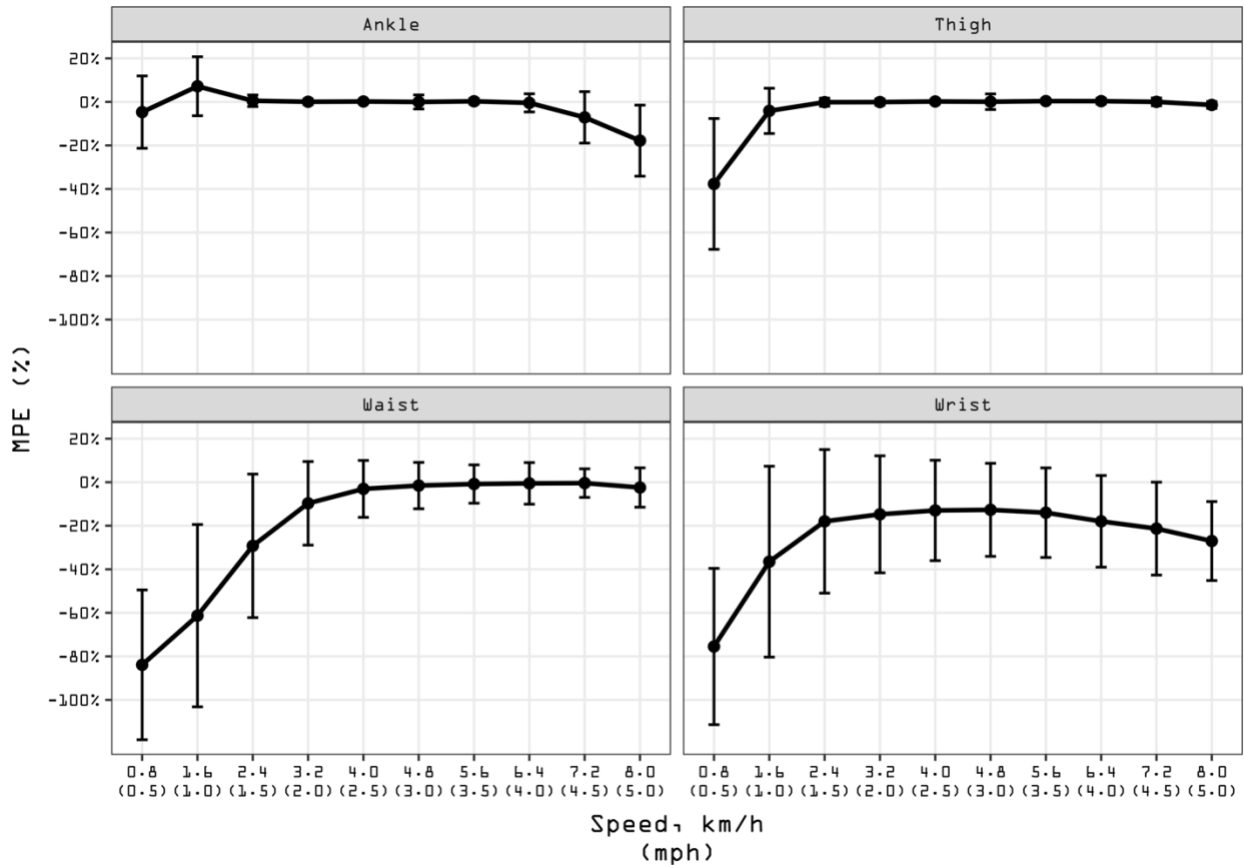1

Additional file 6: Suppl Fig 1 Mean percentage error (MPE) of each wearable technology across walking speeds. Participants walked

