

Walking and Public Health: Research Insights into the Value of Active Living



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Overview

Physical activity and health (5')

- Health benefits of physical activity
- Aerobic physical activity guidelines

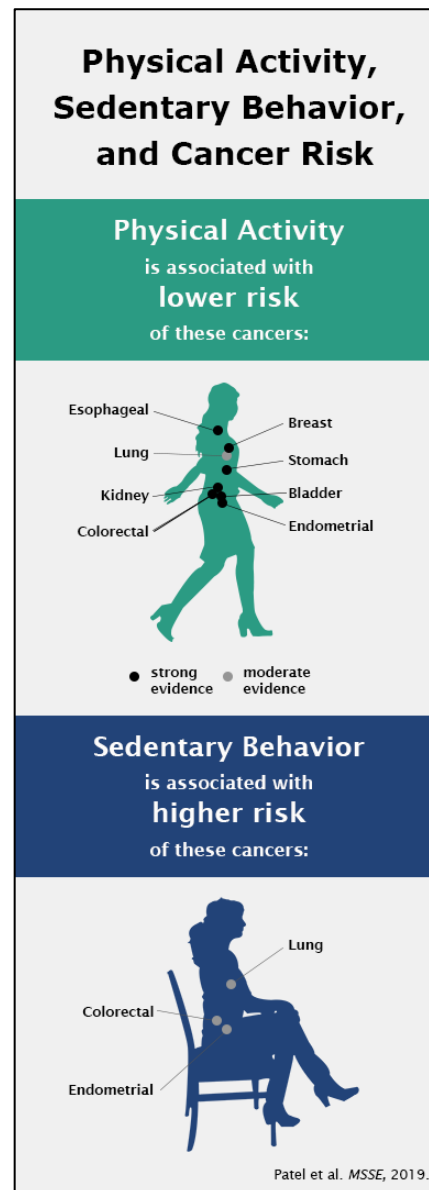
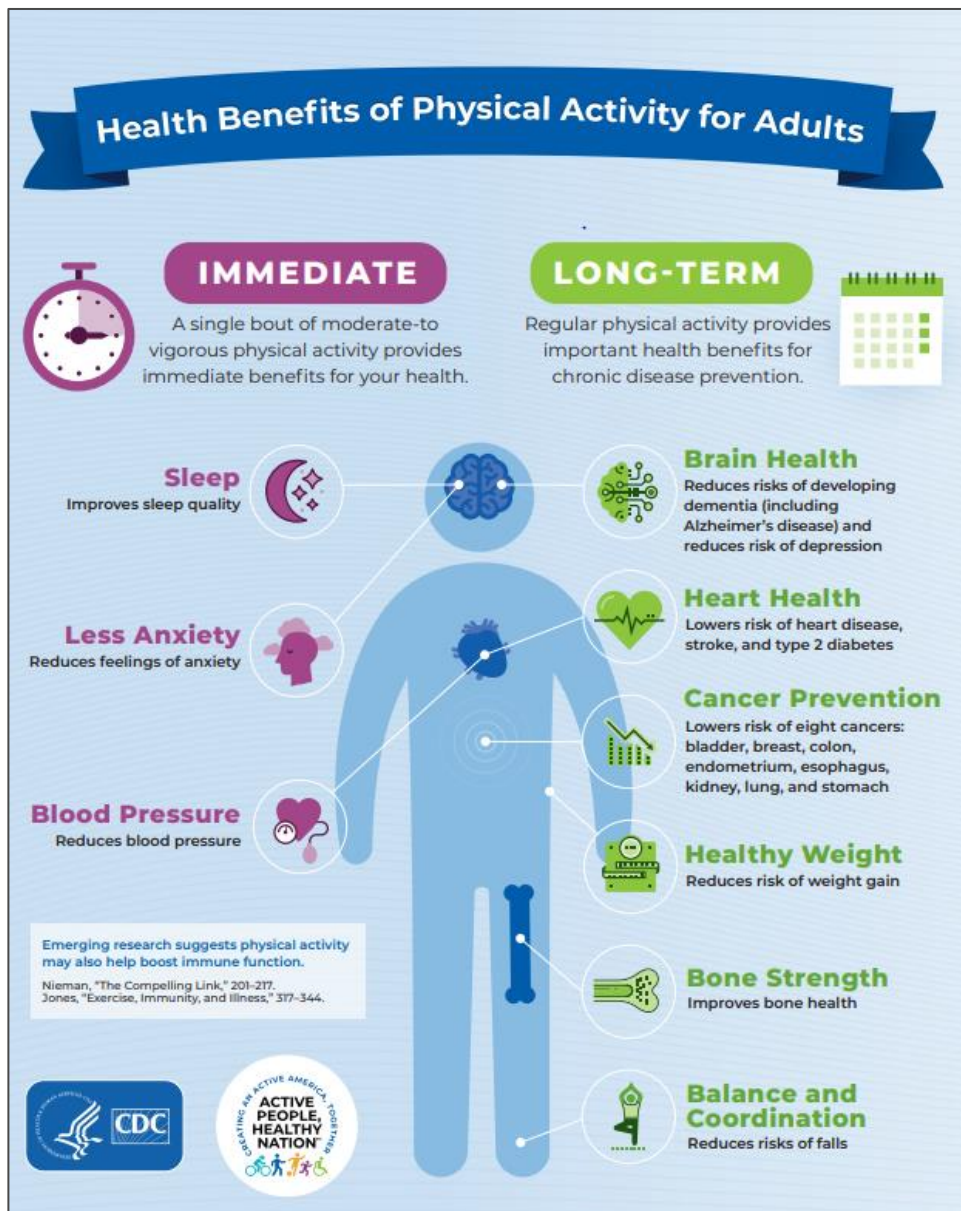
How many steps per day? (13')

- Walking is a popular form of physical activity
- The origin of 10 000 steps
- The science of steps for preventing premature mortality

One step forward (7')

