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Early detection of patient deterioration in patients with infection or sepsis

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Appendix A

Technical terms of heart rate variability analysis

PUBLISHED AS

Supplementary material to **CHAPTER 7**: Quinten VM, van Meurs M, Renes MH, Ligtenberg JJM, Ter Maaten JC. Protocol of the sepsivit study: a prospective observational study to determine whether continuous heart rate variability measurement during the first 48 hours of hospitalisation provides an early warning for deterioration in patients presenting with infection or sepsis to the emergency department of a Dutch academic teaching hospital. *BMJ Open* 2017; 7: e018259.

Glossary

Term	Description	References
Heart Rate Variability (HRV)	Heart rate variability (HRV) is defined as the temporal variation between sequences of consecutive heart beat intervals. HRV is a marker that reflects the activity of the autonomous nervous system on the sinus node of the heart. Other factors like posture and (deep) breathing, gender, age, physiological and psychological condition, drug interferences, etc. may also influence HRV. A high HRV is considered a normal physiological state of a healthy individual.	1,2
Time domain analysis of HRV	Statistical calculations of consecutive R-R intervals, identifying measurements of variation over time such as standard deviation and range.	3
Frequency domain analysis of HRV	Time series of physiological data may be considered the sum of sinusoidal oscillations with distinct frequencies. The amplitude or power of each sine or cosine wave determines its contribution to the biological signal. The frequency domain of HRV evaluates the power of frequencies contributing to the underlying signal. The frequency domain is analyzed for predefined frequency bands: high frequency (HF, 0.15 – 0.4 Hz), low frequency (LF, 0.04 – 0.15 Hz) and very-low frequency (VLF, 0.003 – 0.04 Hz).	3
N-N interval	The Normal to Normal interval. This is the interval between consecutive normal sinus QRS complexes on an ECG.	3
SDNN	The standard deviation of N-N intervals for the time domain. The SDNN reflects the variability caused by all cyclic components in the period of the recording.	2,3

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