GGIR Parameter Notes

**strategy**: how to deal with knowledge about study protocol.

Value = 1 means select data based on hrs.del.start, hrs.del.end, and maxdur.

Hrs.del.start - how many HOURS after start of experiment did wearing of monitor start?

-we will use 0 hrs as default, adjust if needed per Pp

hrs.del.end - how many HOURS before the end of the experiment did wearing of monitor definitely end?

-use 0 as default, adjust if needed

maxdur - How many DAYS after start of experiment did experiment definitely stop? (set to zero if unknown = default)

-set to 10 days, adjust if needed

Value = 2 makes that only the data between the first midnight and the last midnight is used for imputation.

Value = 3 only selects the most active X days in the file where X is specified by argument ndayswindow.

If strategy is set to value 3, then check out arguments ndayswindow (If strategy is set to 3 then this is the size of the window as a number of days)

Value = 4 to only use the data after the first midnight

**includedaycrit** – minimum required number of valid hours in day specific analysis

-go with 10 hrs

-10 seems pretty standard

-Matthews et al. (2012) - “Some consensus has emerged around the use of a 10-hour per day minimum to determine adequate wearing in most studies, but some studies may select alternate thresholds depending on their objectives and the population studied.” (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3543867/>)

-Tudor-Locke et al. (2012) - “Researchers were also almost p#Perfectly consistent in defining a valid day as 10 or more hours of wear time, which is also the definition provided by SAS syntax. (In 2 of the 4 studies that did not report nonwear criteria, we assumed that they used this definition because they reported using SAS syntax.) Mâsse et al ([57](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3457743/#R57)) compared results of studies that used different definitions of a valid day, and although they did not recommend a specific number of hours of wear time to define a valid day, they noted that the strictest requirement (≥12 h/d) negatively affected sample size. They also speculated that stricter requirements might unduly limit inclusion of inactive people, thereby affecting overall data distribution.” (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3457743/>)

**mvpathreshold** - Threshold for MVPA estimation. This can be a single number or an array of numbers, e.g. c(100,120). In the later case the code will estimate MVPA seperately for each threshold. If this variable is left blank c() then MVPA is not estimated

-we should set multiple (3) common thresholds, depending on journal we can pick which one to use but have the data for all 3 thresholds, do a lit review to find 3 common ones to use then verify w/ kevin

-no default?

-not as much consensus on this, overall a lot of debate - Pedišić & Bauman (2015) - “Across 15 calibration studies of Actigraph accelerometers, the lower threshold for MVPA for adults ranged from 191 to 3285 counts per minute (cpm).” (<https://bjsm.bmj.com/content/bjsports/49/4/219.full.pdf?legid=bjsports%3B49/4/219&casa_token=9RMc7AqSxfkAAAAA:k6w3m78ym9XKuxqXN9D9Mq--5j-W2gGzhSEgAfHnZmbyPlsCONplUjBMgib7v9kdErZHid1KG6_8>)

**boutcriter** - The variable boutcriter is a number between 0 and 1 and defines what fraction of a bout needs to be above the mvpathreshold

-this might be helpful? Effect of breaks in MVPA in young women - Ayabe & Kumahara (2020) - <https://www.sciencedirect.com/science/article/pii/S0966636220302332?casa_token=D7l2kRaE1q8AAAAA:LzkWrOtf60TdkNGj5gzj3sSyjWb--Y0sl9IN4eALmrA4-54EAXSkDHssAHZqsGriDbxWxX74Yzo>

**2.3.3 Configure what fraction of a bout needs to meet the threshold (cut-point) crtieria boutcriter.in, boutcriter.lig, boutcriter.mvpa. Note that bout.metric and the boutcriter arguments are complementary. When bout.metric = 4 combined with boutcriter.mvpa=0.8 means that an MVPA bout can have interruptions (i.e., the time out of MVPA intensity) that meet the following criteria:**

1. A single interruption can last < 1 min
2. Repeated interruptions are allowed provided that their total time does not exceed 20% of the bout duration
3. The time spent in the interruptions is included in the duration of the MVPA bout. For example: A 25-minute bout can have two 1 minute interruption, but not a single 2-minute interruption. Here, the full 25 minutes would count towards the duration of the MVPA bout.

