

Child and Adolescent Health

Social Epidemiology

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Outline

1. Burden of disease in child and adolescent populations
2. Childhood social circumstances and health
3. Prevention of child and adolescent mortality and morbidity

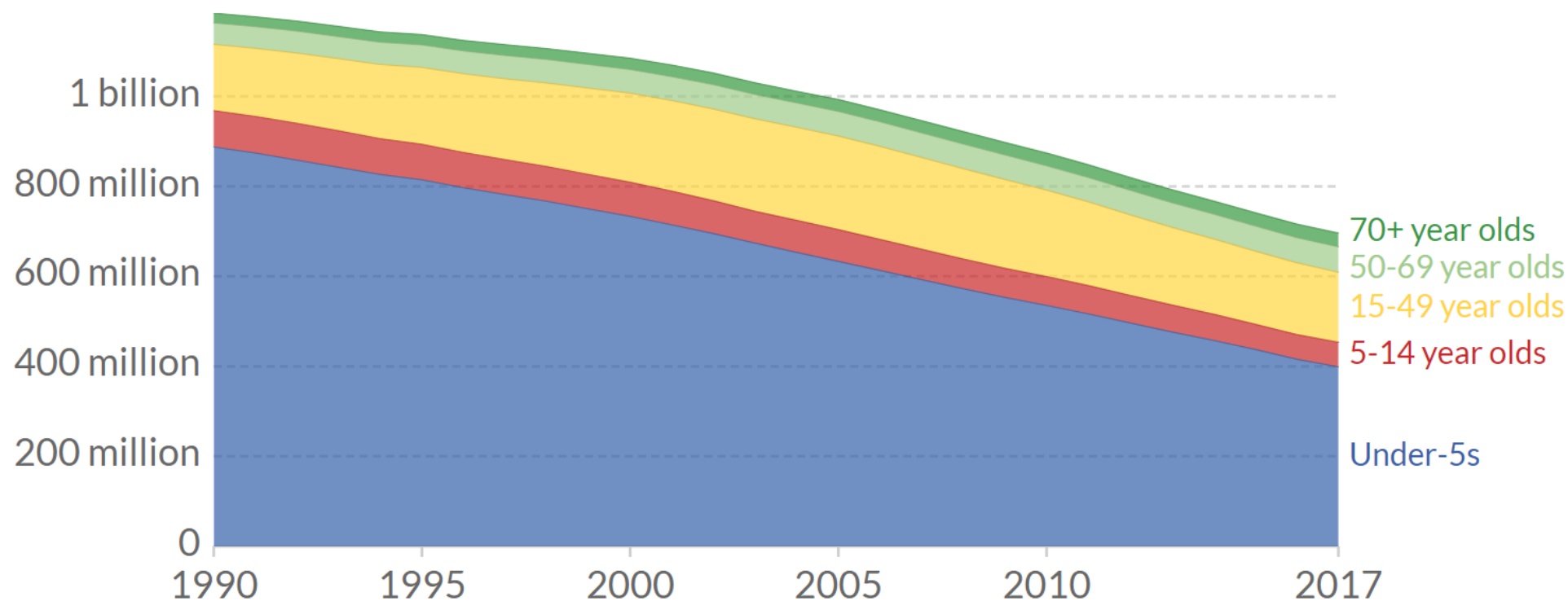
Burden of Disease in Children and Adolescents

1. Non-communicable diseases (NCDs)
 - E.g., cardiovascular diseases, cancers, mental and substance use disorders
 - Typically low in children and adolescents (less than 10% of world DALYs)
2. Communicable, maternal, neonatal and nutritional diseases
 - E.g., diarrhea, lower respiratory & other common infectious diseases, HIV/AIDS, nutritional deficiencies
 - Major source of disease burden in this age group (over 60% of world DALYs)
3. Injuries
 - E.g., road injuries, falls, drowning, self-harm, interpersonal violence, conflict & terrorism, natural disasters
 - Less than 20% of world DALYs in children and adolescents

Disease burden from communicable, maternal, neonatal & nutritional diseases by age, World, 1990 to 2017

Disease burden from communicable, maternal, neonatal and nutritional diseases by age. Disease burden is measured in DALYs (Disability-Adjusted Life Years). DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.

