

Suggested settings for accelerometer data reduction in ICAD 2.0

File formats and initial data cleaning

All file formats from any generation of ActiGraphs can be submitted to ICAD 2.0. The submitted files will be transformed into (if not already) files with a .dat extension, containing vertical axis count data in 60-sec epoch periods. The reason for choosing a 60-sec epoch is that most of the data included in ICAD 1.0 only exists in this epoch. Each accelerometer file will be examined for threats to the reliability of the file (typically temporally shifted files, spurious or malfunctioning units, or plateauing levels of activity (e.g. 32767 in the CSA 7164 model)). When deployment strategies differ within studies, start date and start time will be altered where ActiGraphs were initialized prior to deployment using a read-in file. The accelerometer data files will be analyzed using KineSoft (KineSoft, Loughborough, UK, <http://www.kinesoft.org>).

Valid day criteria and identification of non-wear

The valid day criteria will be ≥ 8 hours of data per day. Similar to ICAD 1.0, the accelerometer will be considered not worn if a period of 60 minutes or more of consecutive zeros (allowing for 2 minutes of non-zero interruptions).

Physical activity outcome variables

The following variables will be available:

- Wear counts, total valid wear minutes and wear counts/wear minutes (cpm) for the total valid wear period (i.e. summary across all valid days), per weekday/weekend day, per day (Mondays, Tuesdays etc.), and per hour per day (e.g. Monday hour 12:00 – 13:00).
- Accumulated intensity-specific sedentary time and physical activity for total valid wear period, per weekday/weekend day, and per day (Mondays, Tuesdays etc.).
- Minutes in continuous bouts of intensity-specific sedentary time and physical activity for total valid wear period, per weekday/weekend day, and per day (Mondays, Tuesdays etc.).

For the intensity-specific variables we suggest to include the cut-points for preschoolers published by Pate et al (2) and the cut points for children and adolescents published by Evenson et al (1) as well as a block-approach summing time spent in narrow blocks of intensity (e.g. 0-50, 50-100 cpm, 100-150 cpm, etc.). This block-based approach allows matching to other cut-points users would like to apply, without processing the data for each exact cut-point available. The intensity-specific variables will be available as accumulated time (number of minutes) and minutes in bouts (minutes spent in continuous bouts of 0-3, 0-10, 3-5, 5-10, 10-20, 20-30, 10+ and 30+ minutes).

References

1. Evenson KR, Catellier DJ, Gill K, et al. Calibration of two objective measures of physical activity for children. *J Sports Sci* 2008;26:1557-65.
2. Pate RR, Almeida MJ, McIver KL, et al. Validation and calibration of an accelerometer in preschool children. *Obesity (Silver Spring)* 2006;14:2000-6.

Table 1. Suggested cut points for sedentary time and intensity specific physical activity

Variable name	Explanation	Accumulated minutes (totals, weekend/weekday, day by day, hour by hour)	Bouted minutes (totals, weekend/weekday, day by day)
0_50	0 – less than 50	Yes	No
50_100	50 – less than 100	Yes	No
100_150	100 – less than 150	Yes	No
150_250	150 – less than 250	Yes	No
250_500	250 – less than 500	Yes	No
500_750	500 – less than 750	Yes	No
750_1000	750 – less than 1000	Yes	No
1000_1500	1000 – less than 1500	Yes	No
1500_2000	1500 – less than 2000	Yes	No
2000_2500	2000 – less than 2500	Yes	No
2500_3000	2500 – less than 3000	Yes	No
3000_3500	3000 – less than 3500	Yes	No
3500_4000	3500 – less than 4000	Yes	No
4000_4500	4000 – less than 4500	Yes	No
4500_5000	4500 – less than 5000	Yes	No
5000_6000	5000 – less than 6000	Yes	No
6000_8000	6000 – less than 8000	Yes	No
8000_up	8000 - 99999	Yes	No
Sedentary_50	0 – less than 50	Yes	Yes
Sedentary_100	0 – less than 100	Yes	Yes
Sedentary_150	0 – less than 150	Yes	Yes
LPA_50_2000	50 – less than 2000	Yes	Yes
LPA_100_2000	100 – less than 2000	Yes	Yes
LPA_150_2000	150 – less than 2000	Yes	Yes
LPA_50_3000	50 – less than 3000	Yes	Yes
LPA_100_3000	100 – less than 3000	Yes	Yes
LPA_150_3000	150 – less than 3000	Yes	Yes
MPA_2000_6000	2000 – less than 6000	Yes	Yes
MPA_3000_6000	3000 – less than 6000	Yes	Yes
VPA_6000_up	6000 - 99999	Yes	Yes
MVPA_2000_up	2000 - 99999	Yes	Yes
MVPA_3000_up	3000 - 99999	Yes	Yes
LVPA_50_up	50 - 99999	Yes	Yes
LVPA_100_up	100 - 99999	Yes	Yes
LVPA_150_up	150 - 99999	Yes	Yes
Evenson_SED	0 – less than 101	Yes	Yes
Evenson_LPA	101 – less than 2296	Yes	Yes
Evenson_MPA	2296 – less than 4012	Yes	Yes
Evenson_VPA	4012 – 99999	Yes	Yes
Evenson_MVPA	2296 - 99999	Yes	Yes
Evenson_LVPA	101 - 99999	Yes	Yes
Pate_SED	0 – less than 800	Yes	Yes
Pate_LPA	800 – less than 1680	Yes	Yes
Pate_MPA	1680 – less than 3368	Yes	Yes
Pate_VPA	3368 - 99999	Yes	Yes
Pate_MVPA	1680 – 99999	Yes	Yes
Pate_LVPA	800 – less than 99999	Yes	Yes

LPA – Light physical activity; MPA – moderate physical activity; VPA – vigorous physical activity; MVPA – moderate-to-vigorous physical activity; LVPA – light-to-vigorous physical activity.

Table 2. Suggested operationalization of the bouts of sedentary time and intensity-specific physical activity.

Variable name	Start	End	Exceptions
0-3min	00:00:00	00:03:00	00:00:00
3-5min	00:03:00	00:5:00	00:00:00
5-10min	00:05:00	00:10:00	00:00:00
10-20min	00:10:00	00:20:00	00:02:00
20-30min	00:20:00	00:30:00	00:02:00
30+min	00:30:00	23:59:00	00:02:00
0-10min	00:00:00	00:10:00	00:00:00
10+min	10:00:00	23:59:00	00:02:00