

# Determining the Essential Metrics for Assessing Health and Non-Communicable Disease Risk

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# Learning Objectives

- Understand the difference between communicable and non-communicable diseases
- Recognize chronic health conditions related to cardiorespiratory and musculoskeletal health
- Differentiate and define the components of fitness
- Compare and contrast valid technology, tools, and techniques for various fitness measures
- Use fitness measures to predict chronic, non-communicable health risks



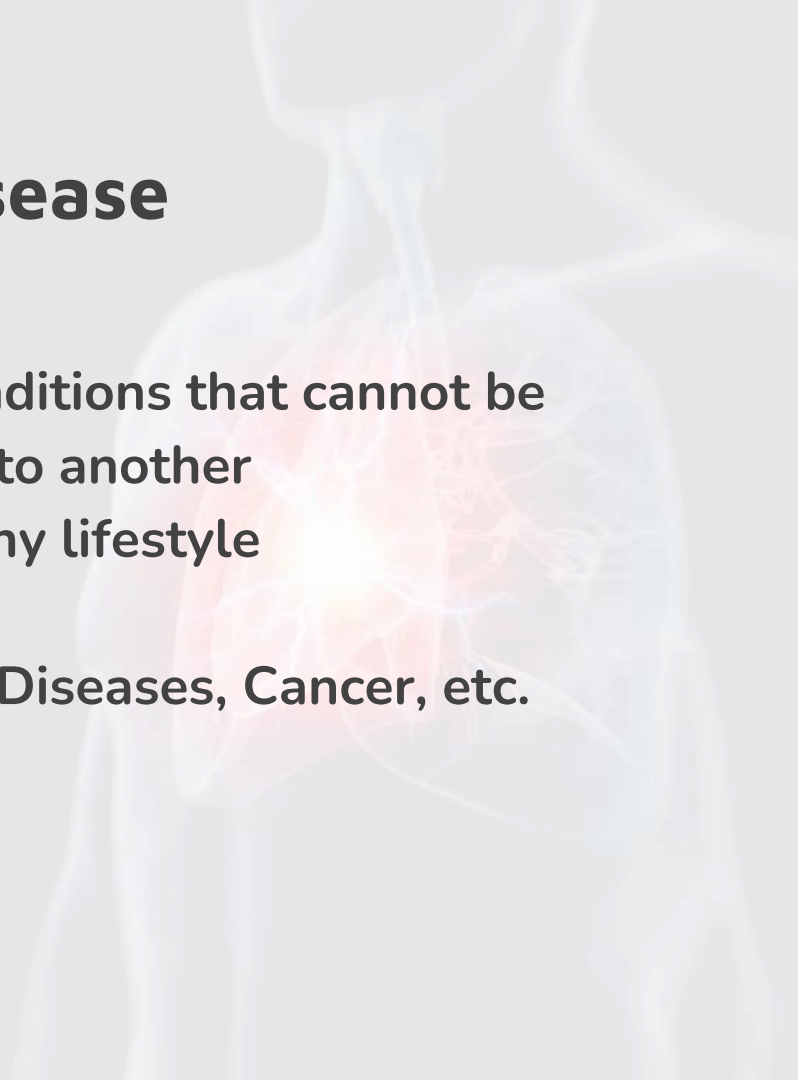
# Communicable Disease

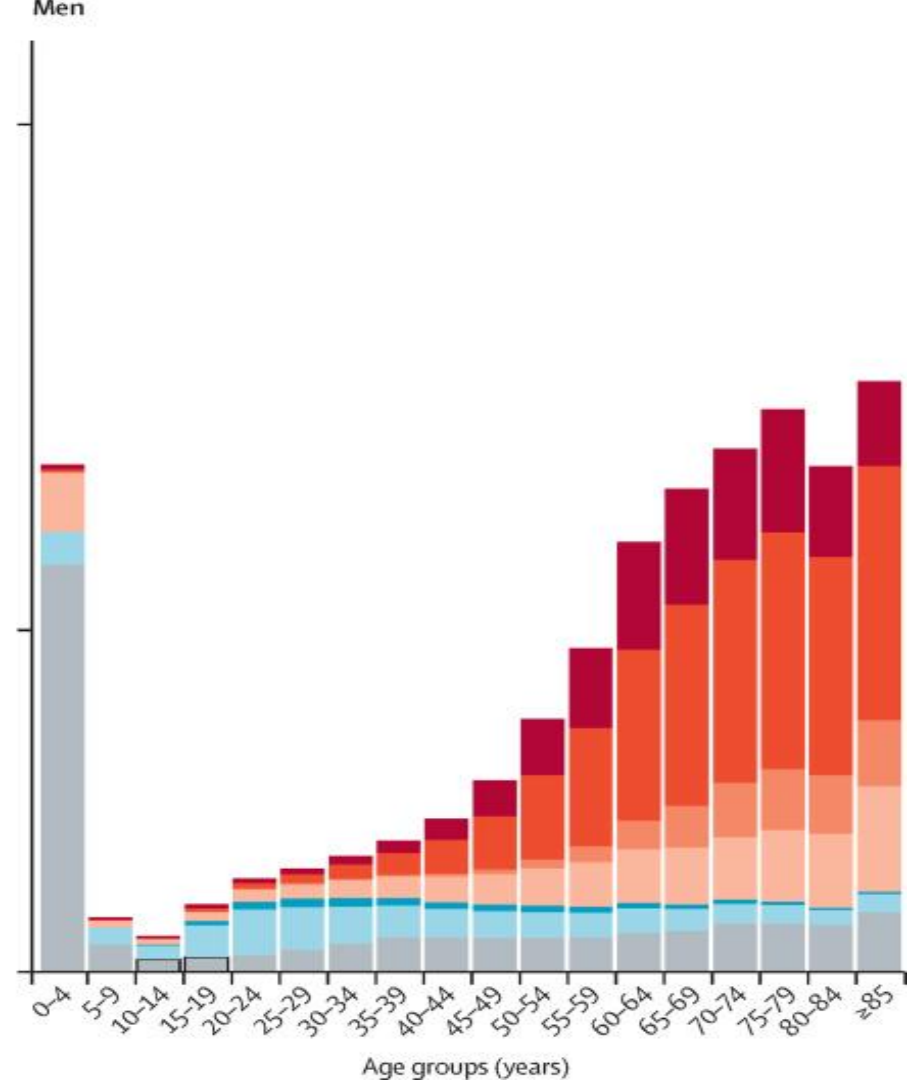
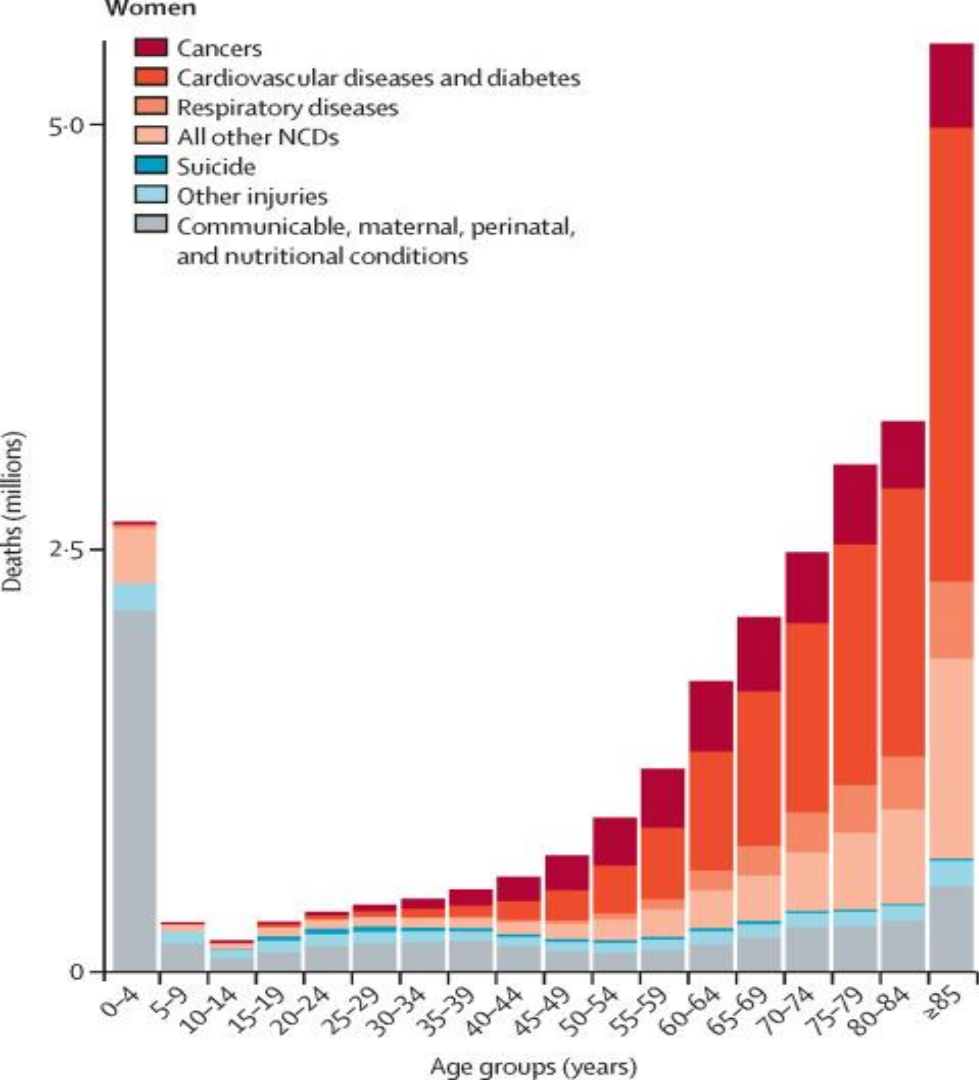
- Infectious disease that is transmitted from one person to another
- Preventative measures include: hand hygiene, vaccination, & isolation
- Examples:
  - Cold and Flu



