

# Physical Activity and Public Health: A Practitioners' Course on Community Interventions

August 23, 2023

Day 1: Setting the Stage for Change

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Activity is now locked.  
Responses are not accepted at this  
time.

**What physical activity did you participate in  
this week?**

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# Physical activity is good for your health!

## 1953 London Bus Driver Study

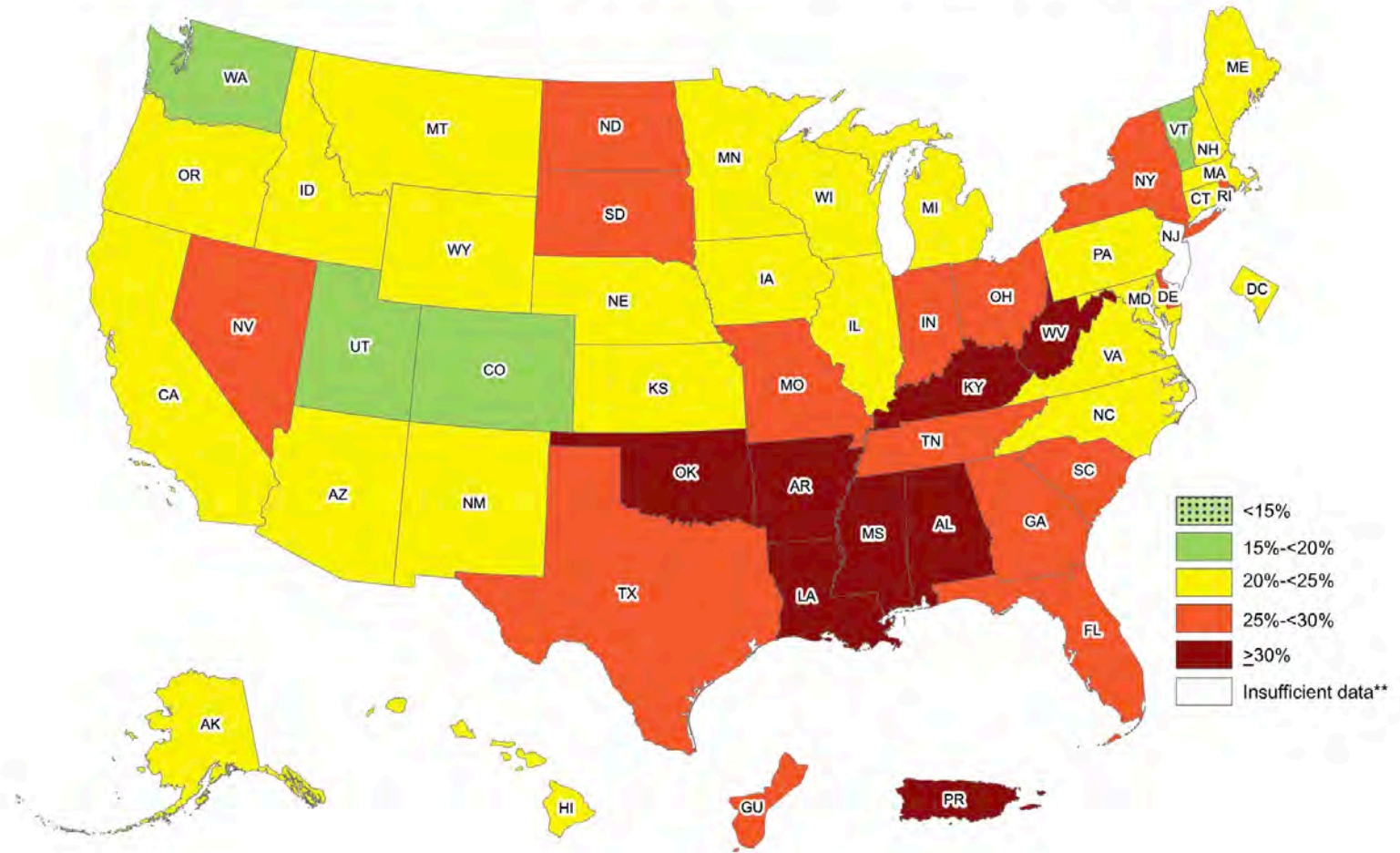


# We have factored physical activity out of our daily lives



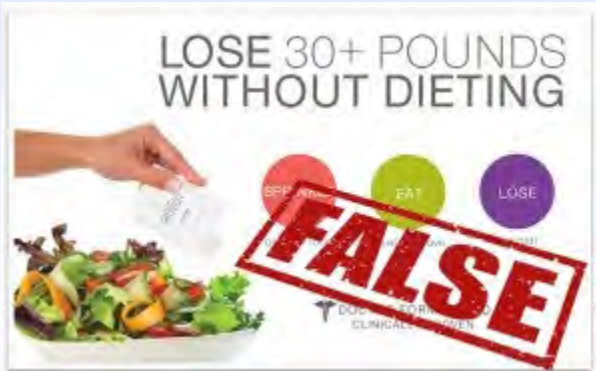
# Physical Inactivity, 2020

Prevalence of Self-Reported Physical Inactivity\* Among US Adults by State and Territory, BRFSS, 2017–2020



# Session Objectives

- Define evidence and how it is created.
- Define evidence-based public health.
- Explore evidence within physical activity.
- Describe two key considerations for physical activity interventions.
- Understand the basic concepts of surveillance, data, and descriptive epidemiology for defining the problem.



