Ontology of number of walking bouts at specified bout durations

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**Ontology of number of walking bouts at specified bout durations**

**Definition**
The total # of walking bouts of a certain duration, over a specific period of time.

**Concepts**
- Walking bout:
  - Start/end
  - Minimum duration
  - Minimum interval between bouts
  - Criteria for walking bout

- Bout duration classification:
  - Minimum & maximum duration

- Metadata:
  - Individual-specific variables
  - Environmental variables
  - Context-of-use dependent
  - Measurement modality

**Properties**
- Total # of walking bouts
  - # of bouts, average # of bouts, min/max # of bouts (e.g., per day or week), etc.
  - Initiation timestamp/termination
  - Seconds
  - Minimum # of steps, strides, and/or cadence
  - # of walking bouts lasting less than x seconds/minutes or between x and y seconds/minutes or more than z seconds/minutes (where ‘x’, ‘y’, and ‘z’ are numerical values defining duration), # of short walking bouts, # of long walking bouts, etc.

**Values (or nested properties)**
- Height, age, body mass index (BMI), gender/sex, age, use of walking aid, etc.
- Location, indoor or outdoor, transition of indoor to outdoor (or vice versa), weather, etc.
- Baseline health status, condition or therapeutic area (if relevant), typical comorbidities
- Technology type and model, evaluation algorithm, form factor, GPS, wear location (if wearable)

**Examples**
- Total # of long walking bouts
- Total # of short walking bouts

- E.g., a minimum of **30 seconds** has been used to define walking bouts
- In practice, some define a **3-second or 20-second** resting period between bouts
- Examples of what is considered a bout, from the literature: **Minimum two consecutive strides**; **Minimum six steps**
- Short walking bouts in this example has been defined as walking bouts lasting between ≥30 seconds and <1 minute; whereas long walking bouts were defined as walking bouts lasting ≥2 minutes
Number of walking bouts at specified bout durations

Measure considerations (assumptions & limitations):

- While stepping and walking are related concepts, there is a distinction. Stepping is a component of walking, related to the movement of the foot and its contact with the ground. Walking describes more continuous locomotion, composed of a series of steps, often resulting in a forward displacement of a person’s center of mass. Walking is rhythmic and involves specific cadence, walking speed, stride length, and other kinematic properties. (1,2)

- There is potential for varying definitions of walking and non-walking behavior.

- Wear locations for wearables can drive the biggest differences in measurement (where standing would be represented as the initial movement) and step count prediction algorithms.

- Factors such as: specific day of the week, type of physical activity performed (if applicable), duration of measurement, and other factors to support decision on number of units will need to be collected to get a good estimate of walking bouts describing specific slices in time.

- If a patient uses a walker or cane, but their condition improves and the walking aid is no longer needed, further analysis may be required to account for this change. In addition, walking aids will not necessarily be used for all locomotive activities and may be task- and context-specific.