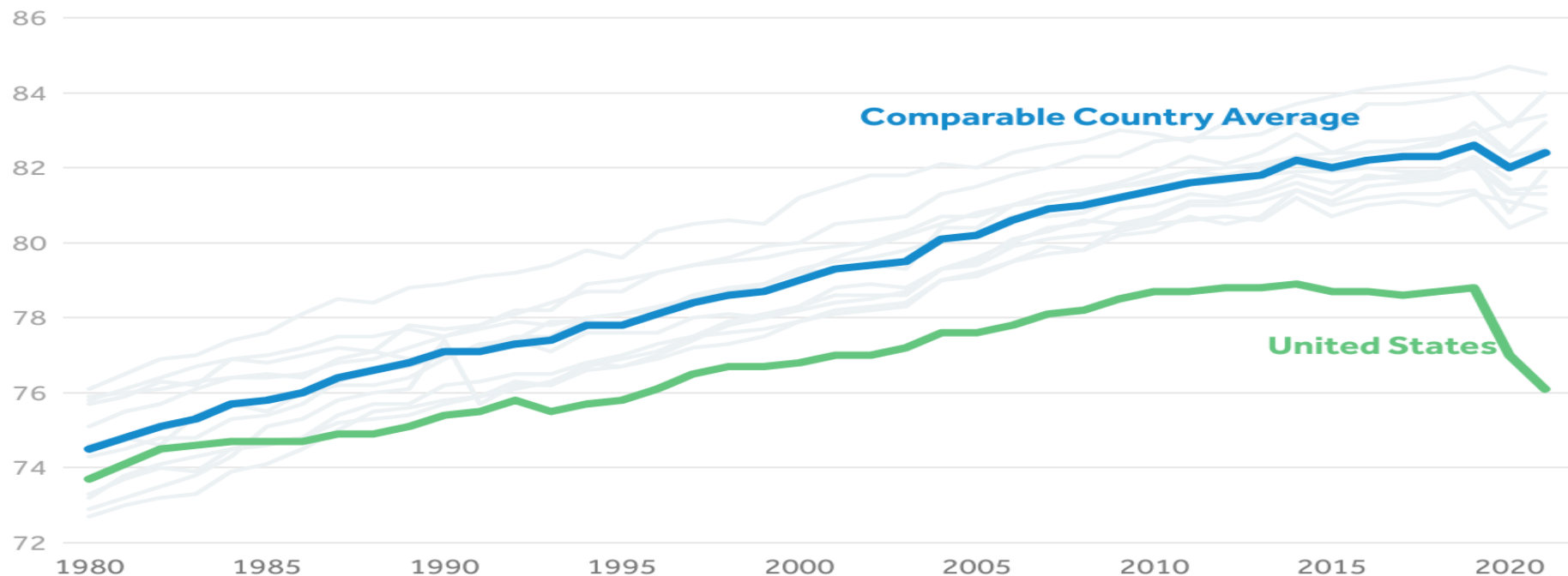
# Non-Communicable Disease

- Chronic diseases, medical conditions that cannot be transmitted from one person to another
- Preventative Measures: healthy lifestyle
- Examples:
  - Diabetes, Cardiovascular Diseases, Cancer, etc.





## Life expectancy at birth in years, 1980-2021



Notes: Comparable countries include: Australia, Austria, Belgium, Canada (except for 2021), France, Germany, Japan, the Netherlands, Sweden, Switzerland, and the U.K. See Methods section of "How does U.S. life expectancy compare to other countries?"

Source: KFF analysis of CDC, OECD, Japanese Ministry of Health, Labour, and Welfare, Australian Bureau of Statistics, and UK Office for Health Improvement and Disparities data

Peterson-KFF

**Health System Tracker**



# **Skill Related vs Health Related Components of Fitness**





## **6 Skill Related Components of Physical Fitness**

- 1. Agility**
- 2. Coordination**
- 3. Balance**
- 4. Reaction Time**
- 5. Power**
- 6. Speed**