on a treadmill for 5-min bouts beginning at 0.8 km/h (0.5 mph) and increasing in 0.8 km/h (0.5 mph). MPE was computed for each
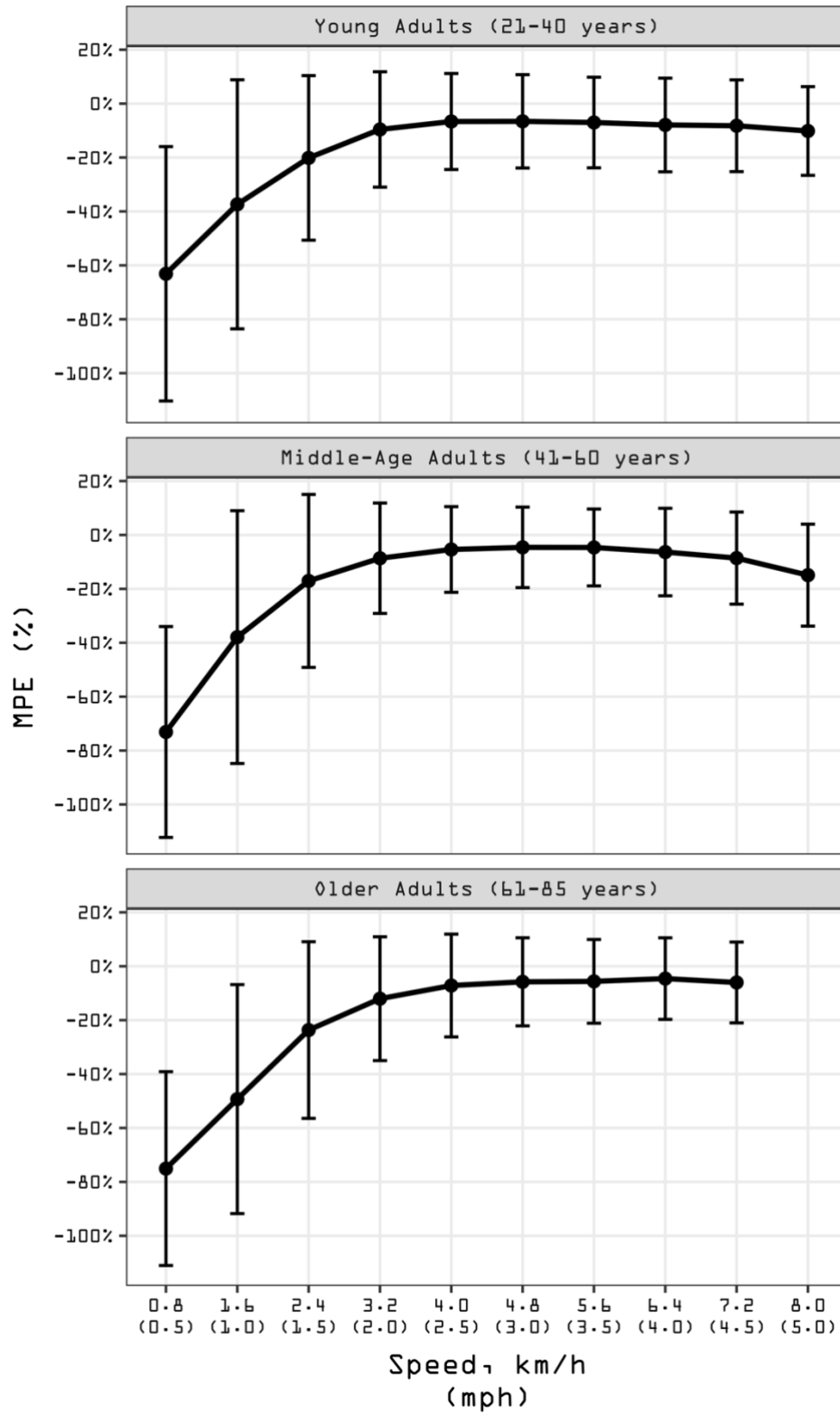
4   person bout subtracting the directly observed steps (criterion measurement) from the wearable technology-derived steps and dividing it

5   by the directly observed steps. The result is a scaled index that explains the difference, regardless of the total number of steps. Black

6   dots represent the averaged MPE across all sample for a given speed. Bars represent standard deviation of MPE. The standard deviation

7   bars are not drawn when they are shorter than the height of the symbol. MPE values closer to 0% indicate improved bias of the wearable

8   technology of interest. See **Additional file 2** for a graphical classification of wearable technologies by age groups.

9

Additional file 6: Suppl Fig 2 Mean percentage error (MPE) across walking speeds presented by

wear location. Participants walked on a treadmill for 5-min bouts beginning at 0.8 km/h (0.5 mph)

and increasing in 0.8 km/h (0.5 mph). MPE was computed for each person bout subtracting the

directly observed steps (criterion measurement) from the wearable technology-derived steps and

dividing it by the directly observed steps. The result is a scaled index that explains the difference,

regardless of the total number of steps. Black dots represent the averaged MPE across specific

wear location for a given speed. Bars represent standard deviation of MPE. The standard deviation

bars are not drawn when they are shorter than the height of the symbol. MPE values closer to 0%

indicate improved bias of wear location of interest. Ankle-worn wearable: StepWatch. Thigh-worn

wearable: activPAL. Waist-worn wearables: Actical, ActiGraph GT9X, Digi-Walker SW-200,

Fitbit One, Fitbit Zip, GENEActiv, NL-1000, PiezoRx. Wrist-worn wearables: ActiGraph GT9X,

21   Apple Watch Serie 1, Fitbit Ionic, Garmin vivoactive 3, Garmin vivoactive HR, Garmin vivofit 2,

22   Garmin vivofit 3, GENEActiv, Polar M600, Samsung Gear Fit2, Samsung Gear Fit2 Pro. See

23   **Additional file 2** for a graphical classification of wearable technologies by age groups and

24   **Additional File 8: Suppl Table 1** for a tabular description of validity indices by wear locations.

25

Additional file 6: Suppl Fig 3 Mean percentage error (MPE) across walking speeds presented by

age group. Participants walked on a treadmill for 5-min bouts beginning at 0.8 km/h (0.5 mph) and

28   increasing in 0.8 km/h (0.5 mph). MPE was computed for each person bout subtracting the directly

29   observed steps (criterion measurement) from the wearable technology-derived steps and dividing

30   it by the directly observed steps. The result is a scaled index that explains the difference, regardless

31   of the total number of steps. Black dots represent the averaged MPE across specific wear location

32   or age group for a given speed. Bars represent standard deviation of MPE. MPE values closer to

33   0% indicate improved bias of the age group of interest. All age groups (21-85 years) wore the

34   Actical, ActiGraph GT9X (Waist), ActiGraph GT9X (Wrist), activPAL, Digi-Walker SW-200,

35   GENEActiv (Waist), GENEActiv (Wrist), NL-1000, and the StepWatch. Young Adults (21-40

36   years) also wore the Fitbit One and Garmin vivofit 2. Middle-Age Adults (41-60 years) also wore

37   the Apple Watch Serie 1, Fitbit One, Garmin vivoactive HR, Garmin vivofit 3, and the Samsung

38   Gear Fit2. Older Adults (61-85 years) also wore the AppleWatch Series 1, Fitbit Ionic, Fitbit Zip,

39   Garmin vivoactive 3, PiezoRx, Polar M600, and the Samsung Gear Fit2 Pro. See **Additional file**

40   **2** for a graphical classification of wearable technologies by age groups. See **Additional File 8:**

41   **Suppl Table 2** for a tabular description of validity indices by age groups.