- Setting my step goal
- Implications for population health

Physical activity improves health



70 years of Physical Activity Epidemiology



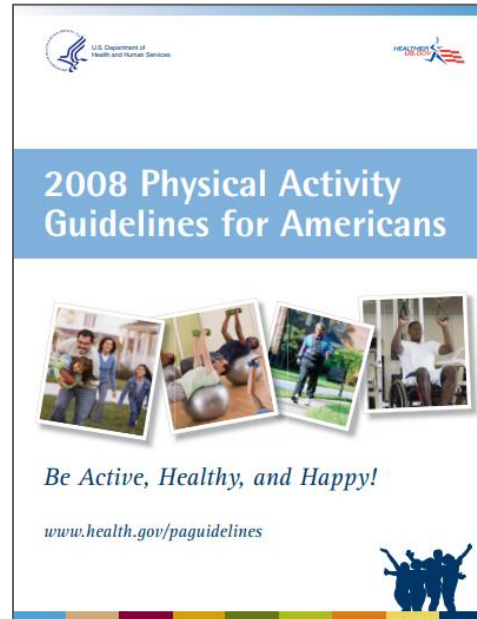
1953



“First” study on physical activity and health



2008



First federal physical activity recommendations



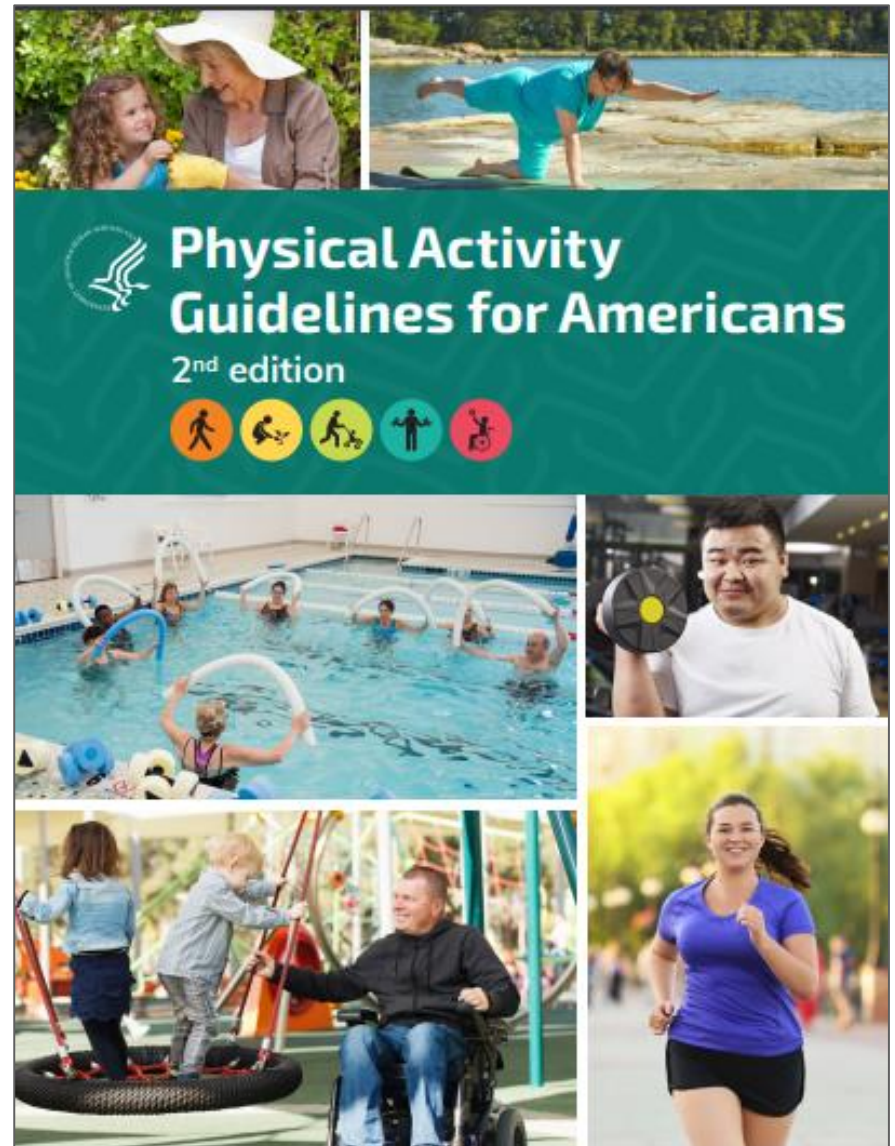
2018



2018

Guidelines for Adults

- Substantial health benefits
 - **150 to 300 mins/week**, moderate-to vigorous intensity
- Additional health benefits
 - **>300 mins/week** moderate-to vigorous-intensity
- **Muscle-strengthening**, all major muscle groups, **2+ days/week**



U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans, 2nd edition. Washington, DC: US DHHS; 2018.

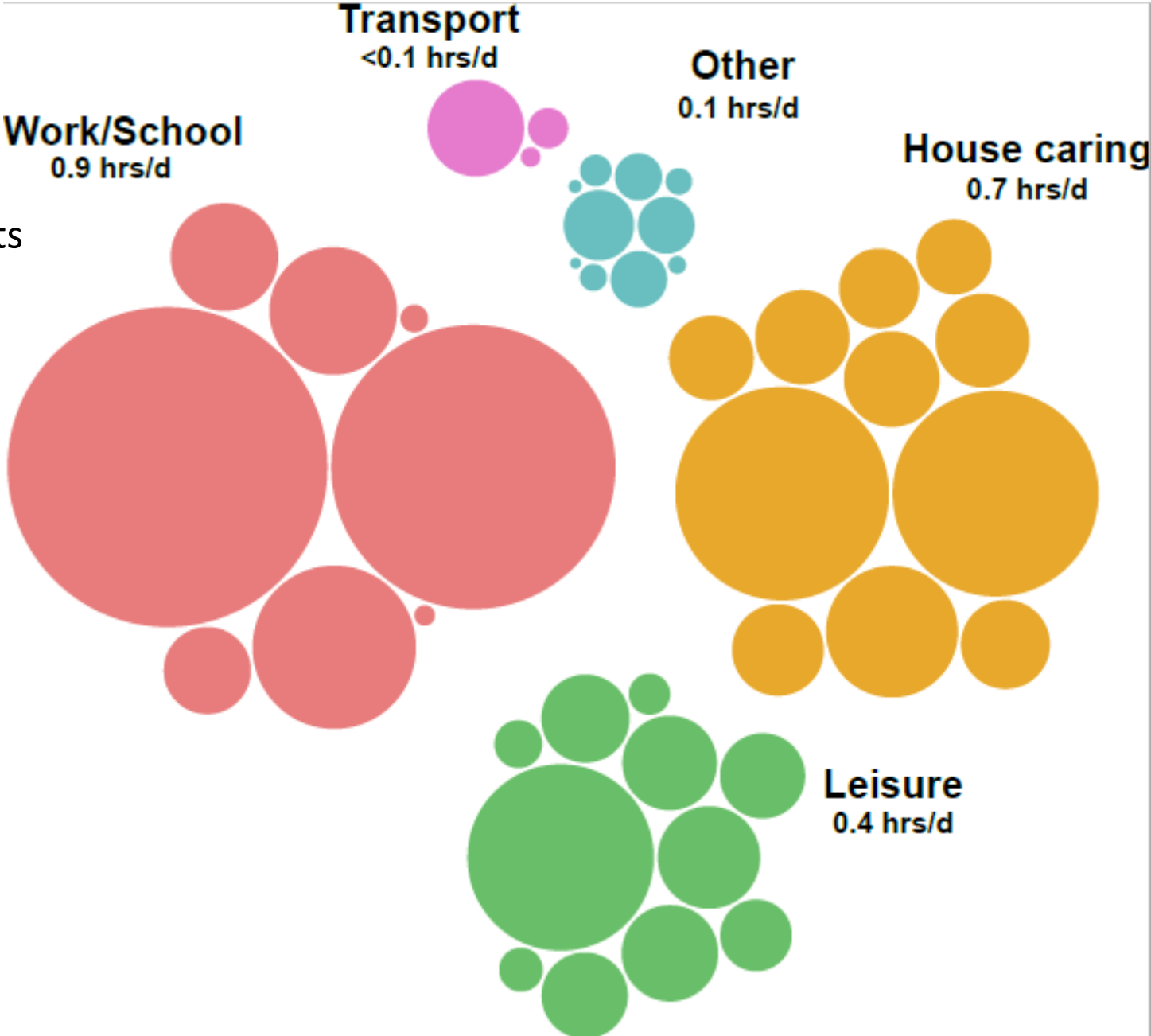
Physical Activity Guidelines Advisory Committee: Steps Conclusion Statements and Grades