# What is "Evidence"?

Scientific literature in systematic reviews

Scientific literature in one or more journal articles

Public health surveillance data

Program evaluations

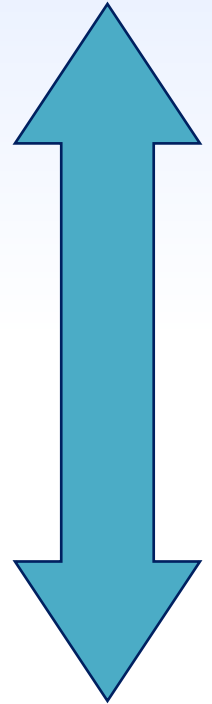
Qualitative data

- Community members
- Other stakeholders
- Media/marketing data

Word of mouth

Personal experience

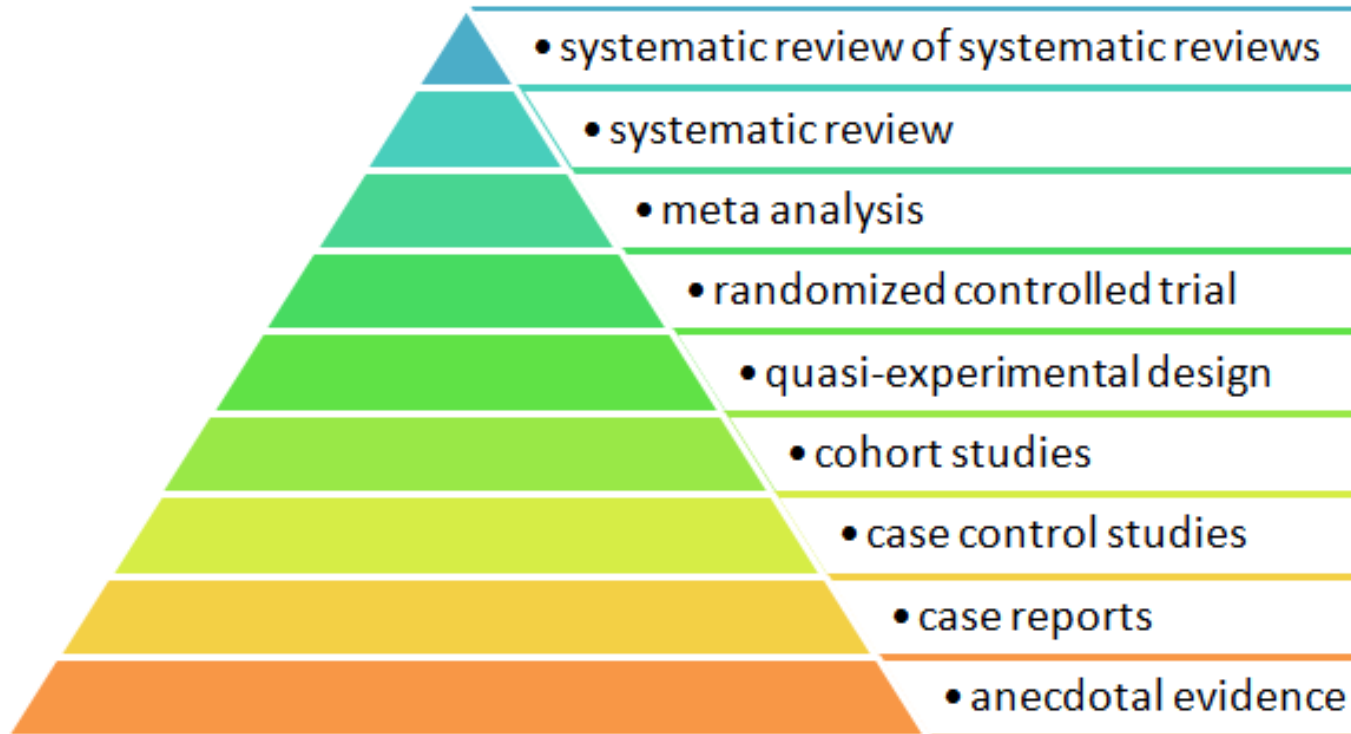
Objective



Subjective



# Research Builds Evidence



The effectiveness of parachutes has not been subjected to rigorous evaluation by using randomised controlled trials.... We think that everyone might benefit if the most radical protagonists of evidence based medicine organised and participated in a double blind, randomised, placebo controlled, crossover trial of the parachute.

Smith and Pell, BMJ, 2004



Parachutes reduce the risk of injury after gravitational challenge, but their effectiveness has not been proved with randomised controlled trials

Think of any other physical activity examples that might not be appropriate for a randomized controlled trial. Share in chat.

# Advantages to using evidence-based approaches

1. Higher likelihood of success
2. Identification of common indicators
3. Defend/expand an existing program
4. Advocate for new programs
5. New knowledge is generated to help others
6. Better use of resources

# Challenges to promoting evidence-based approaches

- Stakeholder interest/characteristics
- Conflicting priorities
- Sometimes enough evidence does not exist, or most rigorous study design is not appropriate

# A simple definition of evidence-based public health

“Evidence-based public health is the process of integrating science-based interventions with community preferences to improve the health (PA) of populations.”

# Some Key Characteristics of EBPH

1. Making decisions based on the best available peer-reviewed evidence (both quantitative and qualitative research);
2. Using data and information systems systematically;
3. Applying program planning frameworks (that often have a foundation in behavioral science theory);

# Some Key Characteristics of EBPH

4. Engaging the community in assessment and decision-making;
5. Conducting sound evaluation; and
6. Disseminating what is learned to key stakeholders and decision makers.



# Why physical activity?

- So much benefit, and so much room for improvement



# Evidence on PA and Health: Selected outcomes

Coronary heart disease (relative risk)

- over 50 epidemiologic studies show an approximate 1.9 RR for physical inactivity

Diabetes

- several cohort studies show a 30-40% increase in risk due to inactivity

Colon cancer

- approximately 30 studies show an inverse association between physical activity and colon cancer (mainly case-control studies)

Population burden of PIA (attributable risk)

