



An Audit Analysing Cross-site Computerised Cardiotocography Practice Using Dawes Redman Criteria

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Introduction & Background

- Cardiotocography (CTG) is a method of measuring **fetal heart-rate** and **uterine contractions** via an ultrasound transducer placed on the mother’s abdomen.
- The Dawes- Redman criteria (DRC) uses computerized CTG (cCTG) which incorporates a computer algorithm to analyse fetal heart rate patterns. This gives an **objective assessment** of fetal wellbeing, reducing **user-error** and inter-user **variability**.
- Failing DRC means that normality has not been demonstrated, and warrants further investigation to rule out fetal distress
- cCTG using DRC was introduced into the **Chelsea and Westminster NHS Foundation Trust cross-site in May 2021**. This included Chelsea and Westminster and West Middlesex Hospitals.

Aims

- This is the **first** audit analysing the Trust cCTG practice since its introduction in May 2021. The main aims were:
 - To determine whether introduction and clinical application of a new device was embedded into clinical practice
 - To determine adherence to Trust-wide guidelines
 - To ensure current cCTG practice informs correct decision-making in clinical practice:
 - Firstly, whether meeting DRC led to uncomplicated deliveries
 - Secondly, whether management of patients failing DRC was adequate to mitigate complications and ensure optimal neonatal outcome.

Methodology

- Paper surveys were completed by midwives between **May 2021 and October 2021** following cCTG in women presenting antenatally to the two Trust sites’ **day assessment units and maternity triages**.
- Surveys documenting details of cCTG practice were compared with Trust guidelines to determine whether indication for, and management of, patients requiring cCTG, was appropriate.
- Birth information was collected to identify mode of delivery, occurrence of complications and neonatal outcomes, using several systems **including K2 Athens, Cerner and Evolve**
- 263 complete **surveys** were analysed, representing **211 different patients** (some patients required cCTG on multiple occasions).

Results

Indication		Number of cases
Reduced foetal movements (RFM) (203*)	1 st episode	103
	2 nd episode	15
	Recurrent	22
	Episode number unknown	60
Other (63)	SGA +/- abnormal dopplers	14
	Repeat cCTG	11
	Pre-eclampsia/pregnancy-induced hypertension	7
	OC	5
	Pre-term premature rupture of membranes	3
	Abnormal dopplers	3
	Other	16

Figure 1: Indications for performing cCTG. The prevailing indication (76%) for cCTG was reduced foetal movements (RFM). The majority, (51.5%) of these were for a first episode of RFM. A small proportion (3%) of cCTGs were inappropriately indicated, for conditions such as obstetric cholestasis and preterm premature rupture of membranes. *3 women with 1st episode RFM did not go on to have cCTG due to lack of equipment availability