Steps Conclusion Statement	Grade
All-cause and heart disease mortality	Not assignable
Incidence of CVD events and risk of type 2 diabetes	Limited
Dose-response heart disease events and risk of type 2 diabetes	Limited
Relationship with heart disease and type 2 diabetes (by age, sex, race/ethnicity, socioeconomic status, or weight/BMI)	Not assignable

Walking is a popular form of physical activity



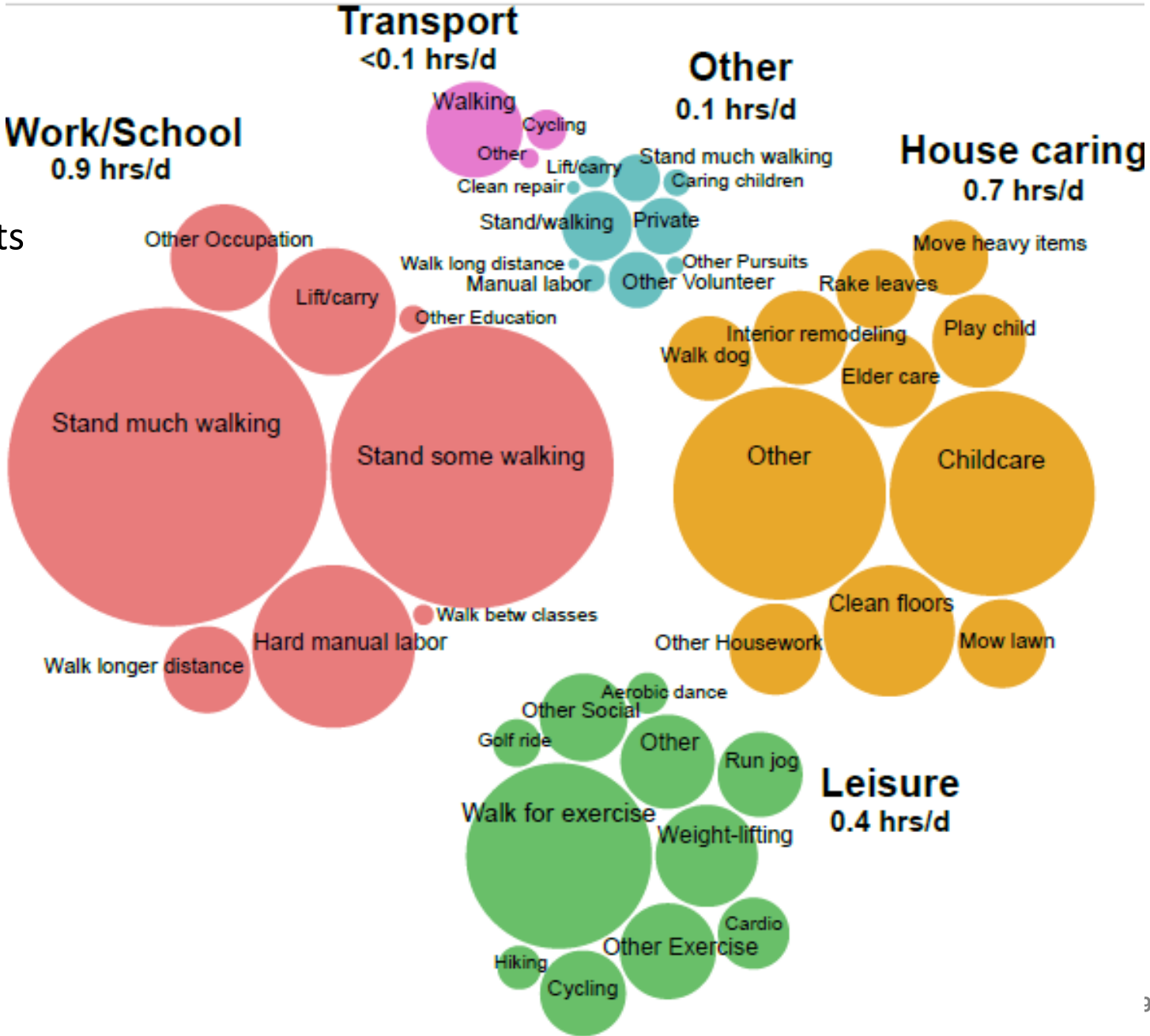
Distribution of physical activity by domain



2,640 participants
20-75yrs
Oct-Nov 2019

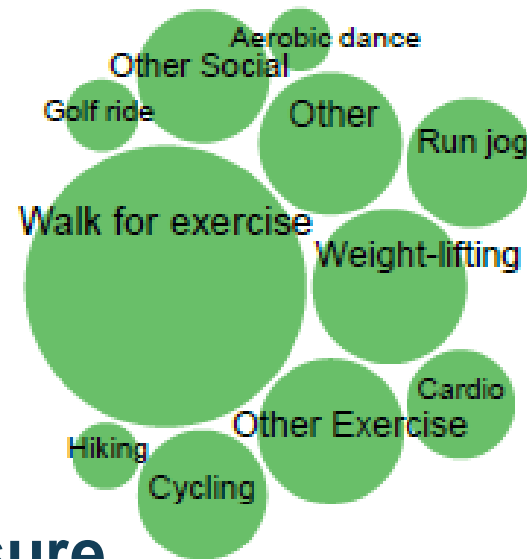
Distribution of physical activity by domain