-use bout.metric = 4 as recommended by GGIR

**2.3.4 Published Cutpoints**

Cut-points to estimate time spent in acceleration levels that are roughly liked to levels of energy metabolism have been proposed by:

* [Esliger et al 2011](https://journals.lww.com/acsm-msse/Fulltext/2011/06000/Validation_of_the_GENEA_Accelerometer.22.aspx): wrist and waist in adults.
  + Male & female adults ages 40-65
* [~~Schaefer et al 2014~~](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3960318/)~~: wrist in 6-11 year old children.~~
* [~~Roscoe et al 2017~~](https://link.springer.com/article/10.1007/s00431-017-2948-2)~~: wrist in 4-5 year old pre-school children.~~
* [Phillips et al 2013](https://www.jsams.org/article/S1440-2440(12)00112-0/fulltext): wrist and hip in 8-14 year olds.
* [~~Vaha-Ypya et al 2015~~](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0134813)~~: hip in adults.~~
  + ~~Male & female adults, mean age 35 (SD=11)~~
* [Hildebrand et al 2014](https://journals.lww.com/acsm-msse/Fulltext/2014/09000/Age_Group_Comparability_of_Raw_Accelerometer.17.aspx) and [2016](https://onlinelibrary.wiley.com/doi/abs/10.1111/sms.12795): wrist and hip in 7-11 and 21-61 years old.

-play around w/ esliger, phillips, & hildebrand thresholds

-phillips & esliger thresholds scale differently than hildebrand, require dif arguments in ggir

**Esliger 2011, Phillips 2013:**

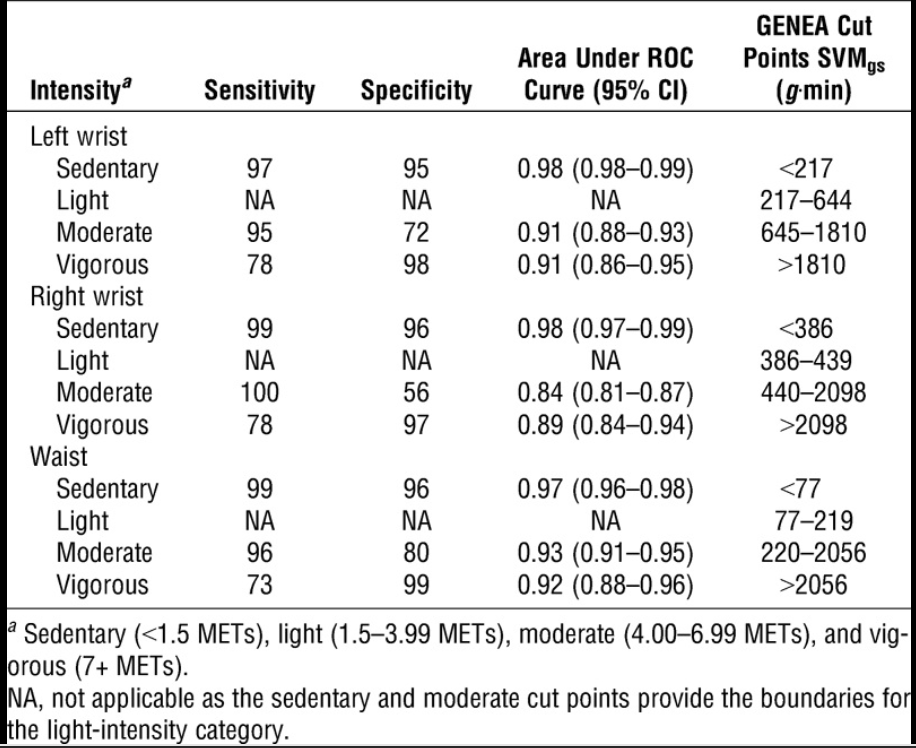
* In GGIR use metric ENMOa instead of ENMO with arguments do.enmoa = TRUE, do.enmo = FALSE, and acc.metric=”ENMOa”.
* threshold.lig = (LightCutPointFromPaper/80) \* 1000
* threshold.mod = (ModerateCutPointFromPaper/80) \* 1000
* threshold.vig = (VigorousCutPointFromPaper/80) \* 1000
* mvpathreshold = (ModerateCutPointFromPaper/80) \* 1000
* In the part2 results you will need the MVPA estimates that are related to ENMOa, not ENMO.
* In the part 5 results everything will be based on the new cut-points.