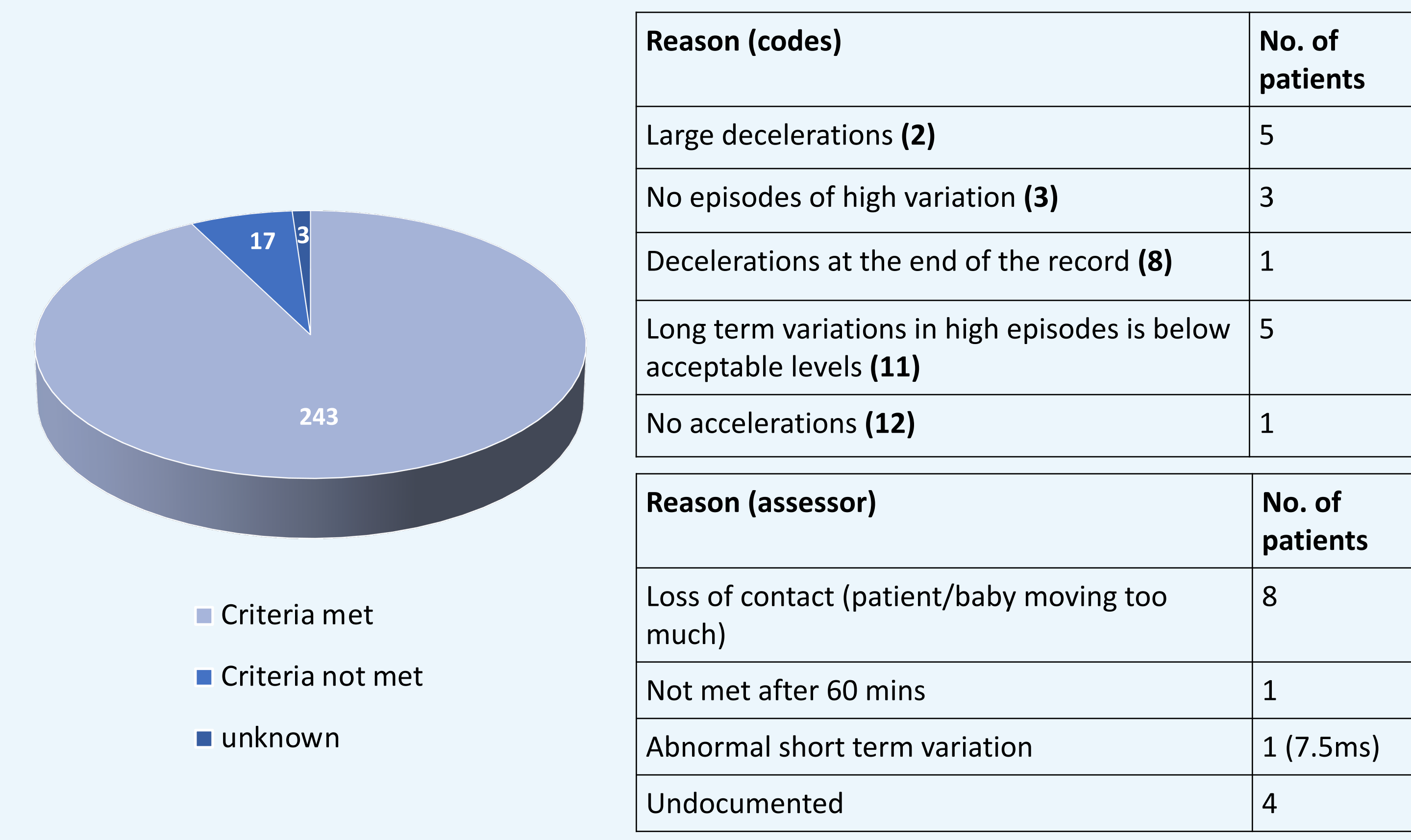


Figure 2: Left: Number of patients meeting vs failing to meet DRC. Right: Reasons for failing DRC. Of the 263 patients that had cCTG, 243 met DRC, 17 did not, and 3 was unknown. Reasons for failing criteria were most commonly due to technical errors such as loss of contact between transducer and fetus. Most common pathological reasons for failure were large decelerations, and poor long-term variation in fetal heart rate.