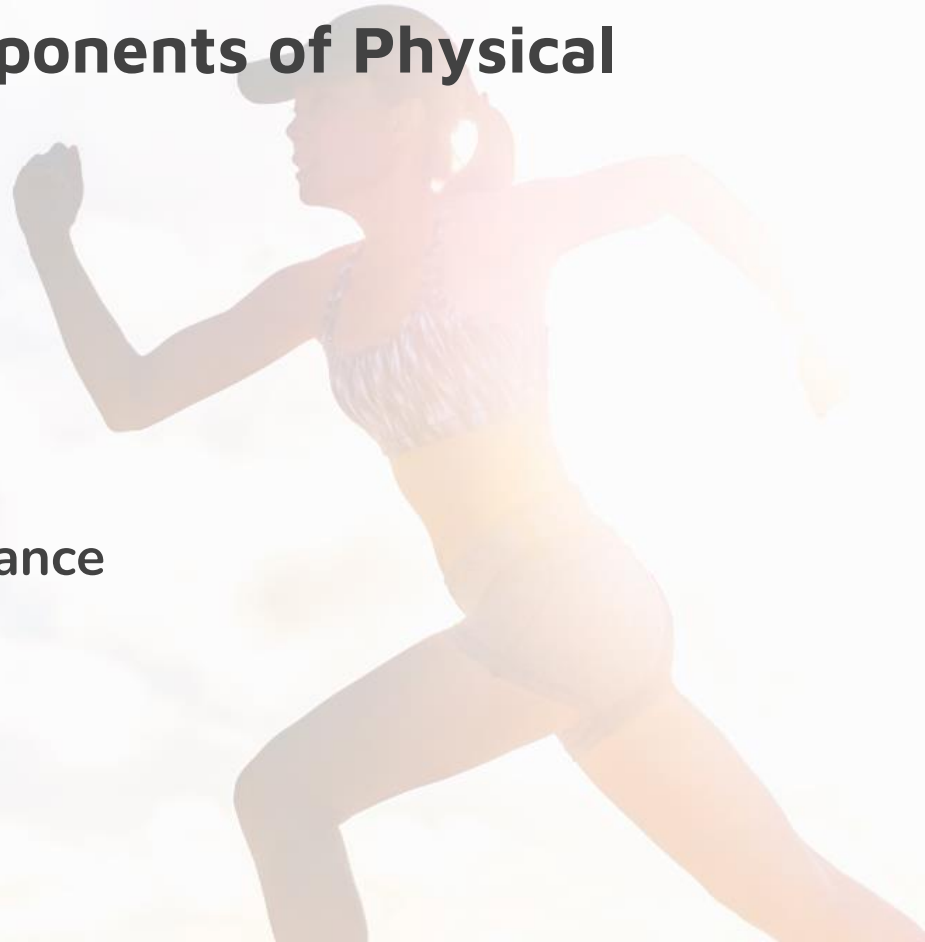







## **5 Health Related Components of Physical Fitness**

- 1. Flexibility**
- 2. Muscular Strength**
- 3. Muscular Endurance**
- 4. Cardiorespiratory Endurance**
- 5. Body Composition**



A woman with long blonde hair, wearing a grey sports bra and black leggings, is seen from behind, stretching her back by pulling her arms up and over her head. She is in a gym setting with various exercise machines visible in the blurred background. The overall image has a soft, light grey overlay.

## **Health Related Components of Physical Fitness: Flexibility**



# Flexibility

- Defined as the range of motion available at the joint
- Measured with tape measure (sit and reach) or goniometer





# Flexibility

- Negatively impacts the ability to perform activities of daily living -> increasing dependency and reducing quality of life
- Decreased flexibility caused obesity, aging, and physical inactivity
- We actually see flexibility decrease anywhere from 20-30% between the ages of 30 to 70 years old

A photograph of two women, one younger with dark hair in a ponytail and one older with short blonde hair, both smiling and flexing their biceps in a gym setting. They are wearing athletic tank tops. The background is blurred, showing gym equipment.

## **Health Related Components of Physical Fitness: Muscular Strength & Endurance**



# Muscular Strength & Endurance

- Muscular strength is defined as the ability of the muscles to exert force
- Measured using a 1RM, multiple RM, or Force Plates
- Muscular endurance is the ability of the muscle to perform without fatigue
- Measured muscular effort (repetitions) over a period of time (push-ups, sit-ups, arm curl)



## Muscular Strength & Endurance

- Both have demonstrated inverse relationships to mortality risk
- Muscular strength being the biggest influencer when it comes to chronic disease risk
- Strength is associated with better bone health and reduced risk of cardiovascular disease



