate the matter further. One area of concern highlighted during this review was fetal monitoring, particularly regarding the process of escalation. As clinicians, it is essential to address this issue effectively. A key strategy for accomplishing this is by implementing a well-defined escalation policy and empowering staff at all levels to promptly communicate their concerns to senior colleagues. This enables appropriate and timely actions to be taken in response to the identified issues.

Cause of death						
The tables below describe the cause of death reported to MBRRACE-UK for stillbirths which occurred in your Trust and for neonatal deaths of babies who were born in your Trust. They are listed by the primary categories of the "Cause Of Death & Associated Conditions" (CODAC) system of death classification.						
Congenital anomaly is reported as the cause of death for all deaths where a congenital anomaly is coded as either the primary cause of death or an associated condition.						
In order to ensure accurate, consistent reporting using the CODAC system of death classification, Trust and Health Board Perinatal Review groups should focus on the quality of cause of death coding.						
		Infection	Neonatal	Intrapartum	Congenital anomaly	Fetal
Stillbirths	Your Trust	% (N)	15.4% (2)	0.0% (0)	0.0% (0)	0.0% (0)
	UK-wide	%	3.4%	1.3%	1.6%	5.1%
Neonatal Deaths	Your Trust	% (N)	25.0% (1)	50.0% (2)	25.0% (1)	0.0% (0)
	UK-wide	%	6.9%	41.7%	2.2%	4.3%
		Cord	Placental	Maternal	Unknown	Missing
Stillbirths	Your Trust	% (N)	15.4% (2)	61.5% (8)	0.0% (0)	7.7% (1)
	UK-wide	%	4.7%	34.9%	3.1%	4.3%
Neonatal Deaths	Your Trust	% (N)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
	UK-wide	%	0.2%	2.7%	0.1%	2.8%

DESIGN

The innovative Fetal Early Warning Score/Screening System is designed as a clear escalation policy with instructions to address potentially reversible causes. The proposed tool provides a continuous threshold, for any life-threatening fetal heart rate anomalies, our 5-year experience of utilizing this digital process has provided promising results, as we have managed to significantly reduce serious complications such as hypoxic-ischemic encephalopathy, neonatal cerebral palsy, or intrapartum stillbirth.

METHOD

This is a retrospective study conducted between 2018 and 2022. The tool was initially implemented in our trust at Peterborough City Hospital in 2018, followed by its implementation at Hinchinbrook Hospital in 2019. Once developed, the tool was integrated into the K2 system, enabling midwives and obstetricians to assess the cardiotocography (CTG) using the tool directly at the bedside through the electronic monitoring portal. Our methodology relies on numerical measurements obtained from the CTG, providing a continuous review system that is easily recognizable by all maternity staff members. The automated process ensures timely risk evaluation and offers potential solutions at various risk levels. By eliminating human error, this system enables midwives and obstetricians to promptly comprehend emerging risks.

TEST, MattDOB 09-Nov-1999 (20y)NHS No. Unknown

Nullip, 40+0, Not in Labour, SingletonPhysiological CTG10:03:55

Review For: Fetus 1

	Normal	Suspicious	Pathological
Normal baseline appropriate to gestation? Baseline: 143 bpm Rise in Baseline (± 10%): No Baseline Appropriate for Gestational Age: Yes	110-160bpm No gradual increase from initial baseline	Gradual increase of ≥10% from initial baseline or FHR > 90-110bpm Look for signs of Sepsis or Stress response to hypoxia	>160bpm or <90 or Unable to interpret/obtain baseline rate
Good oxygenation to brain present? Variability: 12 bpm Sinusoidal Pattern: No Maintained Cycling: Yes	Yes 5-25 Cycling present	Reduced 5-8 for 50 minutes and cycling absent	Poor Absent / or more than 25 for 15 minutes Sinusoidal pattern
Fetal movements present? Accelerations Present: Yes	Seen	Absent if previously seen in current CTG	Presence of 'overshoots'
Good fetal response in Labour? Deceleration: None	Yes No evidence of hypoxic episodes or decelerations	Reduced Seen with quick recovery to a stable baseline Baroreceptor mediated	No Seen - late recovery to baseline Chemoreceptor mediated
Evidence or risk of Hyperstimulation? Contractions: 3 / 10 mins Interval > 90 seconds: Yes	No 3-5 in 10 with more than 90 seconds between the peak of each contraction	Yes More than 5 in 10 minutes: with no fetal concerns or less than 90 seconds between the peak of each contraction	Confirmed Fetal concerns with more than 5 in 10 minutes or less than 90 seconds between the peak of each contraction
Overall Fetal Status in Labour:	Green Zone Good oxygenation to baby	Yellow Zone Reduced oxygenation with preservation to brain showing compensated features	Red Zone Poor oxygenation to brain showing decompensated features