2,640 participants
 20-75yrs
 Oct-Nov 2019



Walking is the most popular form of PA in the US

**Transport
Walking: 82%**



**Leisure
Walk for exercise: 39%**

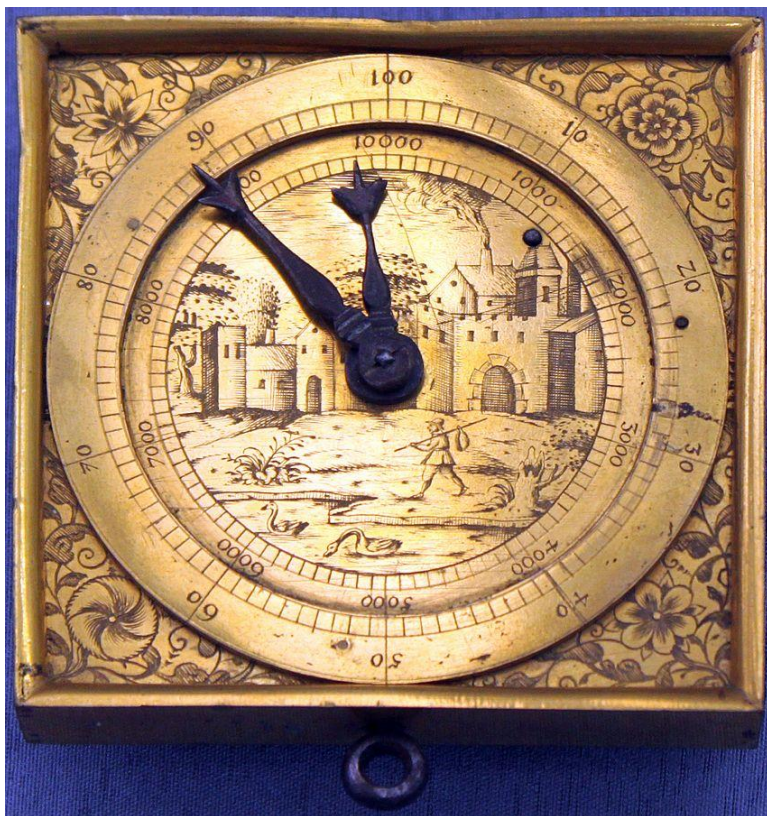
Saint-Maurice, et al, J Phys Act Health, 2021.

American Time Use Survey (ATUS)

<https://www.bls.gov/spotlight/2017/sports-and-exercise/home.htm>

How many steps per day?

Origin of 10,000 steps



German pedometer, c. 1590;
By Anagoria - <https://commons.wikimedia.org/w/index.php?curid=27150203>

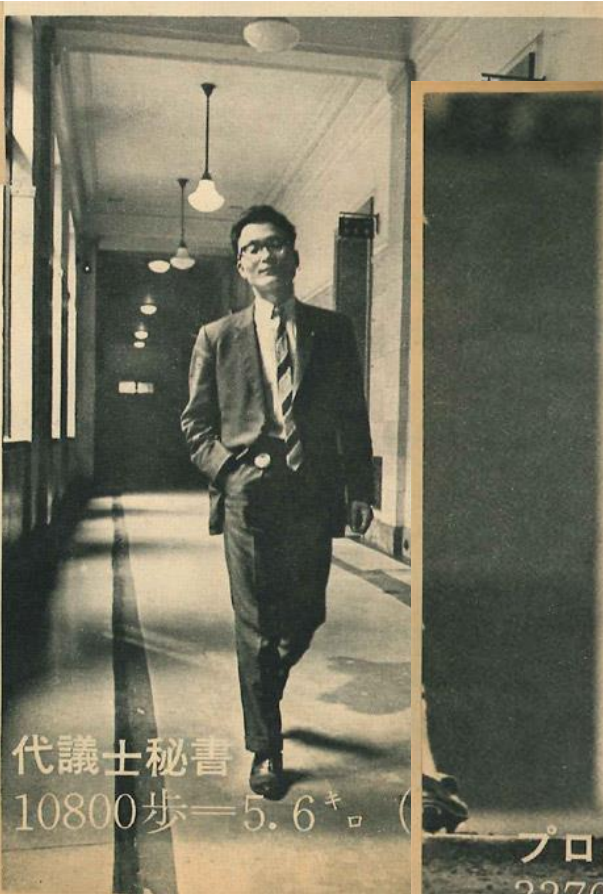


(1965)

Origin of 10,000 steps (c. 1965)



さん (27) 海部俊樹氏
秘書 かなり忙しい日の数字である
議員会館と院内との往復がほとんど、早足の方である



How do we measure steps?

Video-Recorded Validation of Wearable Step Counters under Free-living Conditions



FIGURE 1—Placement of all devices on the body. Two SW devices on each ankle; one AP on each thigh; one AG, NL, DW, and FZ on the hip; one AG on each wrist; one FC on each wrist; and one GoPro camera worn on the chest.



FIGURE 2—A sample view of the time-stamped video. The video resolution was set to 1080, filming 30 frames per second with a wide field of vision.

How do you measure your steps?



Apple Watch



OURA ring



Garmin



Jawbone UP2



Fitbit



3DTriSport Walking

NHANES 2003-2006 physical activity protocol

- Nationally representative
- Civilian, non-institutionalized household population in USA
- All ages
- Oversample minorities
- Target: 5,000 individuals/annually



Accelerometer

- Ages 6 years +
- Waist worn monitor
- Waking hours only
 - No objective sleep data
- Uniaxial (vertical axis)
- 1-minute epochs (counts)



JAMA | **Original Investigation**

Association of Daily Step Count and Step Intensity With Mortality Among US Adults

Pedro F. Saint-Maurice, PhD; Richard P. Troiano, PhD; David R. Bassett Jr, PhD; Barry I. Graubard, PhD; Susan A. Carlson, PhD; Eric J. Shiroma, ScD; Janet E. Fulton, PhD; Charles E. Matthews, PhD

IMPORTANCE It is unclear whether the number of steps per day and the intensity of stepping are associated with lower mortality.