- 200-300K preventable deaths each year in the United States

# Health Benefits of Physical Activity for Adults

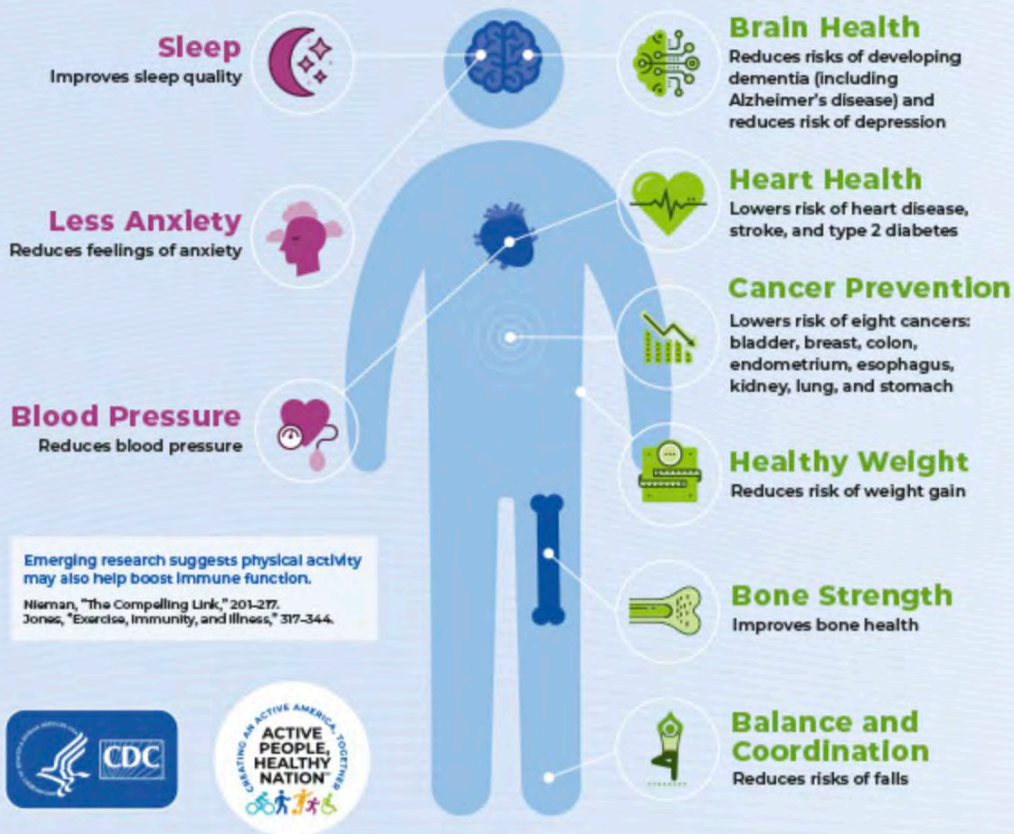


## IMMEDIATE

A single bout of moderate-to-vigorous physical activity provides immediate benefits for your health.

## LONG-TERM

Regular physical activity provides important health benefits for chronic disease prevention.



# So how much? What kind? How often?

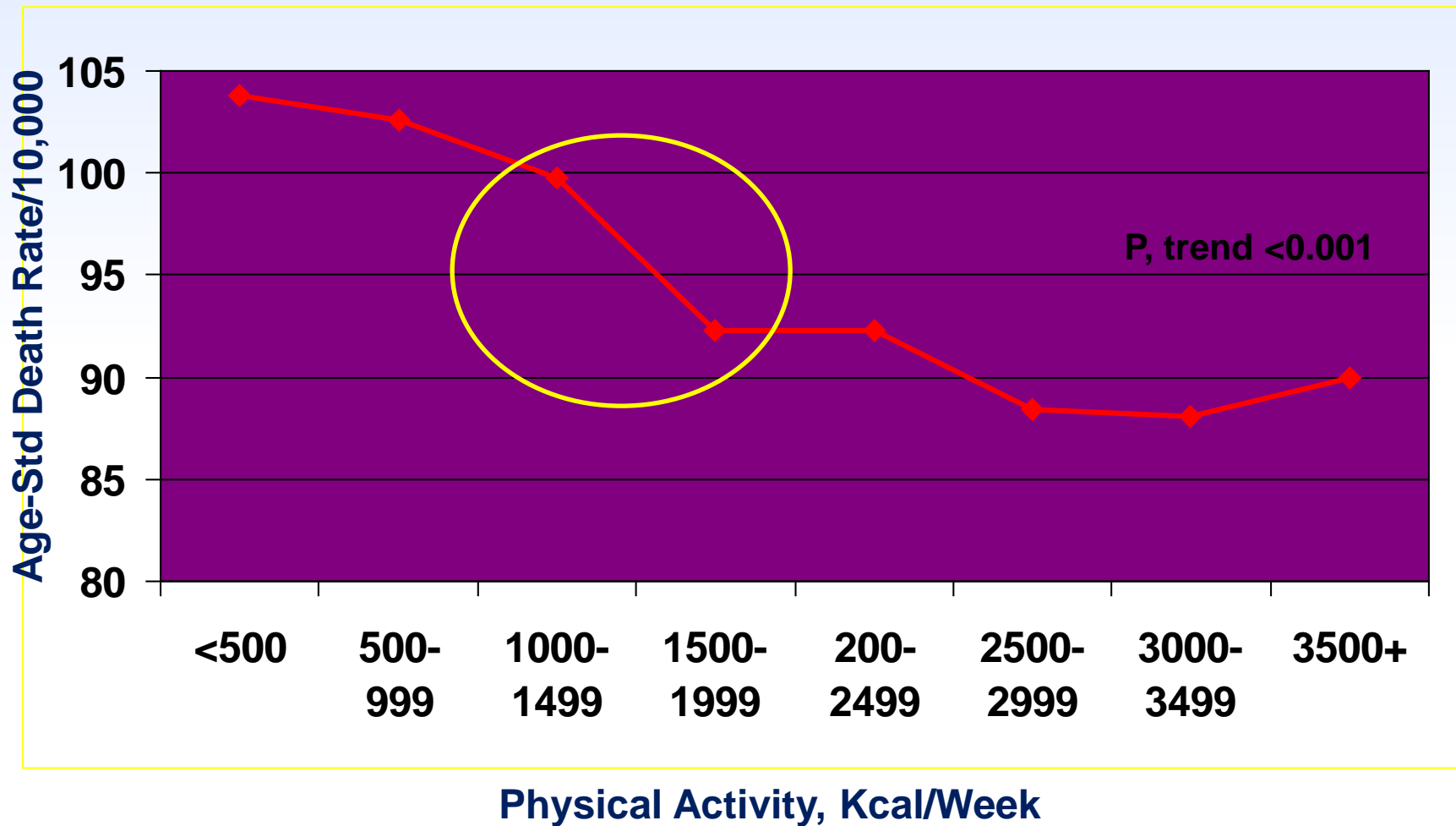
- Recommendations have evolved
- First was based on improving cardiorespiratory fitness
  - 3x a week, at least 20 minutes duration, 60-80% of MHR
- 1995 CDC/ASCM
  - “every adult should accumulate 30 minutes or more of moderate intensity physical activity on most, preferably all days of the week”
- 2002 IOM report on dietary intake:
  - “To prevent weight gain and accrue additional weight-independent health benefits, 60 minutes of daily moderate intensity physical activity is recommended.”