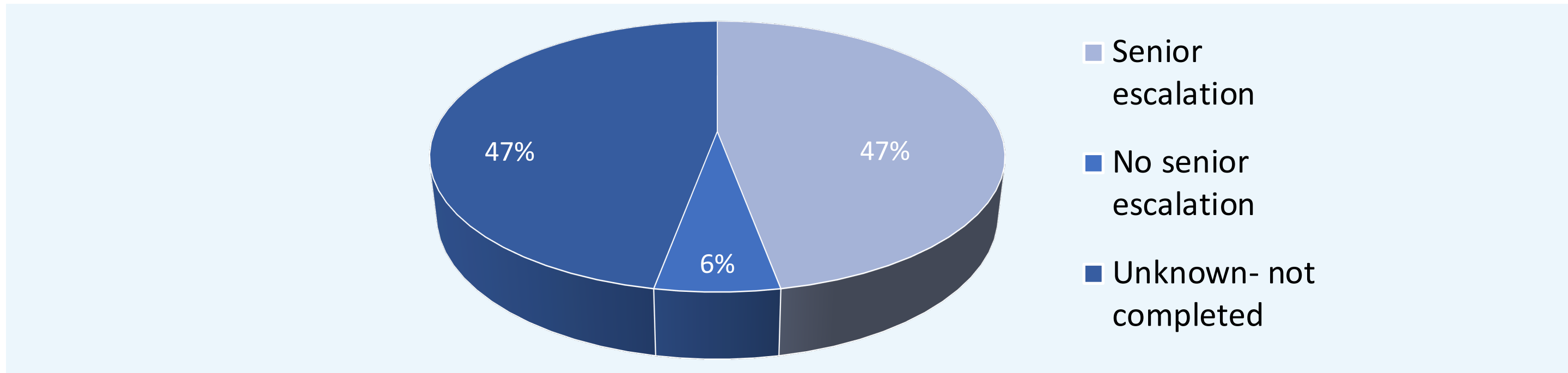


Figure 3: Senior escalation for patients not meeting DRC. As per trust guidelines, all 17 patients that did not meet DRC should have had a senior review. 8 patients were managed per guidelines, while 1 was not. 8 patients lacked documentation on this management step so whether they received senior input was not clear.

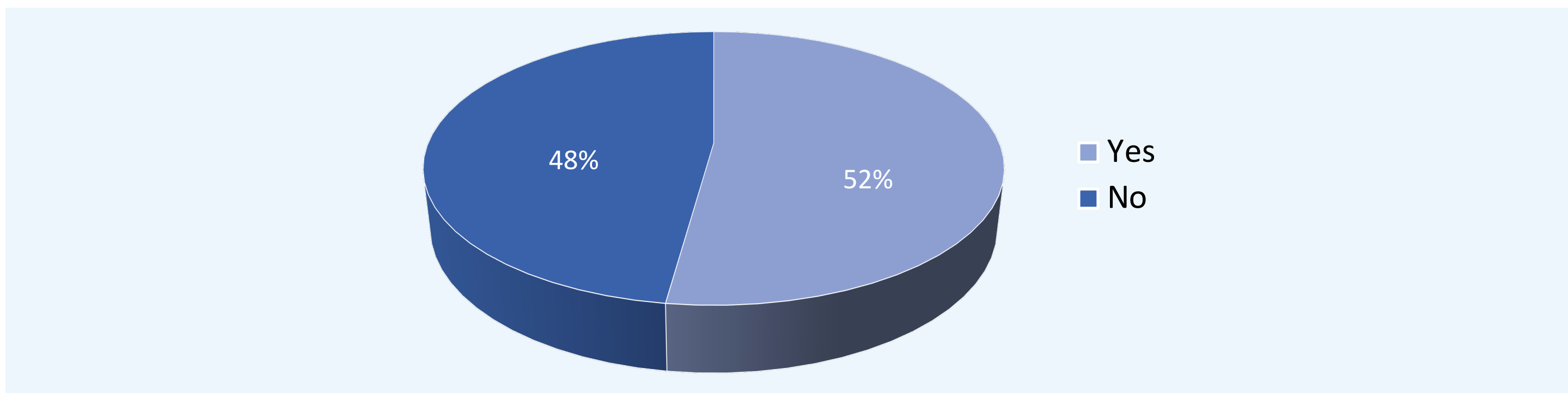


Figure 4: Staff confidence using cCTG. 52% of staff felt confident in using cCTG, while 48% did not.