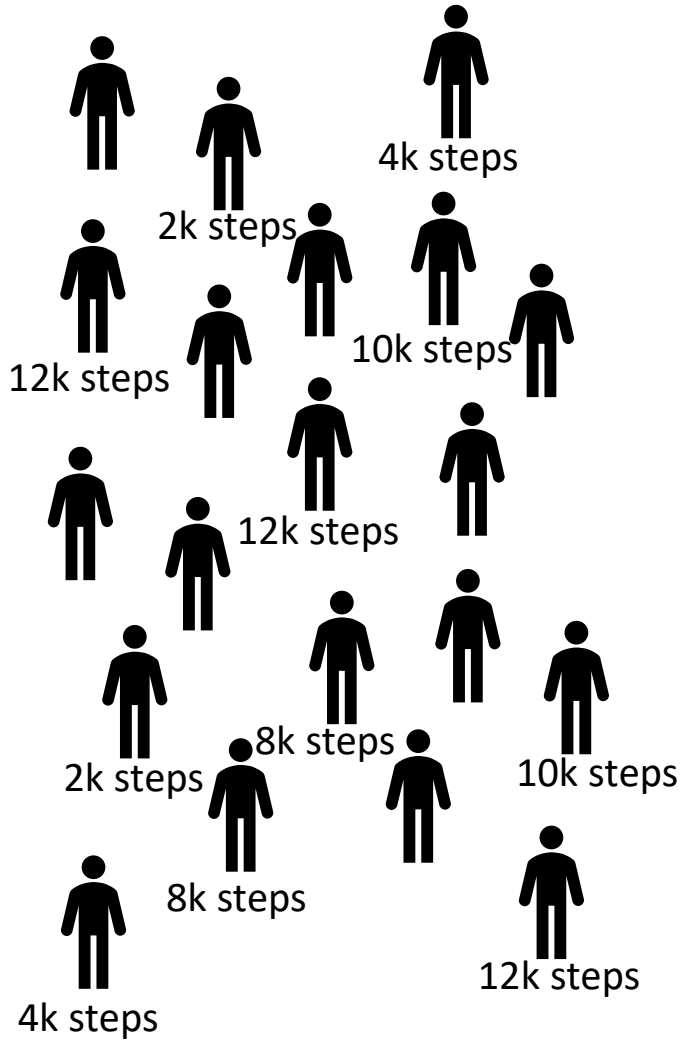
OBJECTIVE Describe the dose-response relationship between step count and intensity and mortality.

 [Supplemental content](#)

Published: March 24th 2020

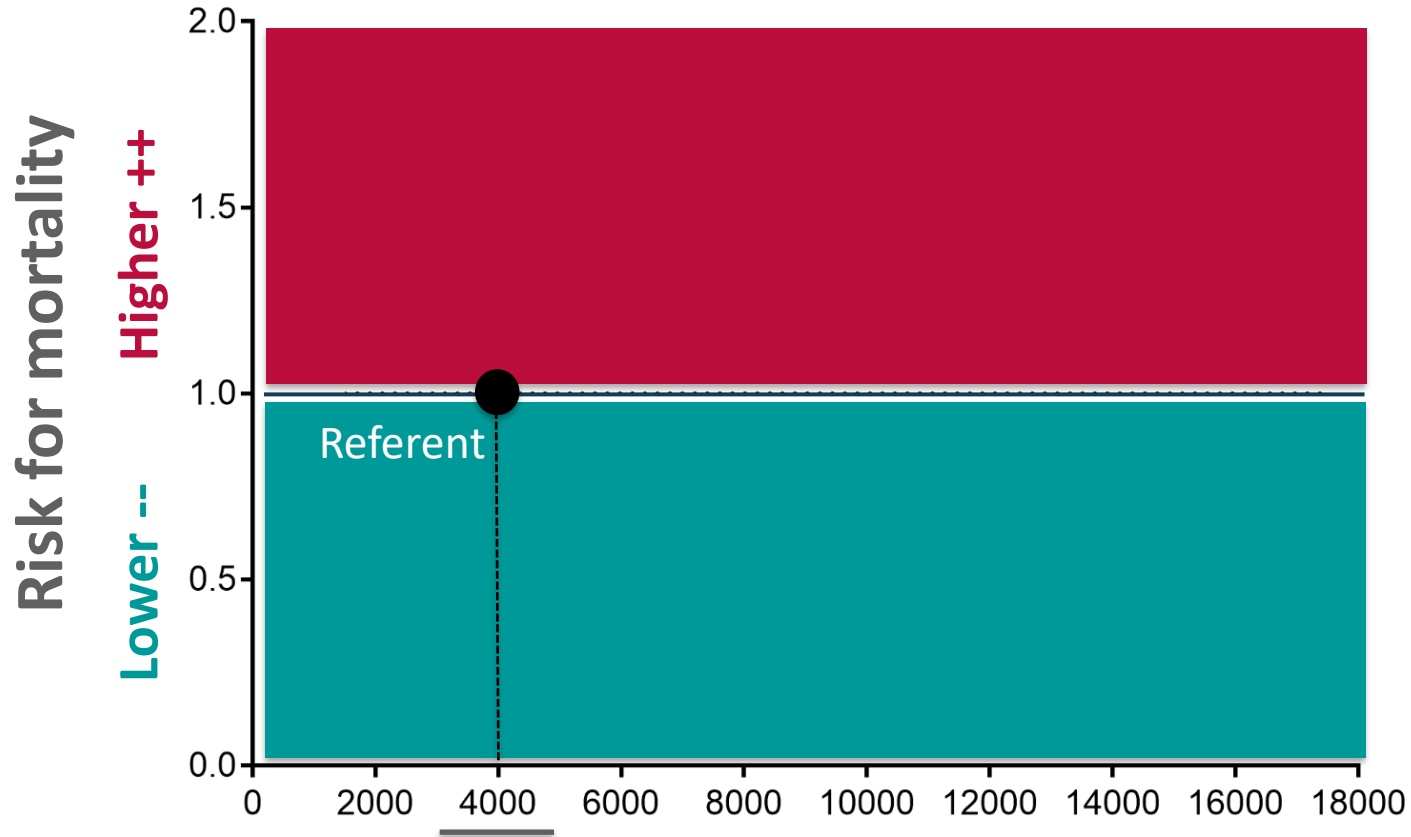
US adult population

Adults do different steps/day.



