

# Health Benefits of Physical Activity: Implications for Sustainable Communities



California Air Resources Board  
California Environmental Protection Agency

**June 25, 2015**

# Why look at physical activity and health?

- Physical Activity Guidelines for Americans
- Benefits of sustainable community design
  - Reduced vehicle use
  - Increased mobility
  - Economic growth
  - Conservation of open space
  - **Increased physical activity**



# Built environment designs promote physical activity

- Community designs can improve public health
- Increased physical activity associated with:
  - Green spaces<sup>1,2</sup>
  - Neighborhood walkability<sup>3, 4, 5</sup>
  - Access and use of public transportation<sup>6, 7</sup>



1. Almanza, E., et al. Health & Place 2012; 18: 1.

2. Jerrett, et al. American Journal of Preventative Medicine 2013; 45:4.

3. Frank, D., et al. Journal of the American Planning Association 2006; 72: 1.

4. Sturm, R. Public Health 2004; 118: 7.

5. Li, F., et al. Preventative Medicine 2009; 48: 3.

6. Besser, . American Journal of Preventative Medicine 2005; 29: 4.

7. Boarnet, MG., et al. The Haynes Foundation 2013.

8. Photo courtesy of Eric Fredricks.

<https://creativecommons.org/licenses/by-sa/2.0/>

# Health benefits of physical activity

## Children and Adolescents

**Aerobic Fitness**

**Reduced Disease  
Risk & Symptoms**

**Healthy Weight**

**Psychological  
Well-Being**

## Adults

**Aerobic Fitness &  
Functional Health**

**Reduced Death &  
Disease Rates**

**Disease Treatment**

**Cognitive Health &  
Psychological Well-Being**

# Increased physical activity improves health

- Greatest benefit is from sedentary to active
- Continued benefit seen with higher levels of activity
- Increasing activity reduces premature death: similar reduction to quitting smoking<sup>1</sup>



1. Byberg L, et. al. British Journal of Sports Medicine 2009; 43: 482.

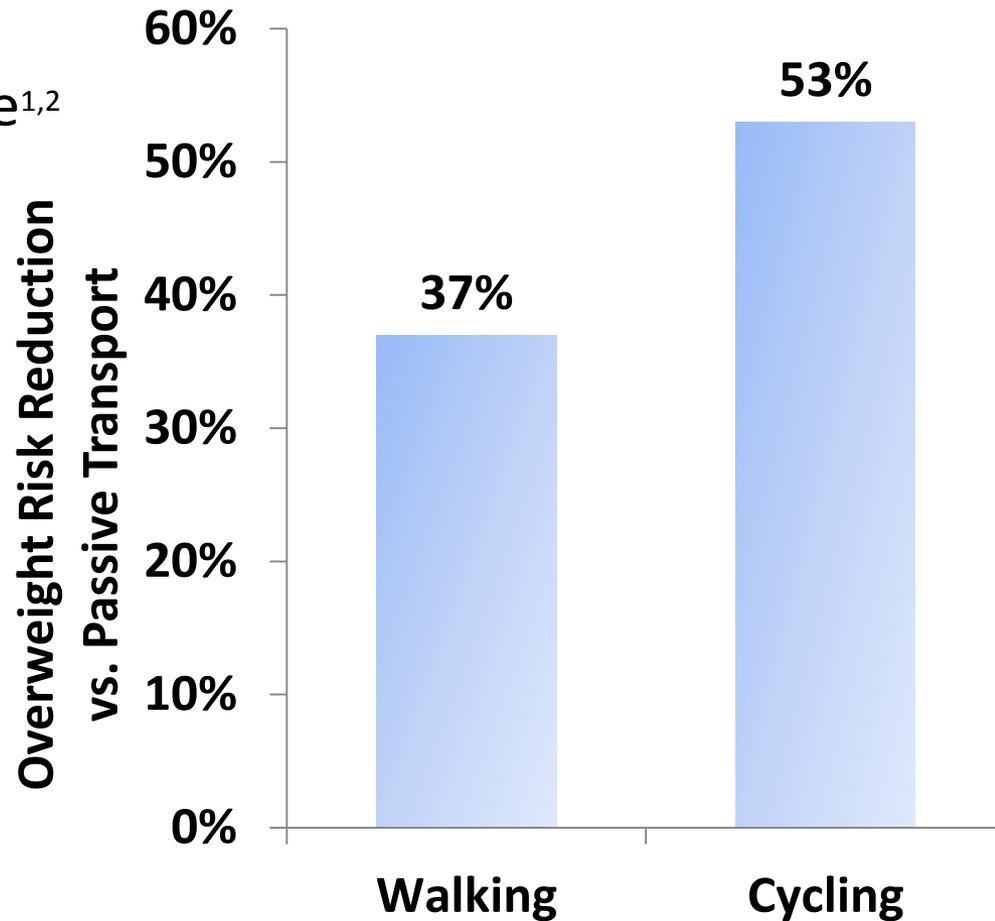
# How can adults achieve their physical activity goal?