# 2018 Physical Activity Guidelines for Americans

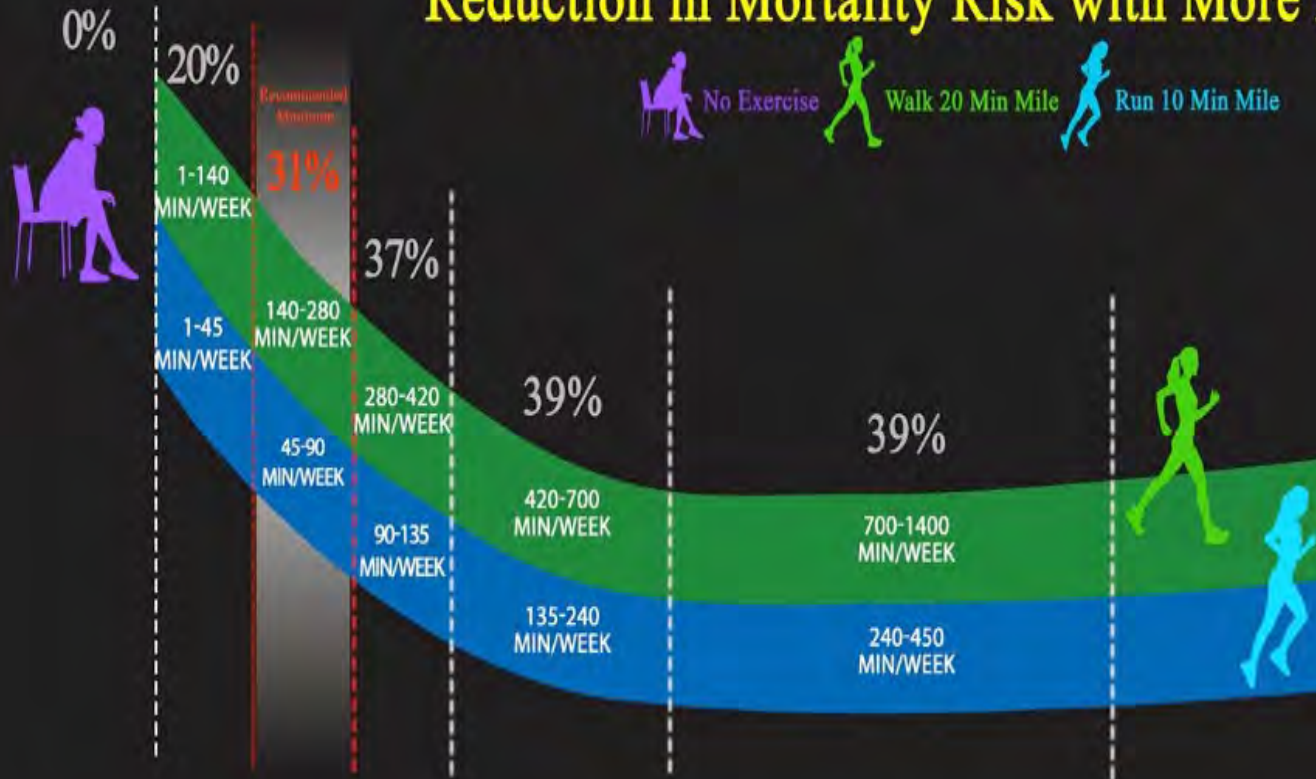
## Aerobic Activity

- For substantial health benefits, **adults should do at least 150 minutes** (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous intensity aerobic activity.
- Every minute counts!
- All adults should avoid inactivity

# One example: Harvard Alumni Health Study



# Reduction in Mortality Risk with More Exercise



This infographic summarizes the findings as reported in the manuscript published by Arem, et.al. *JAMA Internal Medicine* 2015

@NCIEpiTraining

We have enough evidence on the physical and mental health benefits of physical activity, but how can we get more people to do it?



# Evidence on intervention effectiveness

- Need to know what works and how to implement
- On-going work attempting to summarize a large and diffuse body of evidence
  - [www.thecommunityguide.org](http://www.thecommunityguide.org)
  - Heath et al. review in Lancet (2012)