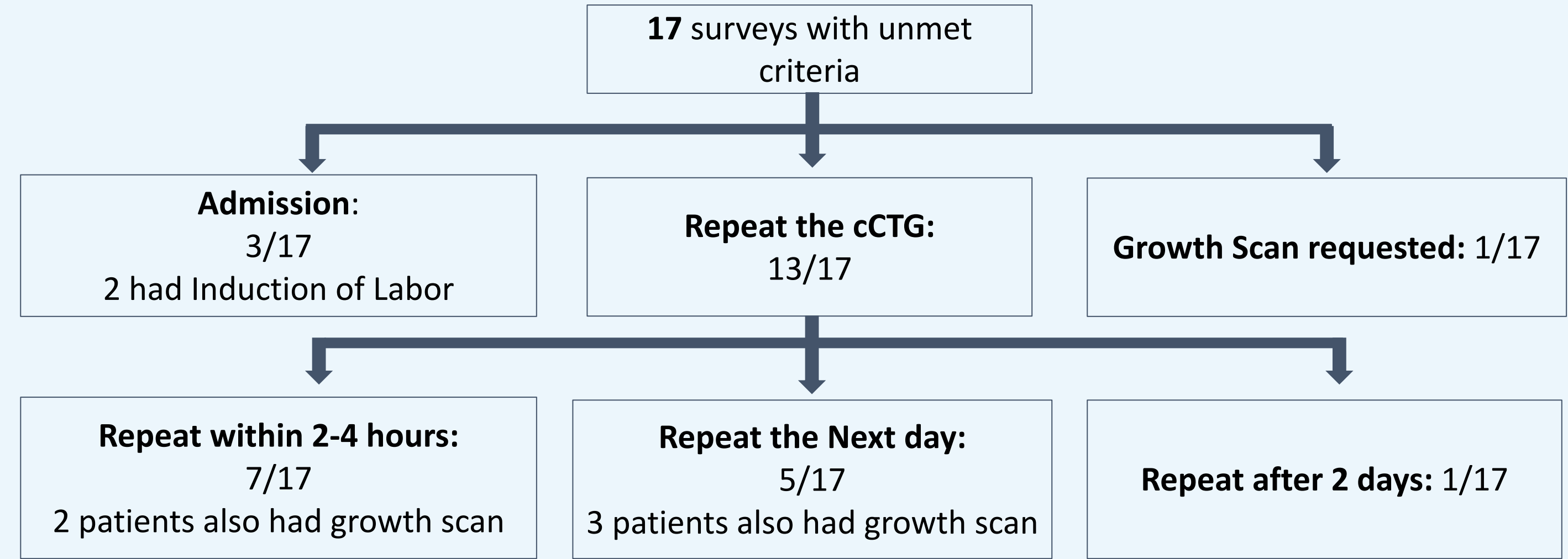


Figure 5: Management for patients with unmet DRC. A majority (76%) had a repeat cCTG and 18% had an admission. Of the 5 patients with a repeat cCTG the following day, one was not managed according to guidelines. They were over >37 weeks gestation and therefore should have had a repeat within 2-4 hours. Likewise, 1 patient who was < 37 weeks gestation had a repeat cCTG after 2 days, but they should have been seen the next day.