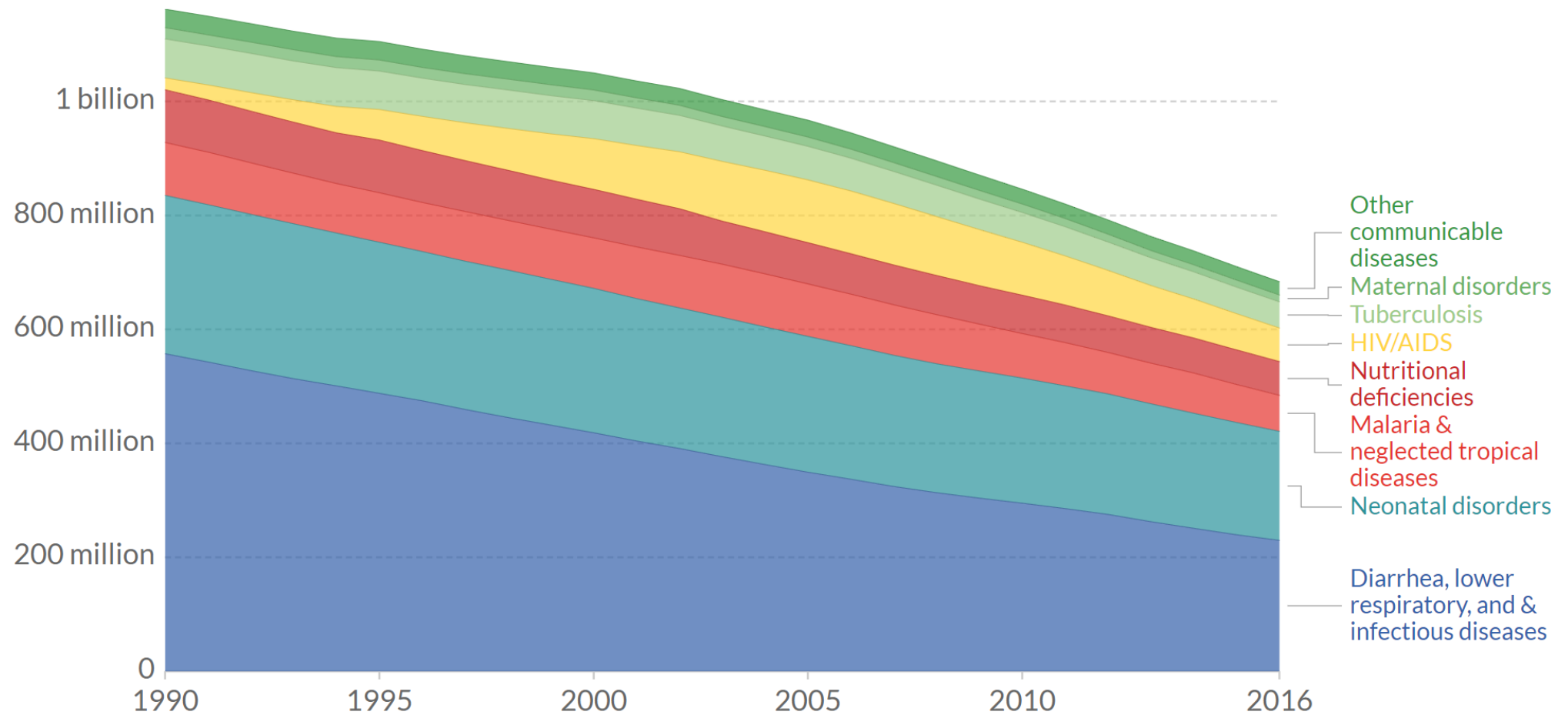
↔ Change country □ Relative



Disease burden from communicable, maternal, neonatal and nutritional diseases, World, 1990 to 2016

Total disease burden from communicable, maternal, neonatal and nutritional diseases, measured in DALYs (Disability-Adjusted Life Years) per year. DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.