**ACTIVITY-FRIENDLY ROUTES TO EVERYDAY DESTINATIONS**

**ACCESS TO PLACES FOR PHYSICAL ACTIVITY**



**SCHOOL AND YOUTH PROGRAMS**

**COMMUNITY-WIDE CAMPAIGNS**



**SOCIAL SUPPORTS**

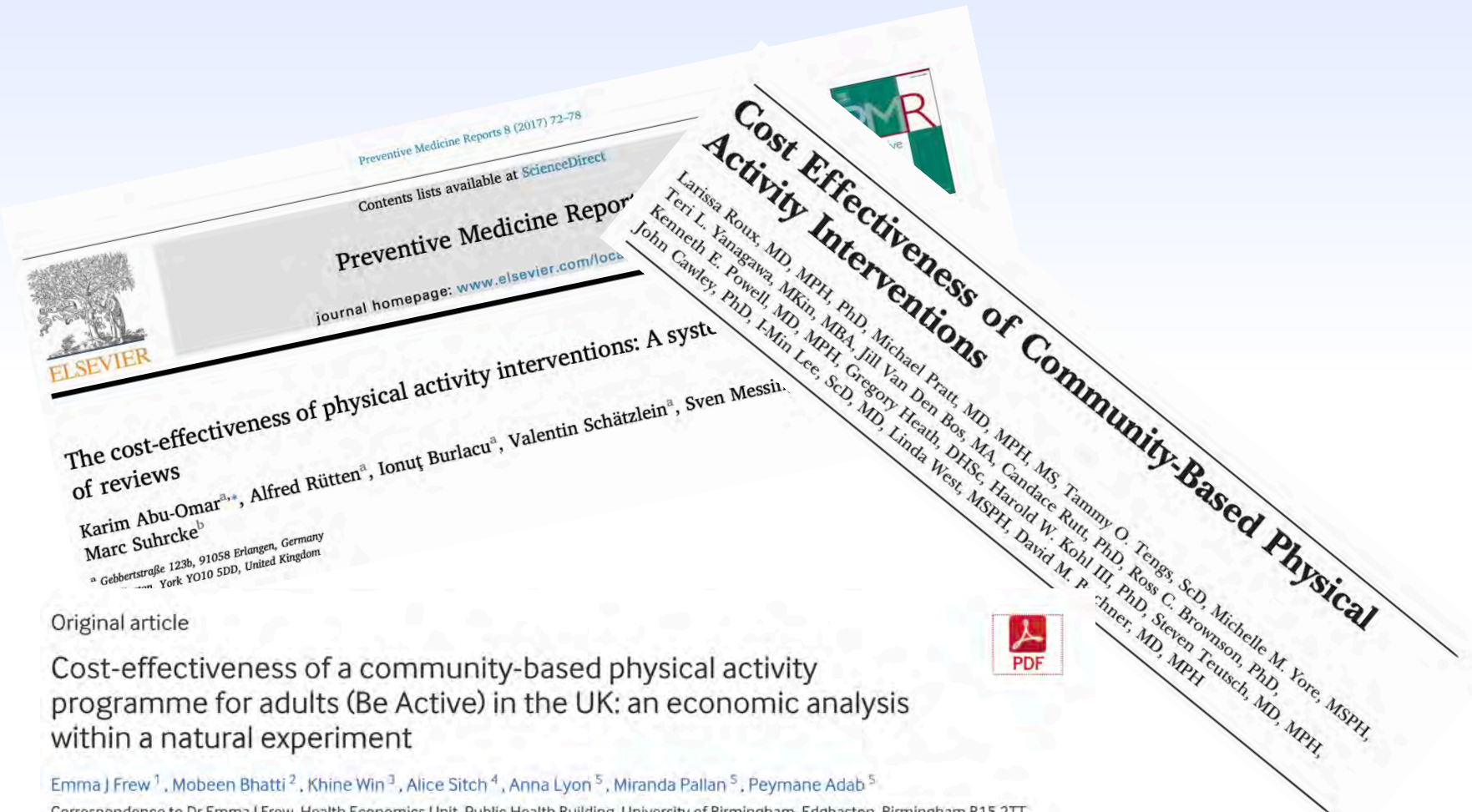
**INDIVIDUAL SUPPORTS**



**PROMPTS TO ENCOURAGE PHYSICAL ACTIVITY**

**EQUITABLE AND INCLUSIVE ACCESS**

# And growing literature on cost-effectiveness...



Original article

## Cost-effectiveness of a community-based physical activity programme for adults (Be Active) in the UK: an economic analysis within a natural experiment

Emma J Frew<sup>1</sup>, Mobeen Bhatti<sup>2</sup>, Khine Win<sup>3</sup>, Alice Sitch<sup>4</sup>, Anna Lyon<sup>5</sup>, Miranda Pallan<sup>5</sup>, Peymane Adab<sup>5</sup>

Correspondence to Dr Emma J Frew, Health Economics Unit, Public Health Building, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK; e.frew@bham.ac.uk.

# Other Key Considerations...

# Our multi-level world...

## Socio-Ecological Model



Write in the chat one example  
of a POLICY that  
would encourage people  
to be physically active?

# Opposition

## The surprising politics of sidewalks

It takes a lot more than concrete to get a sidewalk built.

BY ELEANOR CUMMINS | PUBLISHED APR 10, 2018 8:30 PM

LEELAND STATION RESIDENTS DECRY VDOT PROJECT

## Leeland Station residents oppose \$2.8 million shared-use path

James Baron | Aug 5, 2021 | 6

## Spring Valley Residents in Uproar Over DDOT's Bikelane Proposal

By **Northwest Courier** - November 20, 2019

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# Surveillance

The ongoing collection and timely analysis, interpretation, and communication of health information for public health action



# Physical Activity Surveillance

- What are the trends in physical activity?
- What environmental or policy factors influence physical activity?
- Are there differences among sub-groups?

# Surveillance Data Sources

- BRFSS/YRBS/500 cities
  - Risk factors or behavior
- Observational data
- Determinants/Correlates
  - Audits
  - Spatial data
- Commercial data

# Descriptive Epidemiology

Evaluating *variations* in the frequency of disease allows us to ...

- identify high risk populations
- prioritize public health resources
- generate hypotheses about disease causation

# Missouri



2021 State Level Data and Ranks

## 2021 County Health Rankings: Disaggregated State-Level Racial/Ethnic Data

Measure	Overall	AIAN	Asian	Black	Hispanic	White
<b>HEALTH OUTCOMES</b>						
Premature death*	8,400	4,800	3,000	14,400	4,600	7,800
Life expectancy	77.3	96.1	88.6	72.4	88.8	77.7
Premature age-adjusted mortality	400	220	150	630	220	390
Child mortality	60	—	30	110	40	50
Infant mortality	6	—	4	12	5	5
Low birthweight*	8%	9%	9%	15%	7%	7%

[https://www.countyhealthrankings.org/sites/default/files/media/document/CHR2021\\_MO.pdf](https://www.countyhealthrankings.org/sites/default/files/media/document/CHR2021_MO.pdf)