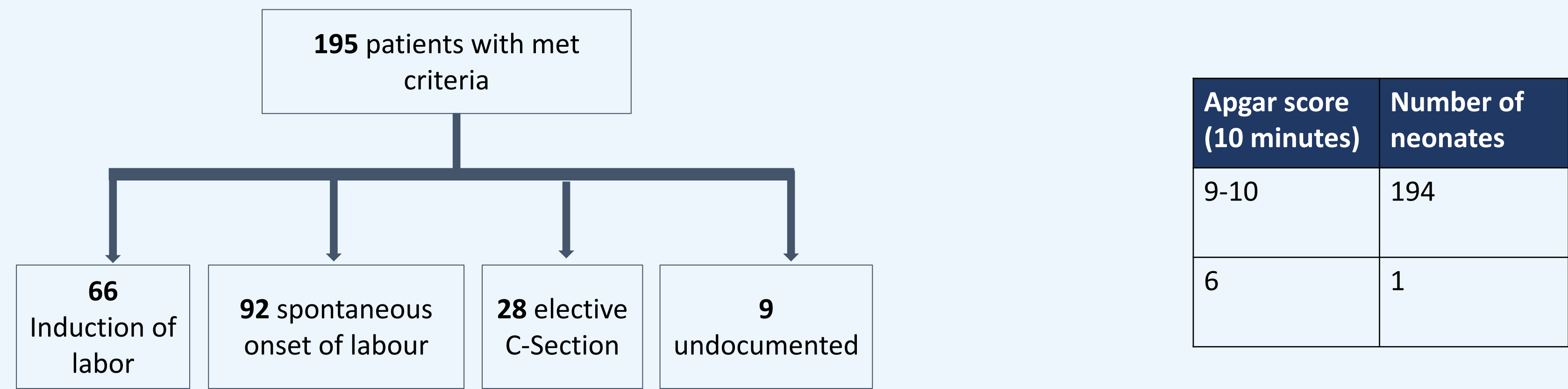


Figure 6: Mode of delivery for patients meeting DRC (left) and neonatal outcome (right). All deliveries were uncomplicated with no neonatal concerns apart from one infant requiring life support and transfer to NICU.

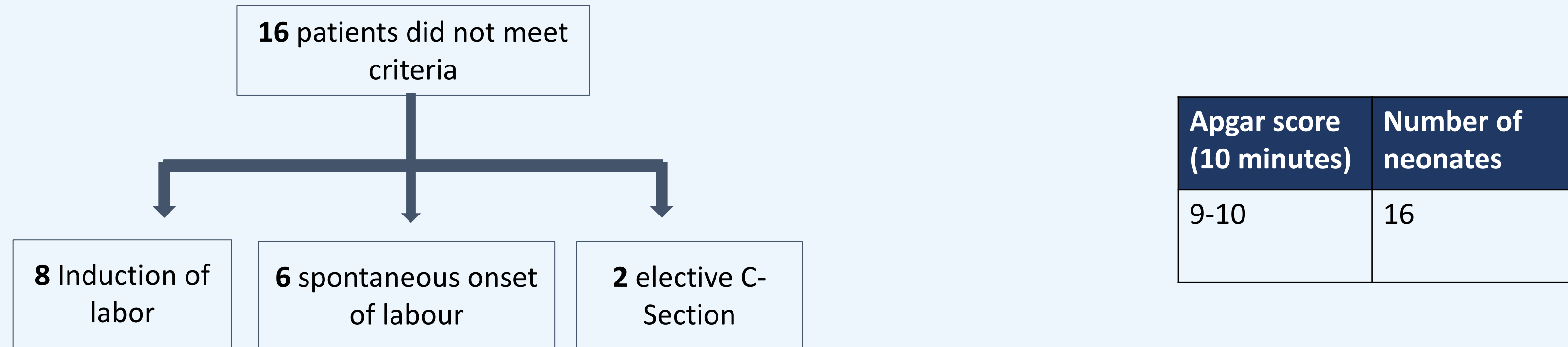


Figure 7: Mode of delivery for patients with unmet DRC (left) and neonatal outcome (right). Out of the 8 that had induction of labour, 5 were uncomplicated spontaneous vaginal deliveries (SVD) . There were two further SVDs with primary post- partum haemorrhage and significant SVDs meconium. The last IOL had ventouse for failure to progress. In the 6 that had spontaneous onset of labour, there were 4 uncomplicated SVD, 1 forceps delivery and 1 category 3 C-section . Both elective C-sections were indicated for breech presentation, with no complications. All neonates were healthy with APGAR scores of 9-10 at 10 minutes.

Conclusion and Next Steps

- The results of this audit demonstrate that trust guidelines on cCTG were correctly followed in the majority of cases.
- A minority of patients did not receive repeat cCTGs within the correct time-frame. These discrepancies highlight the importance of **acting on clinical picture** and **following through with more significant management options** where there may be multiple reasons for failing DRC.
- To aid decision making, an improved management tool which stratifies management options based on DR code for not meeting criteria has since been created
- To tackle poor user-confidence, a **training on antenatal cCTG** was embedded into a **foetal monitoring study day**
- Further areas that warrant consideration are the impact of patient demographic factors on cCTG indication, result, management, and outcome