↔ Change country Relative



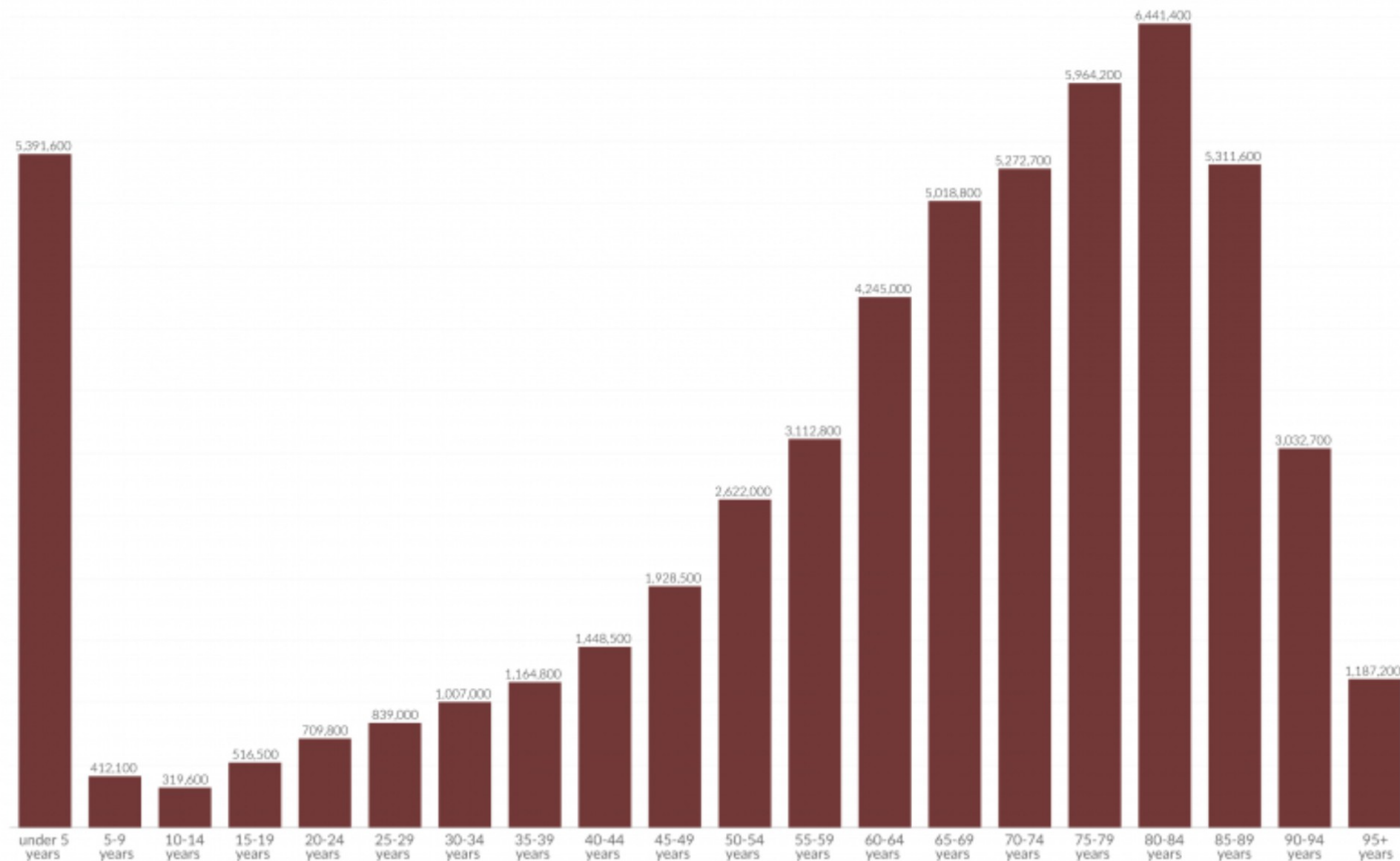
Burden of Disease Globally

Global rates are driven by:

1. conditions affecting the youngest children
 - Under 5 years old, particularly newborns
2. mortality in regions with low socio-demographic index (SDI)
 - Sub-Saharan Africa
 - Central and Southern Asia
3. by communicable, maternal, neonatal and nutritional diseases
 - Prevalent particularly in low SDI regions

Deaths globally by age

56 Million people died in 2017. Shown here is at what age each person died.



Data source: Global Burden of Disease published by the Institute for Health Metrics and Evaluation
This is a visualization from [OurWorldinData.org](https://ourworldindata.org), where you find data and research on how the world is changing.

