ReadMe file for accelerometry data set from upper limb dose RCT for persons with stroke
9/2021, CE Lang

These accelerometry data were collected from 2012-2015 from persons with stroke participating in an upper limb rehabilitation clinical trial. To qualify for the trial, participants had to be ≥ 6 months post stroke and have mild-to-moderate upper limb paresis. These participants match the referent sample of community-dwelling adults with respect to age, race, ethnicity, and other demographic factors.

Details of the sample and data collection procedures can be found in:

- Lang CE, Strube MJ, Bland MD, Waddell KJ, Cherry-Allen KM, Nudo RJ, Dromerick AW, Birkenmeier RL (2016) Dose-response of task-specific upper limb training in people at least 6 months post stroke: A Phase II, single-blind, randomized, controlled trial. *Annals of Neurology*, 80:342-354.
- Waddell KJ, Strube MJ, Bailey RR, Klaesner JW, Birkenmeier RL, Dromerick AW, Lang CE (2017) Does task-specific training improve upper limb performance in daily life post-stroke? *Neurorehabilitation and Neural Repair*, 31:290-300.

These papers should be cited in any cases of presentation or publication with the data.

The file, *DoseTrialDataShare_20210826.csv*, contains the participant numbers, some demographics, weekly scores on the primary outcome, the Action Research Arm Test, along with other variables. Group assignment and the amount of movement practice (in both time and number of repetitions) during the trial intervention are listed in the final columns. Three of the four groups received the intervention for 8 weeks, while one of the four groups, the "individualized maximum" group, continued to receive the intervention for additional weeks until achieving plateau on the primary outcome measure. Thus, there are more weekly measurements for about 25% of the participants. Note that not every participant in the trial has accelerometry data; accelerometry data are most likely to be missing from the first trial participants recruited – which is not directly related to subject ID in this study.

Participants wore Actigraph GTX3 accelerometers on both wrists and both ankles for 26 hrs at baseline, during the beginning of each treatment week (TW2 – TW8 or beyond), at the first post-intervention assessment (p1) just after the end of treatment and the second post-intervention assessment (p2) 2 months later. During the first 90 minutes of the recording during the treatment weeks, the participant completed the weekly assessment and an upper limb therapy session. The remaining recorded hours were from activity outside of the laboratory.

Files are stored in folders by participant number. Each participant folder contains folders from the time points in the study and some additional files. The additional files include a summary of the processed variables from each time point, processing notes and other miscellaneous items. Each time point folder contains folders for the four limbs, named LUE, RUE, LLE, RLE, accordingly. There are other files in each time point folder that may or may not be useful. The other files contain output variables and graphs, generated via MATLAB.
Within each limb folder, there will be at least four files.

*.gt3x is the original Actigraph file and needs to be opened with Actigraph software.
*.agd is also an Actigraph file. It is used for visualizing data in the Actigraph software. There may be two *.agd files that were downsampled to different bin widths (e.g. 10 sec).
*RAW.csv is a comma-separated values file of the 30 Hz raw data, with accelerometry values in gravitational units (m/s^2).

*1sec.csv is a comma-separated values file with filtered and resampled data. Using the proprietary ActiLife software, data were bandpass filtered between 0.25 and 2.5 Hz and binned into 1 second epochs, where each second is the sum of the values within that second. Values are in activity counts, defined by the software as 1 activity count = 0.001664 gravitational units (m/s^2).

[Note that this file storage/file naming system is a good example of how not to store data for future access and sharing. Please direct questions about the data to langc@wustl.edu]

Additional papers published using these accelerometry data include:

- Bailey RR, Klaesner JW, Lang CE (2015) Quantifying real-world upper limb activity in nondisabled adults and adults with chronic stroke. *Neurorehabilitation and Neural Repair*, 29:969-978.
- Urbin MA, Bailey RR, Lang CE (2015) Validity of Body-Worn Sensor Acceleration Metrics to Index Upper Extremity Function in Hemiparetic Stroke. *Journal of Neurologic Physical Therapy*, 39:111-118.
- Urbin MA, Waddell KJ, Lang CE (2015) Acceleration metrics are responsive to change in upper extremity function of stroke survivors. *Archives of Physical Medicine and Rehabilitation*, 96:854-861.
- Waddell KJ, Lang CE (2018) Comparison of self-report vs. sensor-based methods of upper limb activity outside the clinic. *Archives of Physical Medicine and Rehabilitation*, 99:1913-1916.
- Barth J, Klaesner JW, Lang CE (2020) Relationships between accelerometry and general compensatory movements of the upper limb after stroke. *Journal of NeuroEngineering and Rehabilitation*, Oct 20;17(1):138. doi: 10.1186/s12984-020-00773-4.