**150 minutes/week of moderate intensity physical activity**



# Children and active transport

- Higher fitness Levels<sup>1,2</sup>
- Better flexibility<sup>1,2</sup>
- Increased muscular endurance<sup>1,2</sup>
- Lower overweight risk<sup>3,4</sup>

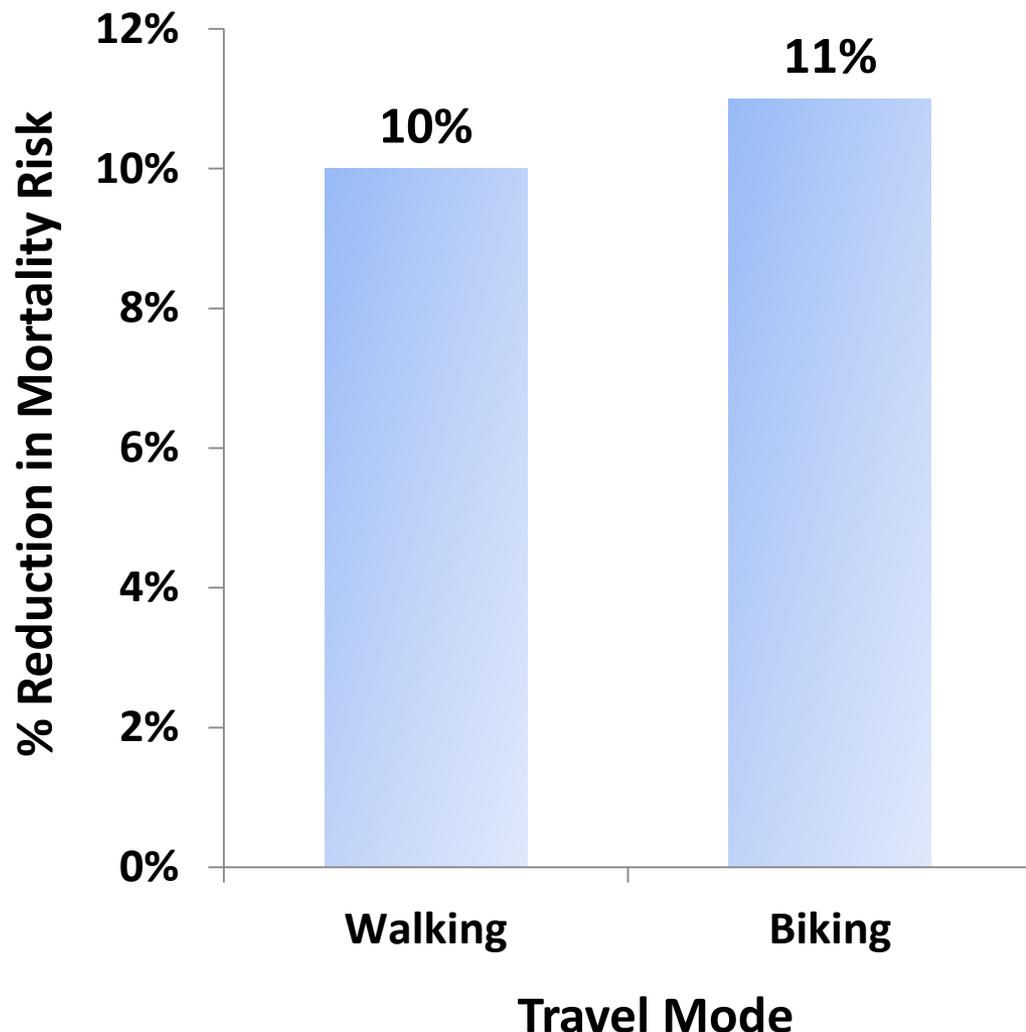


1. Cooper, A. R., et al. *Medicine & Science in Sports & Exercise* 2006; 38: 10.
2. Cooper, A. R. , et al. *Preventive Medicine* 2008; 74: 3.
3. Ostergaard, et al. *Journal of Physical Activity and Health* 2012; 9: 5.
4. Pabayo, R., et al. *Preventative Medicine* 2010; 50.

# Adults and active transport

Associated with decreased:

- Premature death<sup>1</sup>
- Strokes and heart attacks<sup>2</sup>
- Cases of type 2 diabetes<sup>3</sup>



1. Kelly, P., et al. International Journal of Behavioral Nutrition and Physical Activity 2014; 11: 1.

2. Hamer, M., et al. Preventative Medicine 2008; 46: 1

3. Gill, M.R., et al. Sports Medicine 2008; 38: 10.

# Air pollution impacts during physical activity

## Current Scientific Consensus

- *All populations can benefit from physical activity, but should alter behavior based on air quality*
  - Sensitive populations are more impacted by air pollution during physical activity<sup>1,2</sup>
  - Acute and long-term exposure is associated with detrimental cardiovascular and pulmonary effects in healthy and asthmatic children and adults<sup>3,4,5,6</sup>



1. McCreanor, J., et al. New England Journal of Medicine 2007; 357: 23  
2. Scannell, C., et al. American Journal of Respiratory and Critical Care Medicine 1996; 154: 1.  
3. McConnell, R., et al. Lancet 2002; 359: 9304 .

4. Yu, I.T., et al. Journal of Occupational and Environmental Medicine 2004; 46: 9  
5. Lundback, M., et al. Particle and Fibre Toxicology 2009; 6.  
6. Kubesch, N.J., et al., Occupational and Environmental Medicine 2015; 72: 4

# Air pollution exposure mitigation strategies

- **Select less trafficked route<sup>1</sup>**
- **Avoid walking near the street<sup>2</sup>**
- **Build green buffers<sup>3,4</sup>**
- **Observe School AQI Flag Program<sup>5</sup>**
- **Support Safe Routes to School Program<sup>6</sup>**
- **Design communities to promote activity**