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Burden of Disease by Age and Region

Drivers of health loss in **low SDI regions**

- Mortality due to communicable, maternal, neonatal and nutritional diseases

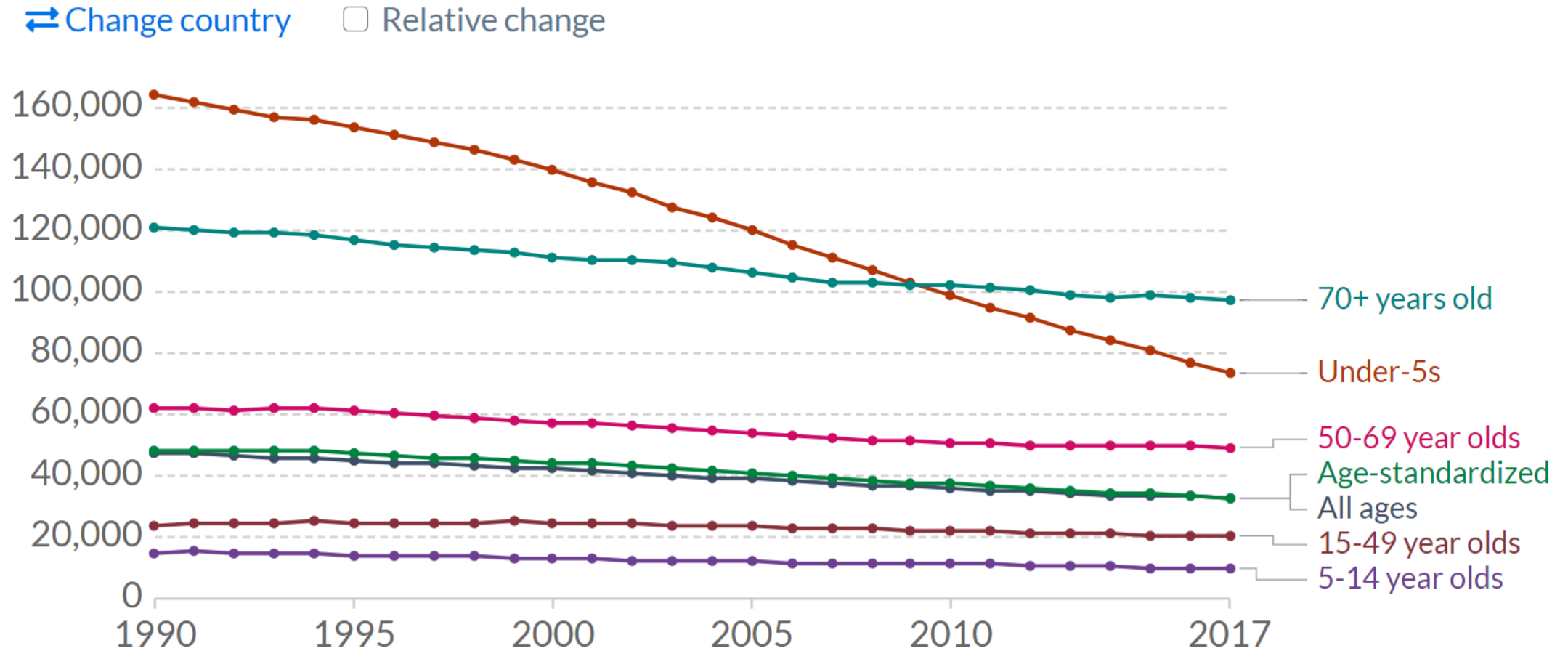
Drivers of health loss in **high SDI regions**

- Nonfatal health loss
- Greater role of NSDs and injuries

- Differences between the regions are more pronounced with increasing age of the children
- DALYs decreased across the world (particularly in children under 5); however income and disadvantage-related inequalities persist
- DALYs in older children, adolescents and those due to nonfatal health outcomes (NCDs, incl. acquired chronic conditions with childhood onset) decreased less

Burden of disease, by age group, World, 1990 to 2017

Disability-Adjusted Life Year (DALYs) from all causes per 100,000 individuals, by age group. DALYs measure the total burden of disease – both from years of life lost due to premature death and years lived with a disability. One DALY equals one lost year of healthy life.