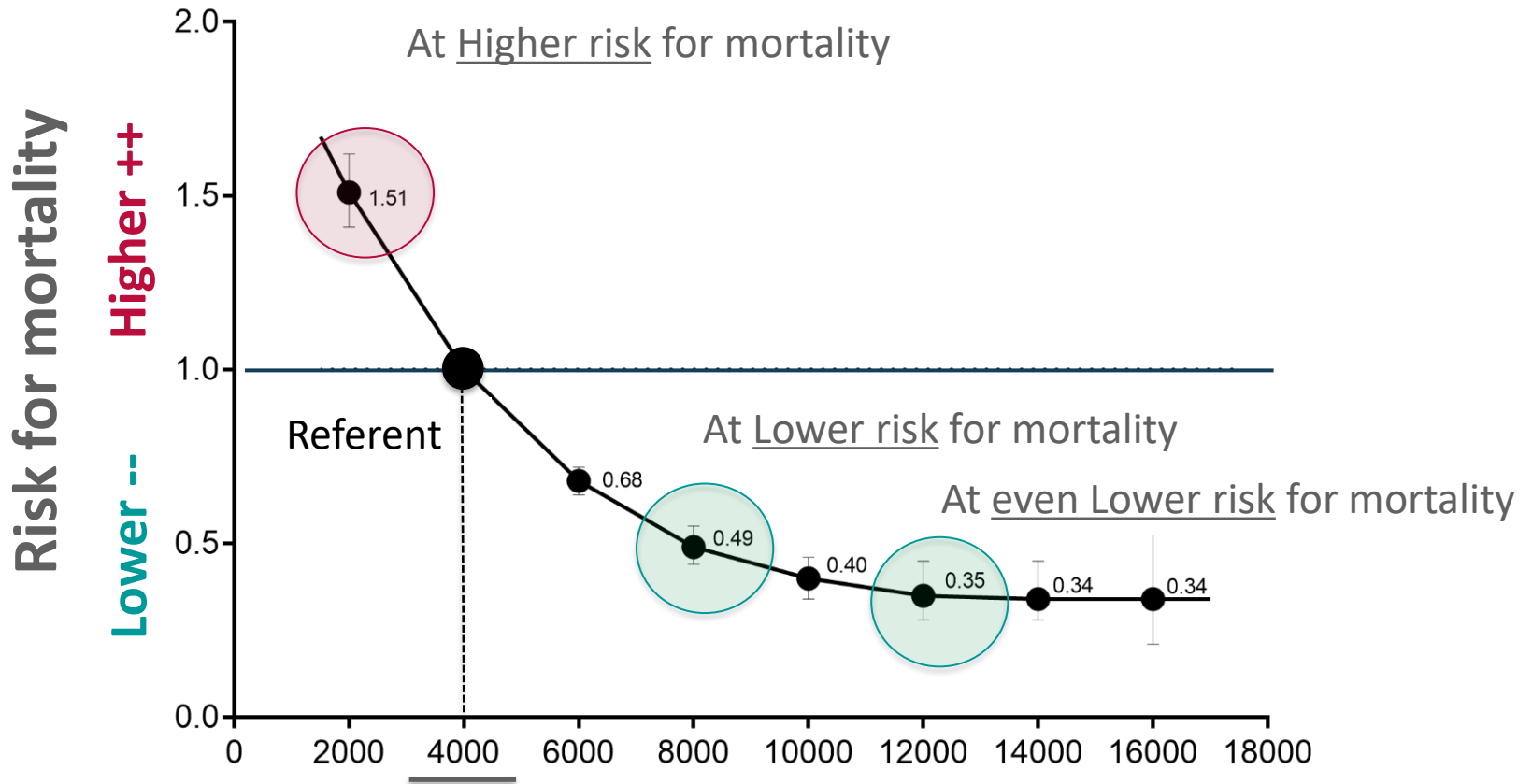
Steps/day and all-cause mortality

4,840 participants 40-85yrs
NHANES 2003-2006



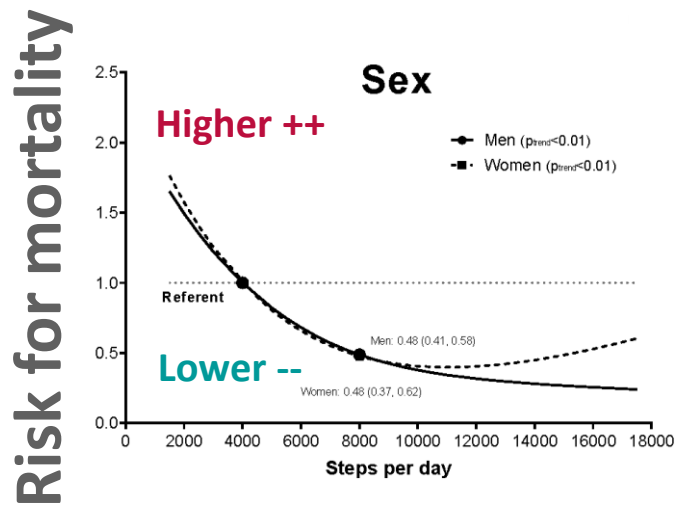
Steps/day and all-cause mortality

4,840 participants 40-85yrs
NHANES 2003-2006



Curvilinear association between steps/day and mortality with a plateau at approximately 12 000-14 000 steps/day.

Associations by sex, age, and race-ethnicity

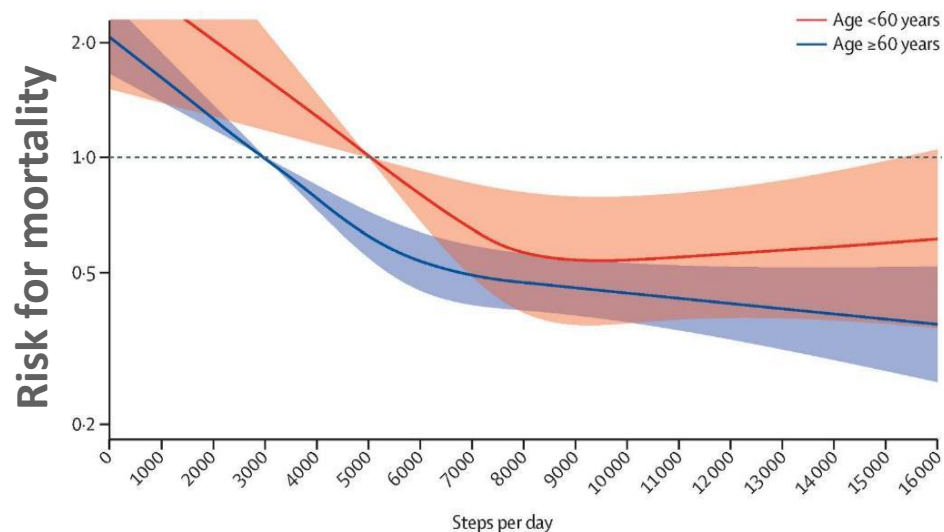


- Similar associations across subgroups of the US adult population
- Lower mortality risk at 8 000 steps/day and even lower risk at 12 000 steps/day