Previous

Next

Management of Intrapartum Fetal Hypoxia

Green zone Normal	No intervention is needed Either continue CTG or change to IA after clinical evaluation
Amber or Yellow Zone Suspicious	Escalate to Senior/Core Midwife – Review within 15 minutes Obstetric team review within 30 Minutes Complete Plan of action Reposition women to increase uteroplacental circulation and ease or reduce cord compression Exclude abnormal observations, dehydration, prematurity and drugs related (reversible). If Oxytocin running consider to reduce or stop. Consider Terbutaline Reassess for 15 - 30 minutes
Red Zone Pathological/Abnormal	Escalate immediately to Senior/Core Midwife/Obstetric team Think of reversible causes Perform vaginal examination to access and relieve cord compression if present Stop Oxytocin or remove Proppos Consider Terbutaline Prepare for delivery if no improvement noticed

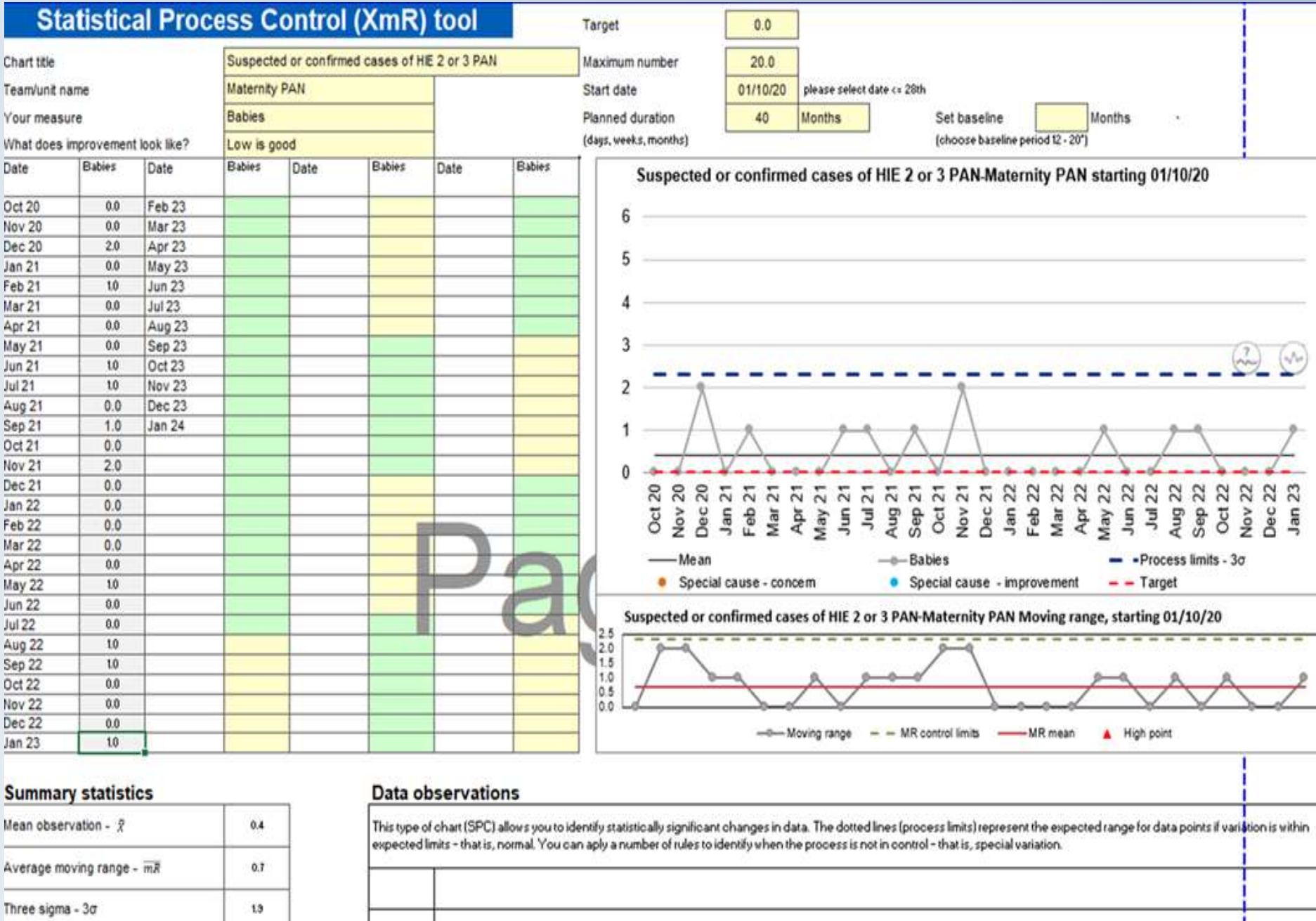
A CTG feature which falls within the yellow Zone is abnormal and requires a clinical review within 15-30 minutes

