

Supplemental Digital Content 1: Additional methodological detail

Calculation of the intensity gradient

To facilitate calculation of the intensity gradient from a waking wear only protocol, data were processed a second time with non-wear during the night identified and considered part of the sleep window. This window was trusted to be the true edges of the night and values were set to zero using the 'TimeSegments2Zero' file in GGIR. This ensured that non-wear during the night was counted in the least active intensity category (0-25 mg) for calculation of the intensity gradient (2). Remaining non-wear was imputed using the default setting in GGIR. The proportion of the 24h cycle ($24h_{\text{CYCLE}}$) the monitor was worn before imputing zeros for non-wear during the night was generated. This variable reflects the proportion of values set to zero during the sleep period for calculation of the intensity gradient and daily duration of wear for the average acceleration and was retained for use as a co-variate in analyses.

Detection of non-wear

Detection of non-wear has been described in detail previously (See 'Procedure for non-wear detection' in supplementary document to van Hees et al. (24)). Briefly, non-wear is estimated based on the standard deviation and value range of each axis, calculated for 60 min windows with a 15-min sliding window. The window is classified as non-wear if, for at least 2 out of the 3 axes the SD (standard deviation) is less than 3 mg or the value range is less than 50 mg.