Consistent health benefits of more steps per day

- 15 combined studies (~50k adults)
- Lower risk at 8 000-12 000 steps/day
- Greater health benefits at a lower step threshold among adults 60+ yrs

[Paluch A, ..., Saint-Maurice PF, ... et al, Lancet Public Health, 2022.](#)



8,000 IS **GOOD**, 12,000 IS **BETTER**

TAKING **MORE STEPS** PER DAY



———— IS ASSOCIATED WITH A ————

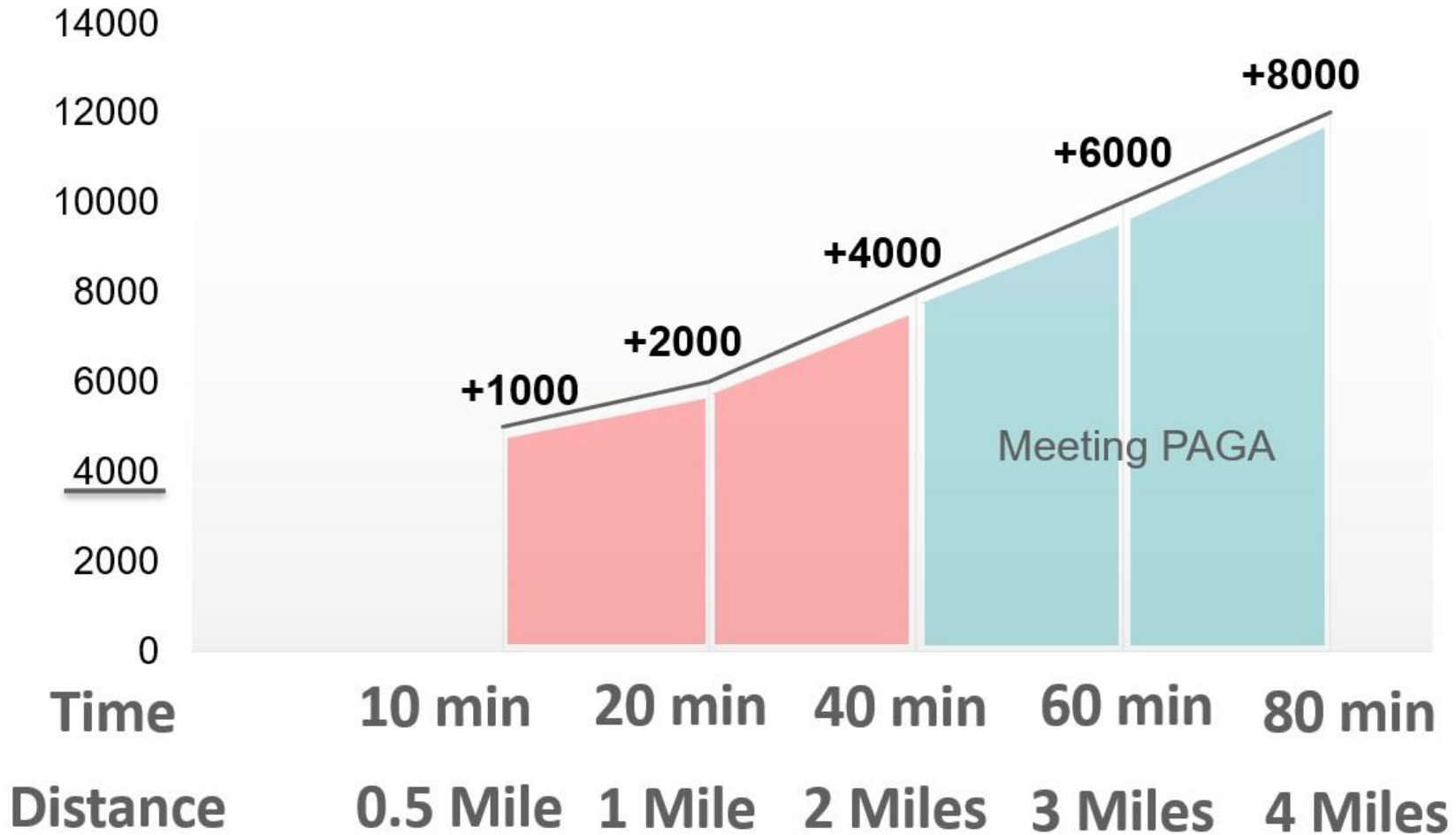
LOWER RISK OF DEATH

[cancer.gov](https://www.cancer.gov)

