Practical 2: WAMAA Physical Activity Worksheet – Manipulate Data

Wave Processing & Outputted files:

You have been supplied with 3 PAT PAWS files. All of which should have been processed following the instructions on the previous worksheet.

Data Manipulation:

Preparing the dataset

To be able to interpret the data more easily a couple of things will need to be done (which were covered in the early presentations). This will need to be done for both the hourly and minute level datasets (the bold **Hour** or **minute** at the beginning of each main bullet outlines which data files that step needs completing on).

- **Hour and Minute:** Strip out the section of data (4hrs) that the monitor was worn for. Each of the files has a given wear period. We recommend resaving any .csv files as .xlsx files to allow equations to be saved.
  - The table below shows the periods that need to be kept.
  - You can delete the data before and after the "Wear Start" and "Wear End" times.

ID	Wear Date	Wear start	Wear end
PAWS02	08/06/2019	11:00	15:00
PAWS03	15/06/2019	09:00	13:00
PAWS04	15/06/2019	14:00	18:00

- **Hour and Minute:** Split date & time into individual columns
  - Put in two blank columns to the right of the timestamp variable
  - Highlight the timestamp column
  - In the Data Tab, click "Text to Columns"
  - Within the option split by Space
  - Option after that within the time variable you can replace all "00:00000" with missing.
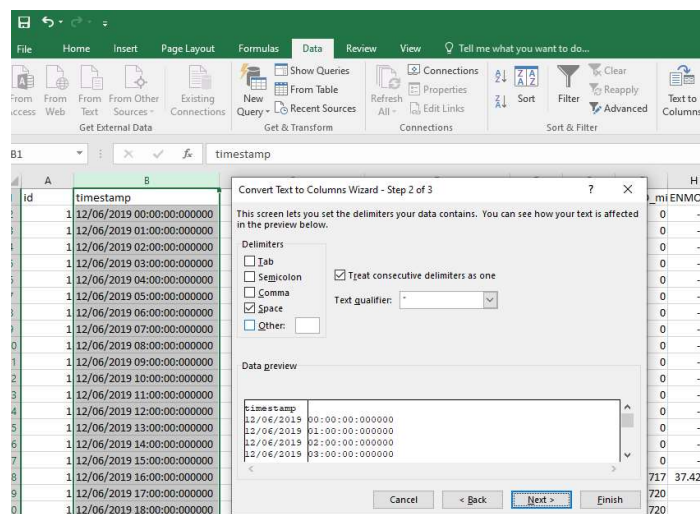
- **Hour and Minutes:** Create a Pwear variable to indicate proportion of wear for the given time period
  - Create a blank column with the title <u>PWear</u>
  - Run the code: =**ENMO_0_99999/(60/5)/***Time resolution(in minutes)*.
    - *Time resolution* is the time resolution of the output file in minutes (hourly = 60, 1 minute = 1)
    - Use ENMO_0_99999 as this is the variable indicating any movement (and thus wear) in the given timeframe
    - (60/5) is how many epochs fit into a minute. In this instance, our processing epoch is 5 seconds, but if this was set differently the new processing epoch would need to be used instead.
  - This is not in minutes. This gives an indication of the <u>portion of the wear period that the device was worn.</u>
- **Hour and Minutes:** Create wear time variable that will be used for within the calculations of the thresholds. This variable will be displayed in minutes
  - Create a blank column with the title <u>WearTime</u>
  - Run the code: **= ENMO_0_99999/(60/5)**
    - Similar to the code above, but only divide by the number of epochs in a minute (which for a 5 sec processing epoch is 12).

Practical Questions:

Work through interpreting the given wear periods to see if you can find the following:

<u>For the following questions please use the hourly level data set</u>

1. **Which file has the most movement across the 4 hour of wear?**
   - Across the 4 hours of the file, you could add together the ENMO_Mean variable
   - This will give the sum of the ENMO_mean for the 4 hours of wear
   - At this point we are not looking at high levels of activity (i.e. MVPA), just total movement.
2. **Which file has the highest activity within an hour?**
   - Looking specifically at ENMO_mean, of the three files, which file has the highest hour, indicating that was the most active hour for the data set.
3. **Which file has the most amount of time spent below ENMO_30_99999 across all four hours?**
   - Time spent below 30, could be deemed as "Sedentary" time, so this could be used as a marker for inactivity.
   - Equation = WearTime-(ENMO_30_99999/(60/5))
   - Make sure to minus the time spent above 30_99999 from WearTime to ensure you are looking at time below.
4. **If you were to set the sedentary category either higher or lower, at what point would a different file have the most sedentary minutes?**
   - Have a look at time spent below ENMO_20_99999, ENMO_40_99999, ENMO_60_99999 (using same equation from Q4 but adjusting threshold)
   - If any of these were used does the file that looks the most sedentary across the 4 hours change?

5. **Which file has the most amount of time spent above ENMO_125_99999?**
   - The amount of time above this category could be classed as time in Moderate to Vigorous Physical Activity (MVPA).
   - Equation: =ENMO_125_99999/(60/5)
6. **If you were to change the point at which we put MVPA, which threshold would need to be selected to change the file with the most MVPA time?**
   - Have a look at time spent above ENMO_100_99999, ENMO_150_99999, ENMO_600_99999, ENMO_800_99999 (using same equation from Q6 but adjusting threshold)
   - If any of these were used does the file that has the most MVPA across the 4 hours change?

For the following questions please use the minute level data set

7. **Which file has the highest (peak) ENMO_mean value?**
   - The same principle can be applied as question 2.
8. **Which file has the most 10 minute bouts of activity over 30mg?**
   - Please use the ENMO_mean to see how many minutes are spent above 30mg
     - This can be done by running the =IF command in excel in a new column, so if the value is above 30, put a 1, then count the amount of continuous 1s, if there are 10 or more before a 0, that could count as a bout.
     - Equation for marking if above 30mg: =if(ENMO_mean>=30, 1, 0)
     - Equation for marking continuous runs of >30: =if(new_marking_var = 1, add 1 to the cell above in continuous column, if not put a 0).
     - **NB: Do not label column for marking continuous bouts otherwise the equation will not work in the first cell**
   - Explore other lengths of bouts maybe 20 minutes or 30 minutes to see how this changes things.
9. **Which file is has the longest continuous bout of movement over 30mg?**
   - Following the same principle as point 8 within the minute data. You can see which file has the longest continuous bout of movement above 30mg.
10. **How long was the longest bout of movement over 30mg?**
    - Using the information gained from question 9. How long was the longest bout in that file?

Please re-join the zoom meeting at 14:00 (BST) – If you have time left after completing the worksheet please continue to have a look through the data practising calculations on both minute and hourly data