

# What is the "normal" fetal heart rate?

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## Abstract

**Aim.** There is no consensus about the normal fetal heart rate. Current international guidelines recommend for the normal fetal heart rate (FHR) baseline different ranges of 110 to 150 beats per minute (bpm) or 110 to 160 bpm. We started with a precise definition of "normality" and performed a retrospective computerized analysis of electronically recorded FHR tracings. **Methods.** We analyzed all recorded cardiotocography tracings of singleton pregnancies in three German medical centers from 2000 to 2007 and identified 78,852 tracings of sufficient quality. For each tracing, the baseline FHR was extracted by eliminating accelerations/decelerations and averaging based on the "delayed moving windows" algorithm. After analyzing 40% of the dataset as "training set" from one hospital generating a hypothetical normal baseline range, evaluation of external validity on the other 60% of the data was performed using data from later years in the same hospital and externally using data from the two other hospitals. **Results.** Based on the training data set, the "best" FHR range was 115 or 120 to 160 bpm. Validation in all three data sets identified 120 to 160 bpm as the correct symmetric "normal range". FHR decreases slightly during gestation. **Conclusions.** Normal ranges for FHR are 120 to 160 bpm. Many international guidelines define ranges of 110 to 160 bpm which seem to be safe in daily practice. However, further studies should confirm that such asymmetric alarm limits are safe, with a particular focus on the lower bound, and should give insights about how to show and further improve the usefulness of the widely used practice of CTG monitoring.