A CTG feature which falls within Red Zone is also abnormal and requires a Rapid response

RESULTS

In our trust, there were no intrapartum deaths reported last year, and the rate of early neonatal deaths was low. However, we observed a higher rate of stillbirths in 2023 (national published data is 2020 rate), with extreme prematurity being a significant contributing factor. Furthermore, we have achieved low rates of hypoxic injury to babies and a low transfer rate for therapeutic cooling.

	Metric	Definition	National Average/Standard	Aspirational Target	Data Source	QTR5 AVE	QTR4 AVE	QTR1 AVE	QTR2 AVE	QTR3 AVE	Oct-22	Nov-22	Dec-22 HH	Dec-22 PCH	Dec-22 NWAF	SPC
Maternal Mortality		23+6 weeks Regional	MSDS 7%	55% annual rolling rate (Total FTR)	EPR			0.1%	0%	0%	0%	0%	0%	0.0%	0.0%	SPC Started
	Stillbirth rate	Rate per 1000 total births. Babies born after 23+6 weeks gestation showing no signs of life. Exclude terminations. 12 month rolling.	MBRRACE 3.33 per 1000 live births (2020 data)	3.35	EPR	3.80	4.10	3.63	3.04	3.25	3.04	3.26	3	2	3.44	2 3
	Intrapartum Stillbirths	Number of stillbirths 24+0 completed weeks or more.	0	0	EPR	0	0	0	0	0	0	0	0	0	0	2 3
	Early neonatal death rate	Early NND within 7 days. Rate per 1000 live births. Exclude <24+0 and terminations.	1.53 per 1000 live births (2020 data)	1.62	EPR	0.15	0.17	0.4	0.47	0.54	0.48	0.49	0	1	0.65	3 4
PMRT Reviews started, completed and parents involved within 4 months		Early neonatal death investigations started, completed and parents involved.	CNST target 95%	95%	EPR	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	3 4



CONCLUSION

The implementation of the Fetal Early Warning Score System within the North West Anglia Foundation Trust has demonstrated a significant reduction in perinatal morbidity and mortality. This system greatly simplifies and standardizes the interpretation of cardiotocography (CTG) for all staff members involved in the Maternity Unit. By introducing small changes like this, we aim to promote equality of care and mitigate complacency. The implementation approach encourages critical thinking during reviews rather than merely providing guidance to clinicians. However, further research is necessary to assess its broader effectiveness. By ensuring early escalation and prompt action by clinicians caring for women in labor, the tool has the potential to prevent potential dangers to both mothers and babies. We have Adult, Paediatrics and Maternal Early Warning Score to identify clinical deterioration which can be escalated and acted upon earlier, which is evidence-based. We should have one similar for fetus and our findings are in supportive of implementation of Fetal Early Warning Score/ Screening System.