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FIRST-DailyLife Example Grant Proposal Text

Uniaxial Accelerometers (GT1M ActiGraph on hip)

Physical activity was objectively measured using GT1M ActiGraph accelerometer (ActiGraph, LLC, Pensacola, FL). This small uniaxial monitor measures and records vertical acceleration as counts/minute, a standard intensity indicator of the movements of each minute. Participants wore the accelerometer for 7 consecutive days on a belt at the natural waistline on the right hip with the right axilla upon arising in the morning until retiring at night (wear time or waking hours), except during water activities. Nonwear time will be defined as intervals of at least 90 consecutive minutes of 0 counts with allowance for up to 2 minutes of counts between 0 and 100. A valid day of wear time is accelerometer evidence of ≥10 hours of monitoring per day. The proposed study will include participants who had at least 3 valid days of accelerometer monitoring at baseline to support reliable assessments. Sedentary time will be identified on a minute by minute basis defined as <100 accelerometer activity counts/minute during wear time. A sedentary break will be defined as an interruption in sedentary time when the count was 100 or more per minute. Duration of sedentary bout will be defined as a period of time lasting 5 minutes or more when count values fall into the sedentary range with only 1 allowable minute outside the sedentary range. Physical activity duration/intensity level during sedentary breaks will be computed using aggregated accelerometer counts, light activity minutes, and moderate/vigorous physical activity minutes.

Matthews CE, Ainsworth BE, Thompson RW, Bassett DR, Jr. Sources of variance in daily physical activity levels as measured by an accelerometer. *Medicine and science in sports and exercise.* Aug 2002;34(8):1376-1381.

Song J, Semanik P, Sharma L, et al. Assessing physical activity in persons with knee osteoarthritis using accelerometers: Data from the Osteoarthritis Initiative. *Arthritis care & research.* Dec 2010;62(12):1724-1732.

Troiano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, McDowell M. Physical activity in the United States measured by accelerometer. *Medicine and science in sports and exercise.* Jan 2008;40(1):181-188.

Gennuso KP, Matthews CE, Colbert LH. Reliability and Validity of Two Self-Report Measures to Assess Sedentary Behavior in Older Adults. *Journal of physical activity & health.* Aug 7 2014.

Triaxial Accelerometers (GT3X ActiGraph on hip)

Physical activity and sedentary behavior were measured by waist-worn accelerometer. We applied non-wear algorithms developed by Choi et al to define non-wear periods as ≥90 minutes of zero vertical axis activity counts allowing for 2 minutes of interruption with 30-minute upstream and downstream screening for artifactual movements during non-sleep hours. Analysis was restricted to 3 to up to 7 days with complete sleep and valid PA monitoring (non-sleep wear time ≥ 10 hours). Thresholds used by the National Cancer Institute (NCI) on a minute-by-minute basis were applied to waist-worn accelerometer vertical axis activity counts to identify sedentary behavior and physical activity over non-sleep wear time: (1) sedentary behavior 0-99 count/minute, (2) light physical activity (light PA) 100 – 2019 count/minute, and (3) moderate-to-vigorous PA ≥ 2020 count/minute. Because vigorous intensity was very rare in this cohort, hereafter the term moderate physical activity (moderate PA) is used.

Choi L, Liu Z, Matthews CE, Buchowski MS. Validation of accelerometer wear and nonwear time classification algorithm. *Med Sci Sports Exerc.* 2011;43(2):357-364.

Troiano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, McDowell M. Physical activity in the United States measured by accelerometer. *Med Sci Sports Exerc.* 2008;40(1):181-188.

Sleep duration (GT3X ActiGraph on wrist)

Sleep duration was determined using established protocols. Wrist-worn accelerometers were programmed to collect activity and ambient light data in 15-sec epochs. Participants were required to keep a sleep log (bed time, wake time) during the accelerometer monitoring week. Upon return of the accelerometers and sleep diary, data were transmitted electronically to the central reading center at Northwestern University for scoring. Each participant's data was evaluated by a scorer who used a standardized protocol that assessed ambient light intensity and physical activity level from accelerometer, and self-report sleep diary information to determine time in bed and time out of bed. The Cole-Kripke algorithm was applied to identify actual sleep minutes between time in bed and time out of bed.

Patel SR, Weng J, Rueschman M, et al. Reproducibility of a Standardized Actigraphy Scoring Algorithm for Sleep in a US Hispanic/Latino Population. *Sleep.* 2015;38(9):1497-1503.

Baron KG, Reid KJ, Kern AS, Zee PC. Role of sleep timing in caloric intake and BMI. *Obesity (Silver Spring, Md.* 2011;19(7):1374-1381.

Cole RJ, Kripke DF, Gruen W, Mullaney DJ, Gillin JC. Automatic sleep/wake identification from wrist activity. *Sleep.* 1992;15(5):461-469.