**SafeRoutes**  
National Center for Safe Routes to School



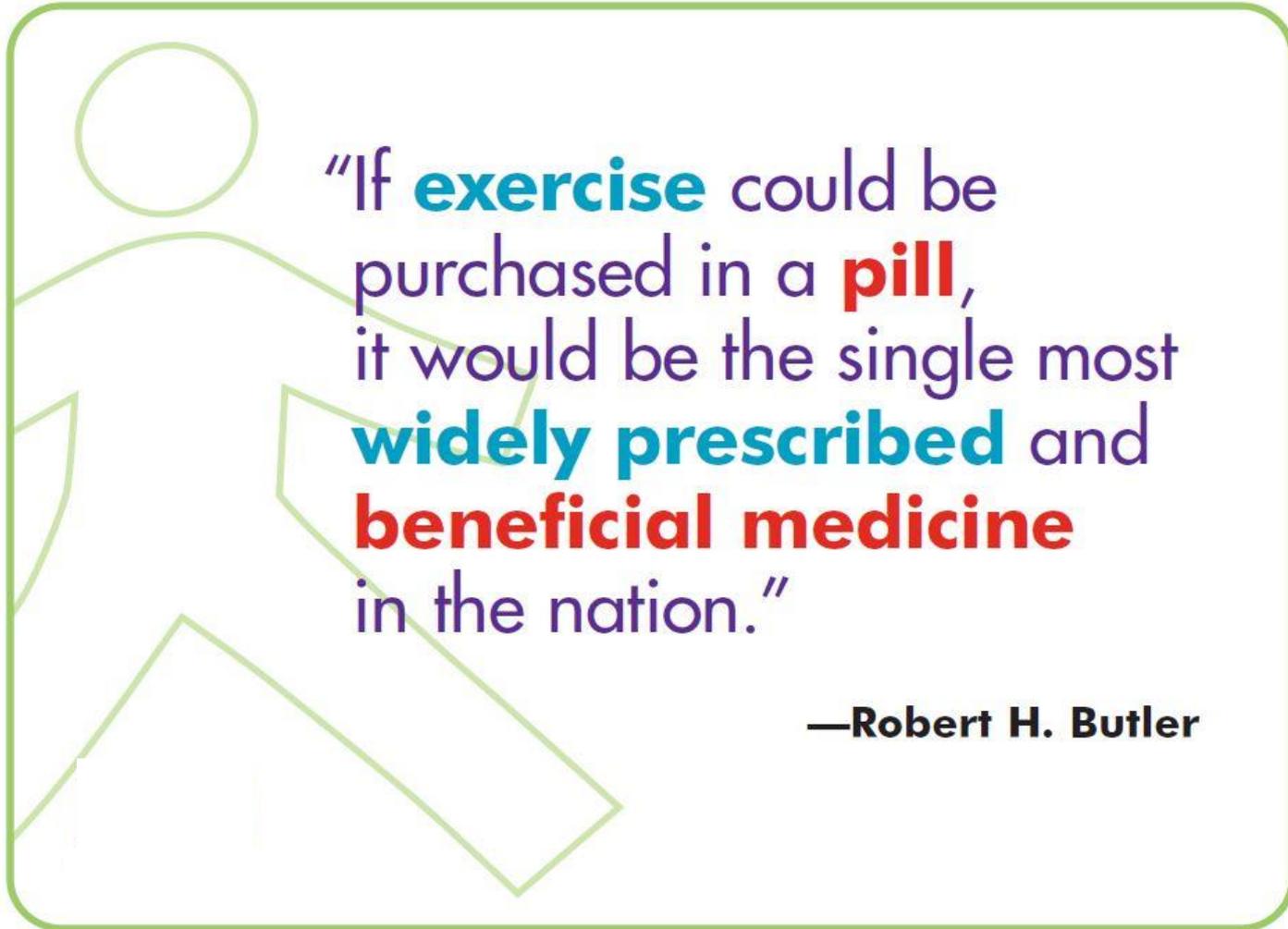
1. Jarjour, S., et al. Environmental Health 2013; 12.
2. Kaur, S., et al. Atmospheric Environment 2005; 39: 38.
3. Su, J. G., et al. Environmental Research 2011; 11: 3.
4. Dadvand, P., et al. Science of the Total Environment 2015; 523
5. Shendell, D. G., et al. Journal of Environmental Health 2007; 70: 3.
6. National Center for Safe Routes to School. (n.d.). <http://www.saferoutesinfo.org/>

# Next steps

- **Support community designs that reduce exposure and promote physical activity**
- **ARB research on mitigation measures**
  - *Active transport studies*
    - Bicycle commuter
    - Walkability
  - *Sustainable communities studies*
    - Complete streets
    - Transit stops
    - Sound wall and vegetation
    - Light rail
- **Distribution of findings**



# Thank you



“If **exercise** could be purchased in a **pill**, it would be the single most **widely prescribed** and **beneficial medicine** in the nation.”

—Robert H. Butler