One step forward

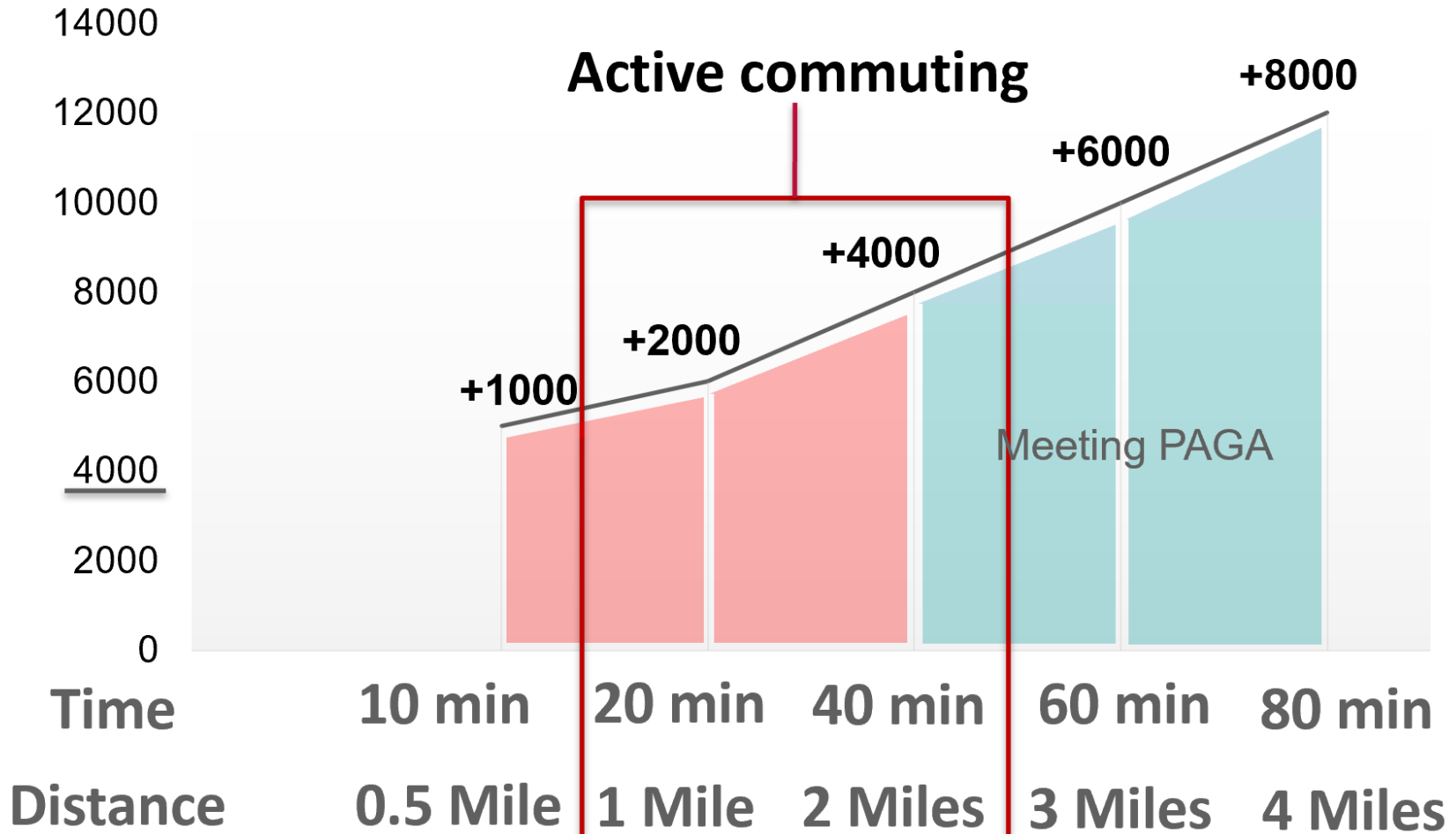
Translating Steps/day to PA Guidelines

Steps per day



Translating Steps/day to PA Guidelines

Steps per day



Breaking News

US adult population PA increases by 10 min

Research Letter

January 24, 2022

Estimated Number of Deaths Prevented Through Increased Physical Activity Among US Adults

Pedro F. Saint-Maurice, PhD¹; Barry I. Graubard, PhD¹; Richard P. Troiano, PhD²; David Berrigan, PhD²; Deborah A. Galuska, PhD³; Janet E. Fulton, PhD³; Charles E. Matthews, PhD¹

[» Author Affiliations](#) | [Article Information](#)

JAMA Intern Med. 2022;182(3):349-352. doi:10.1001/jamainternmed.2021.7755

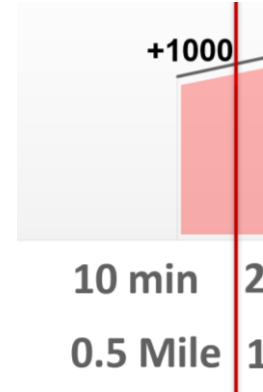
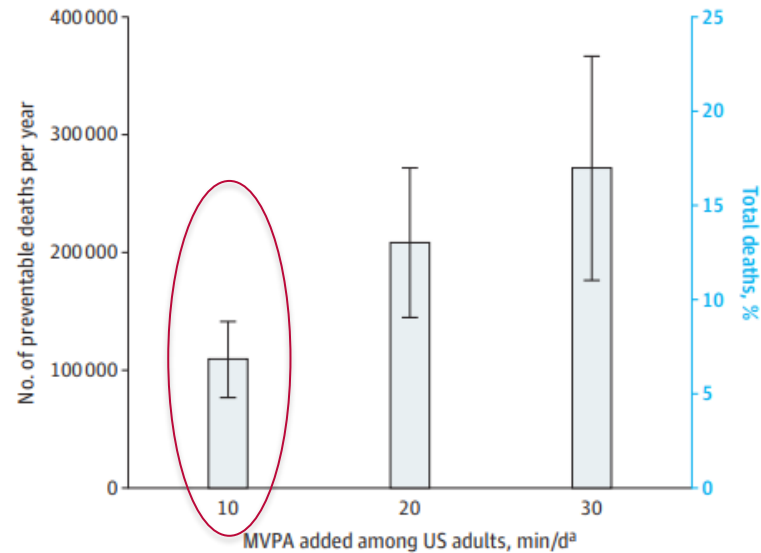


Figure. Number of Preventable Deaths and Equivalent Proportion of Total Deaths by Added Amount of MVPA Among US Adults Aged 40 to 85 Years or Older, 2003 to 2006 National Health and Nutrition Examination Survey



Adding 10 min/d of PA could prevent 110k deaths/year

Results generalizable to all US adults

- Men
- Women
- Mexican American
- Non-Hispanic Black
- Non-Hispanic White

PHYS ED

Walking Just 10 Minutes a Day May Lead to a Longer Life

Ten minutes of moderate exercise daily would prevent more than 111,000 premature deaths a year, a new analysis found.



By Gretchen Reynolds

Jan. 26, 2022

[Leer en español](#)

If almost all of us started walking for an extra 10 minutes a day, we could, collectively, prevent more than 111,000 deaths every year,

How do we get there?



1. Business and Industry
2. Community, Recreation, Fitness, and Parks
3. Education
4. Faith-Based Settings
5. Health Care
6. Mass Media
7. Public Health
8. Sport
9. **Transportation, Land Use, and Community Design**

“We must be intentional in the design and development of our communities to make it easier for people to be active on a daily basis.”

Thank you for your attention

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION

WALKTOBER 2022



Selected Resources: Walking and Health Research

- The 2019 Conference on Health and Active Transportation: Research Needs and Opportunities Berrigan D, et al. *Environ Res Public Health*. 2021
- TRB Committee on Transportation and Public Health AME70
- The EPA Walkability Index
- Validation Study: Associations between the National Walkability Index and walking among US Adults - National Health Interview Survey, 2015. Watson KB, et al. *Prev Med*. 2020
- Web-based previous-day recall for measuring physical activity: ACT24
- Youth and Adult Compendia of Physical Activity & Google Compendium
- CDC resources, including Step it Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities and Why Walk