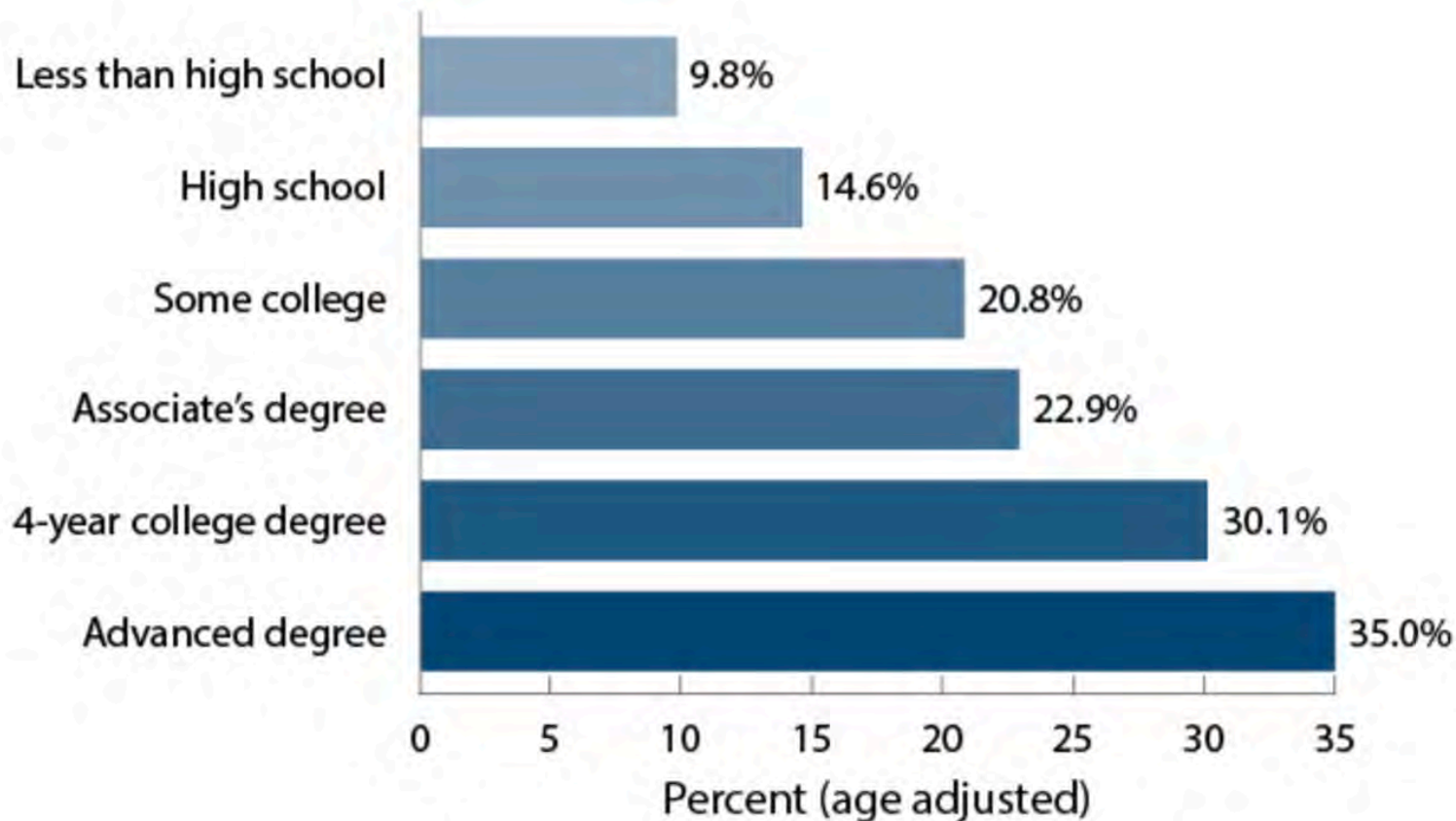
# Descriptive Epidemiology

1. Person
2. Place
3. Time

# Classify: PERSON

- Age
- Race
- Sex
- SES
- Occupation
- Marital Status
- Children

The proportion of adults aged 25 years and over who met the guidelines for aerobic physical activity and for muscle-strengthening activity in 2018 increased as education level increased.



Data source: National Health Interview Survey (NHIS), CDC/NCHS.

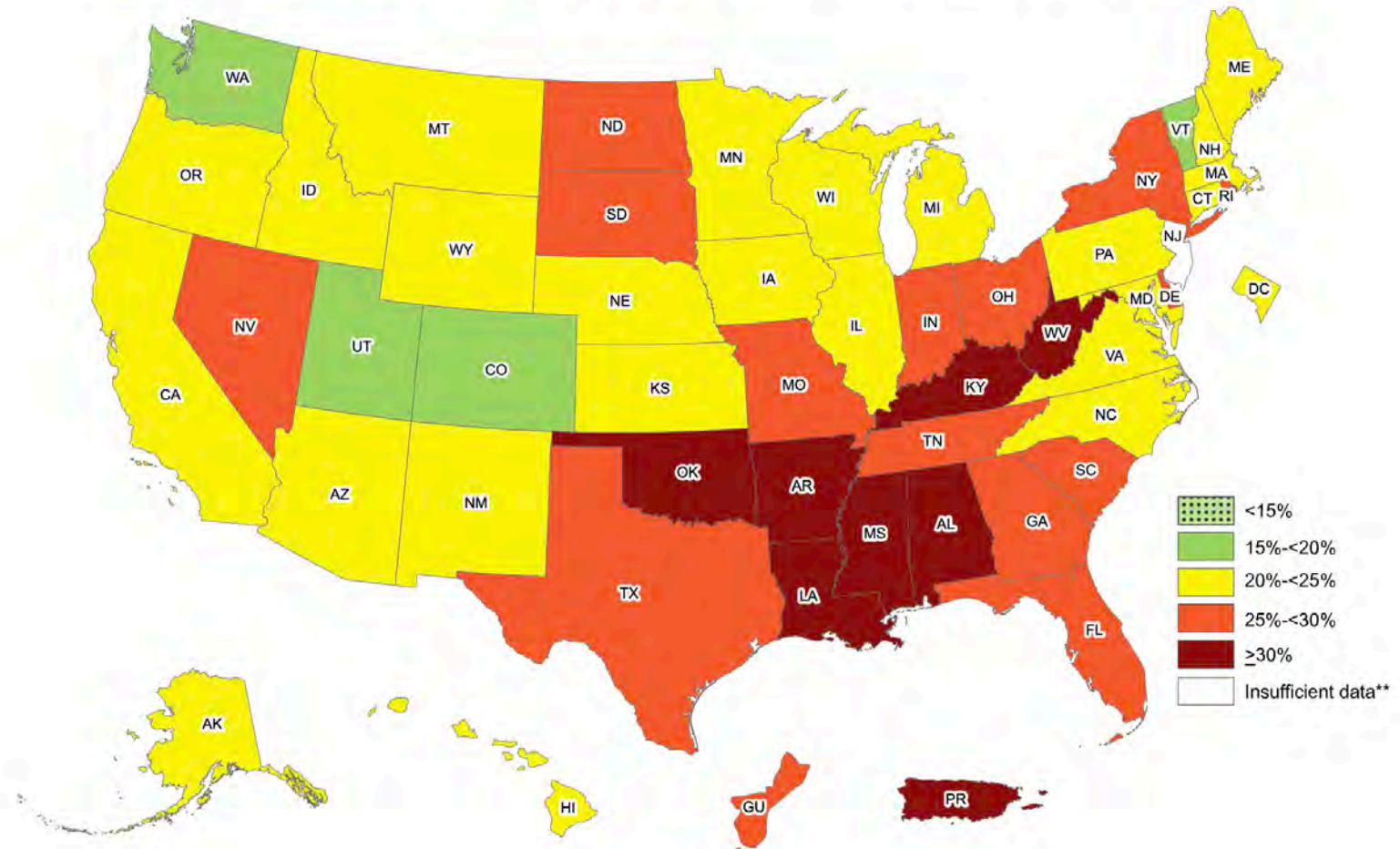
# Classify: PLACE

- Natural boundaries
- Political boundaries
- Urban-rural classification
- Environmental exposure