**Hildebrand 2014 and Hildebrand 2016:**

* Use default setting do.enmo= TRUE, acc.metric=”ENMO”
* Use the cut-points as provided by Hildebrand directly. No need for scaling.

-next step: identify thresholds we want to use

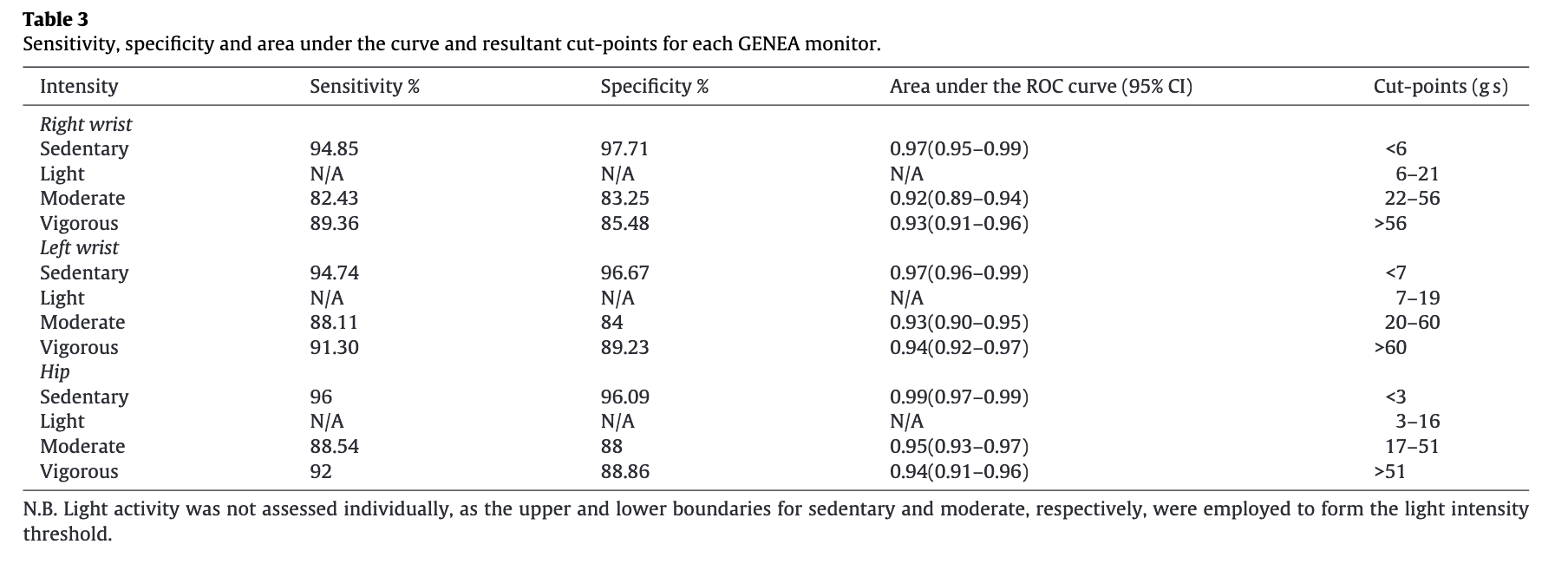
**Esliger et al. (2011):**



From discussion: “The GENEA SVMgs (*g*·min) cut points established in this study demonstrated excellent accuracy for classifying physical activity intensity across the intensity spectrum. Because this is the first article to report cut points for the GENEA, it is not possible to compare these values with other studies. Although the accuracy of the GENEA was greatest at the waist, it also performed well at the wrist, with the left wrist being more accurate than the right. The diminished accuracy experienced on the right wrist was likely due to differences in participant handedness; that is, extraneous movements recorded during the activity conditions were more likely to occur on the right wrist (e.g., scratching, adjusting clothing/glasses, hand gestures). However, given the small number of left-handed participants (*n* = 5), testing of the hypothesis was untenable.”