A woman is running on a treadmill in a gym. She is wearing a blue respiratory mask that covers her nose and mouth, with a tube leading down. She is also wearing a white tank top and orange shorts. The background is a blurred gym interior with other treadmills and people.

# **Health Related Components of Physical Fitness: Cardiorespiratory Endurance**



The background of the slide is a faded image of a person wearing a heart rate monitor and a stethoscope, riding a stationary bike. In the foreground, a laptop is open, displaying a line graph on its screen. The graph has a grid and shows a fluctuating line, likely representing heart rate or oxygen consumption over time. The overall theme is cardiorespiratory fitness and measurement.


# Cardiorespiratory Endurance

- Defined as the ability of the circulatory and respiratory system to supply oxygen during sustained physical activity
- $\text{VO}_2\text{max}$
- Measured using metabolic unit or field test



# Cardiorespiratory Endurance

- A higher level of cardiorespiratory fitness is associated with a decreased risk of all-cause, cardiovascular disease, and cancer mortality
- Cardiorespiratory fitness is also inversely associated with risk of metabolic syndrome



## **Health Related Components of Physical Fitness: Body Composition**



# Body Composition + Anthropometrics

- Body composition describes what the body is composed of
- Anthropometrics defined as systematic measurement and collection of human bodily measurements
- Measured using tape measure, 3DO, DEXA, BIA, Skinfold, etc.
- Measurements can be used to predict chronic disease health risks



## Body Composition + Anthropometrics

- Waist Circumference > 35 inches for women or > 40 inches for men
- Waist-to-Hip ratio > 0.80 for women or >0.95
- Sarcopenia -> calf circumference of approximately 31cm or Appendicular Lean Mass
- BMI greater than 30
- Body Fat Percentage > 28% for men and >40% for women



# Questions

LIFESTYLE

DIETING

SPORT

HEALTH

FITNESS

ENERGY

HYGIENE

EXERCISE

WELLNESS

CARE

NUTRITION