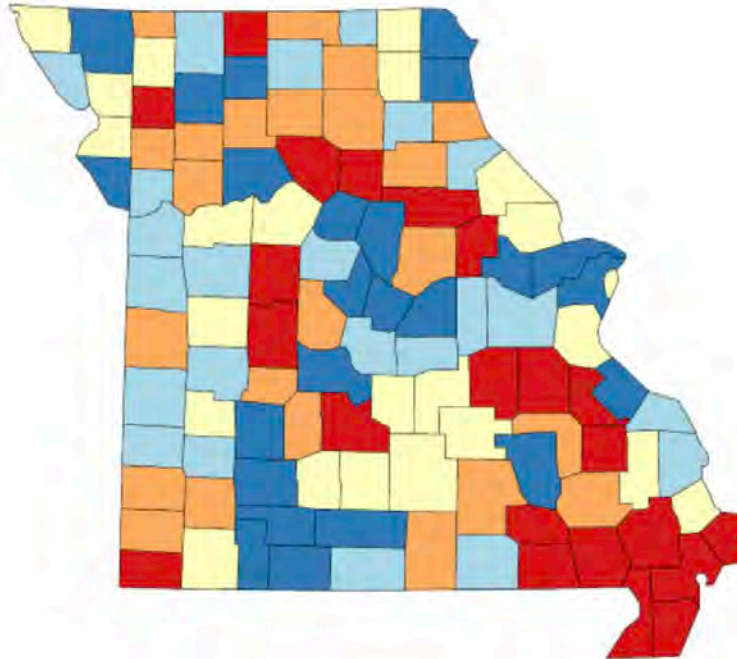


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**Death Rates for Missouri by County**  
**All Cancer Sites, 2016 - 2020**  
**All Races (includes Hispanic), Both Sexes, All Ages**



Age-Adjusted  
 Annual Death Rate  
 (Deaths per 100,000)  
[Quantile Interval](#)

- 124.6 to 153.9
- > 153.9 to 167.6
- > 167.6 to 176.9
- > 176.9 to 188.6
- > 188.6 to 237.0

United States  
 Rate (95% C.I.)  
 149.0 (149.3 - 149.6)

Missouri  
 Rate (95% C.I.)  
 163.0 (161.8 - 164.4)

Healthy People 2030  
 Goal C-01  
 122.7000

**Notes:**

[State Cancer Registries](#) may provide more current or more local data.  
 Data presented on the State Cancer Profiles Web Site may differ from statistics reported by the State Cancer Registries ([for more information](#)).

## Health / Cancer

Age-Adjusted Death Rate due to Breast Cancer

VALUE  
**21.0**  
Deaths per 100,000 females  
(2013-2017)

COMPARED TO:



MO Counties  
(2012-2016)



U.S. Counties



MO Value  
(20.9)



US Value  
(20.1)



Prior Value  
(21.7)



Trend



HP 2020 Target  
(20.7)



HP 2030 Target  
(15.3)