5/12 - change instructions to non-dominant hand, use left wrist cutpoints from esliger – add PMID to code

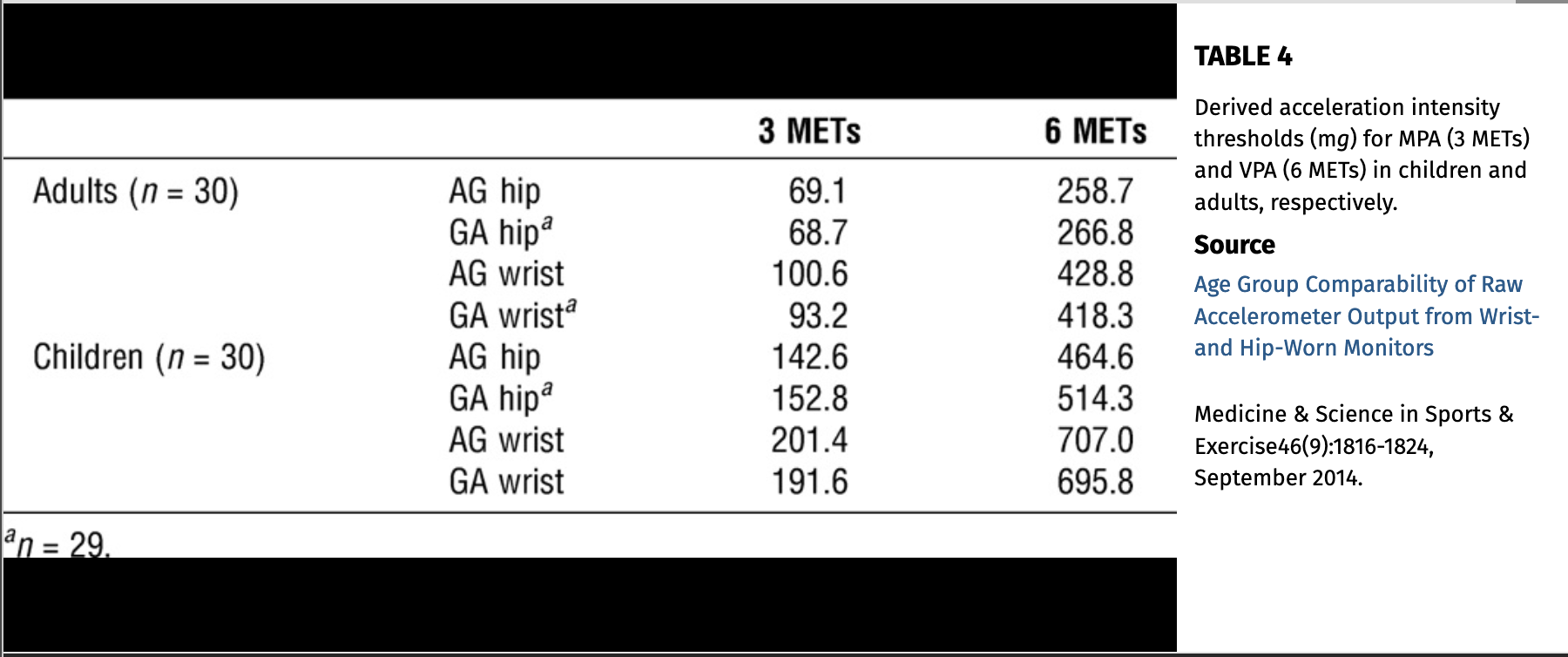
**Phillips et al. (2013):**

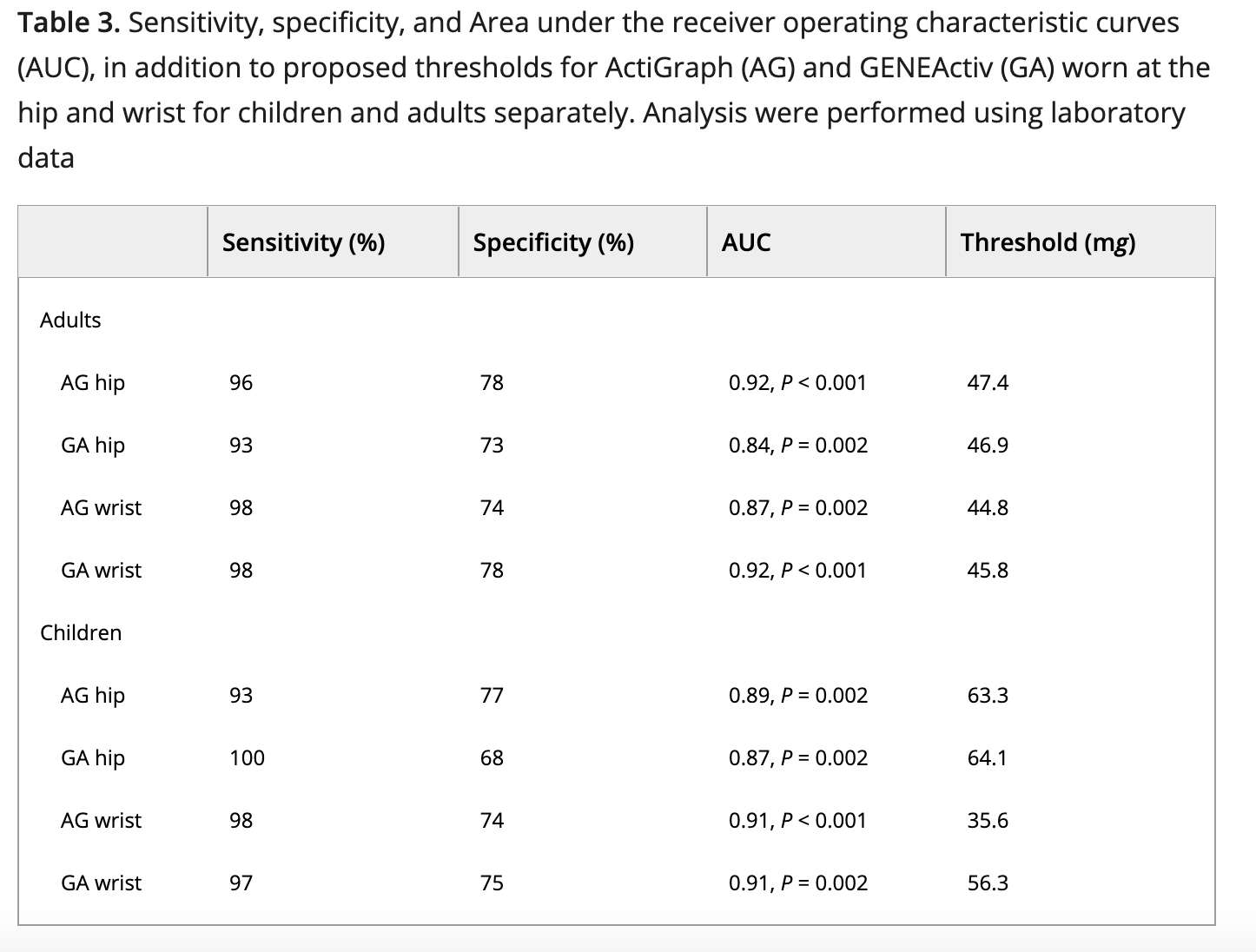


**Hildebrand et al. (2014) & (2016):**

(Note – papers from same sample, 2014 paper covers moderate/vigorous thresholds and 2016 paper covers sedentary/light threshold)

Hildebrand closest to ggir defaults





5/12 - Keep hildebrand thresholds, find another set for actigraph specifically

Find citation for boutdur, adjust numbers if needed (part 5)