Age-Adjusted Death Rate due to Breast Cancer by Race/Ethnicity

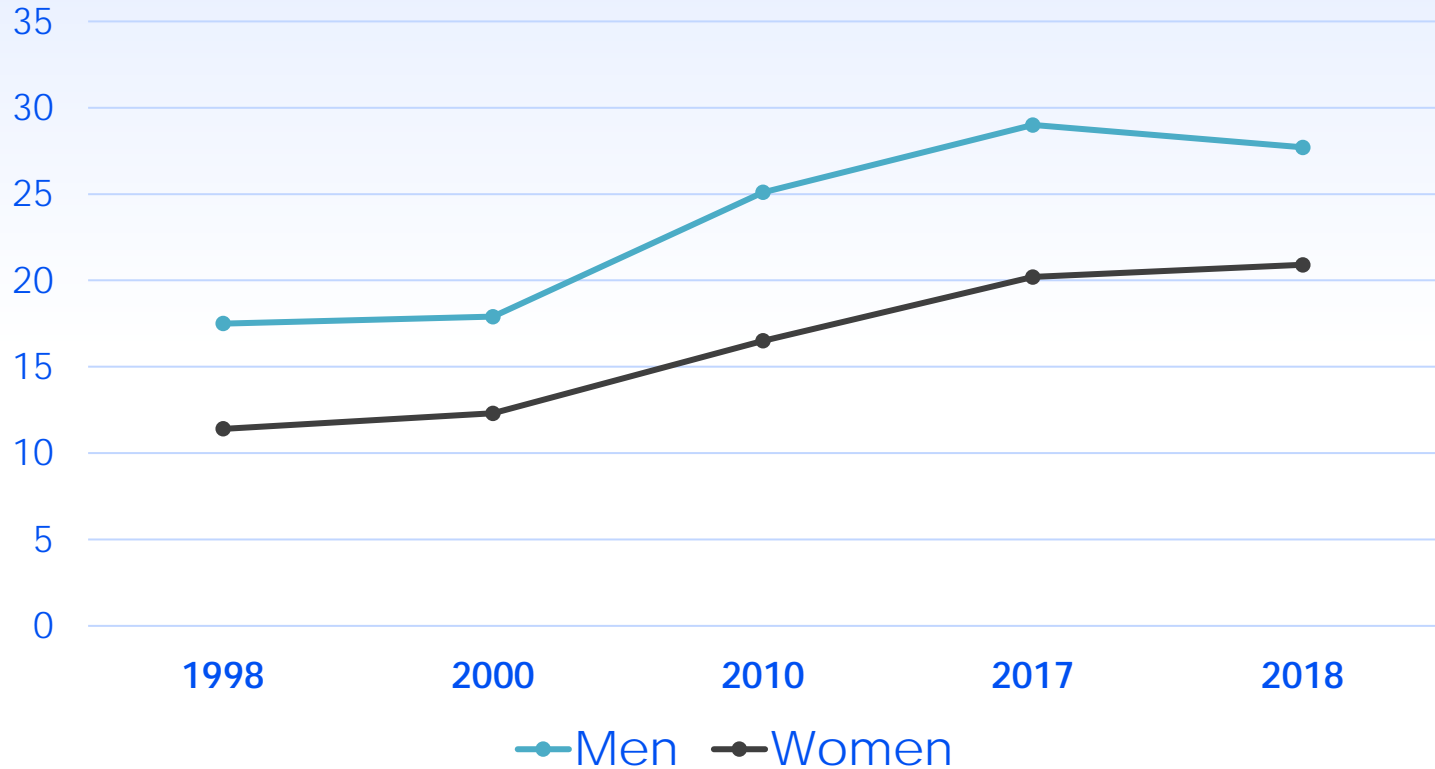


<https://www.thinkhealthstl.org/indicators/index/dashboard?alias=disparities>

# Classify: TIME

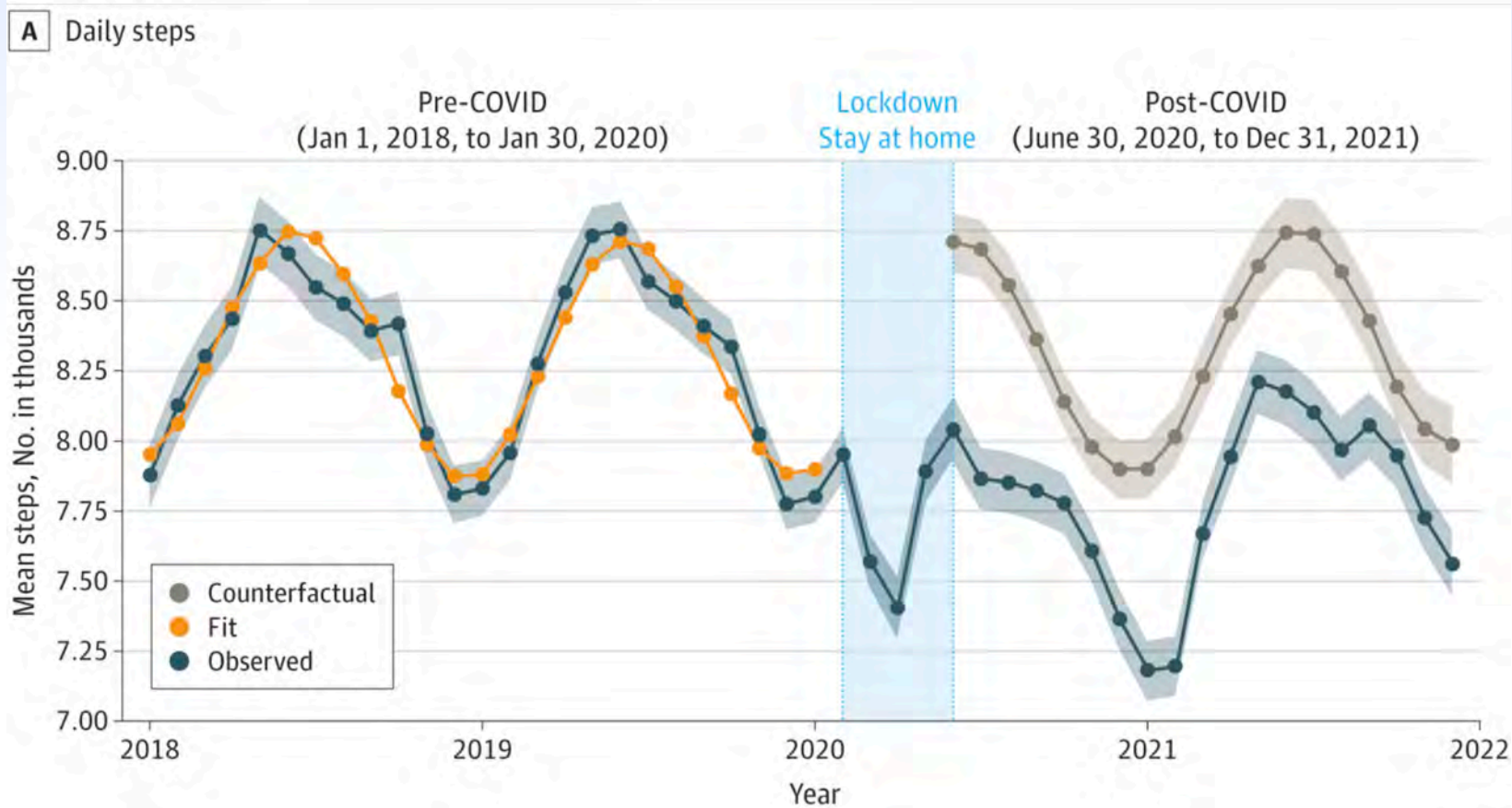
- Trends over time
- Seasonality
- Periodicity
- Clusters in time or place

## Percentage meeting aerobic and muscle strengthening recommendation



From: **Daily Step Counts Before and After the COVID-19 Pandemic Among All of Us Research Participants**

JAMA Netw Open. 2023;6(3):e233526. doi:10.1001/jamanetworkopen.2023.3526



# Define/Quantify the problem

- Develop a concise written statement of the public health problem, issue or policy under consideration

# Define/Quantify the problem

- Should/could the problem be stated in the context of person/place/time?
- Is there a consensus among stakeholders that the problem is properly stated?
- What data do I have available?
- Have I addressed health equity?



# Define/Quantify the problem

- Use existing data
- Collect your own data
- Combine quantitative and qualitative data
- Engage community

# Examples

- Rates of activity have remained essentially constant over the past 5 years and are lowest among lower income women.
- Rates of physical inactivity among children ages 5-12 have increased 15% over the last decade.
- Only 10% of elementary-age children enrolled in public schools have daily physical education.

## The take home messages..

1. The process of evidence-based decision making can improve your PA programs and policies
2. Surveillance and descriptive epidemiologic data can be powerful in framing the issue
3. Many resources already exist to guide the process