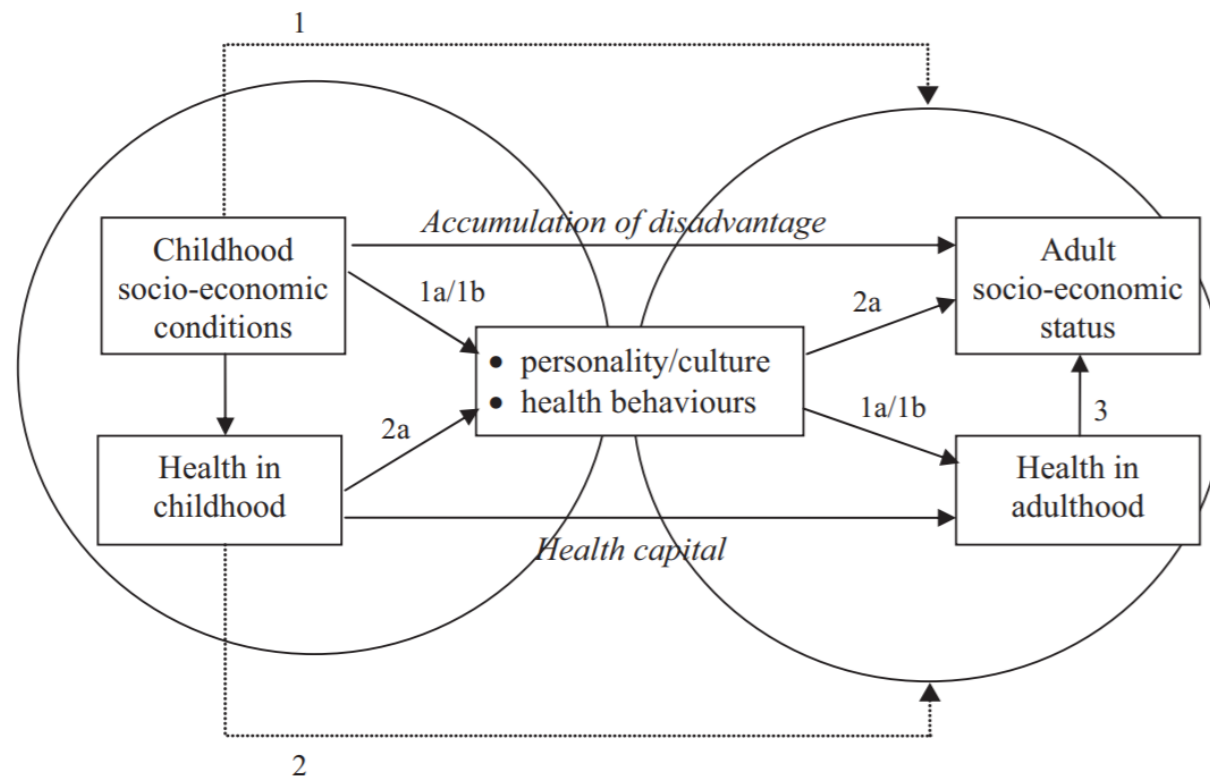
Childhood Social Circumstances and Health

Childhood adversity have lasting impact of physical and mental health

- Childhood socioeconomic status (SES)/poverty
- Adverse childhood experiences (ACEs)

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Childhood Poverty and Health Inequality Pathways of Influence



- 1 contribution of childhood socio-economic conditions to socio-economic health inequalities in adult life
- 1a independent effect of childhood socio-economic conditions on adult health
- 1b independent effect of childhood socio-economic conditions on adult health through health behaviours and personality/cultural factors
- 2 contribution of childhood health to socio-economic health inequalities in adult life
- 2a contribution of childhood health to socio-economic health inequalities in adult life through selection on health in childhood
- 3 selection on health in adult life

Source: Adapted from van de Mheen, H., K. Stronks, and J Mackenbach. 1998. "A lifecourse perspective on socioeconomic inequalities in health, Figure 1, p. 194. In the *Sociology of Health Inequalities*, edited by M. Bartley, D. Blane, and G. Davey Smith. Oxford UK: Blackwell Publishers.

Fig. 1. Pathways by which childhood living circumstances influence adult health.

Childhood Poverty and Health

Levels of Influence

Biological

- Ongoing elicitation of the stress reaction alters endocrine, metabolic, and immune systems
- Epigenetic effects

Psychological

- Weaker sense of control over the environment
- Adopting health threatening behaviors

Community and country

- Distribution of wealth and social mobility
- Welfare state

Childhood Poverty and Risk for Disease

- Low birth weight and increased infant mortality
- Greater risk of injuries
 - Accidents
 - Physical abuse/neglect
- Higher risk for asthma
- Lower developmental scores
- Metabolic diseases (obesity, diabetes)
- Mental health problems

Adverse Childhood Experiences (ACEs) and Health

ABUSE



Physical



Emotional



Sexual

NEGLECT



Physical



Emotional

HOUSEHOLD DYSFUNCTION



Mental Illness



Incarcerated Relative



Mother treated violently



Substance Abuse

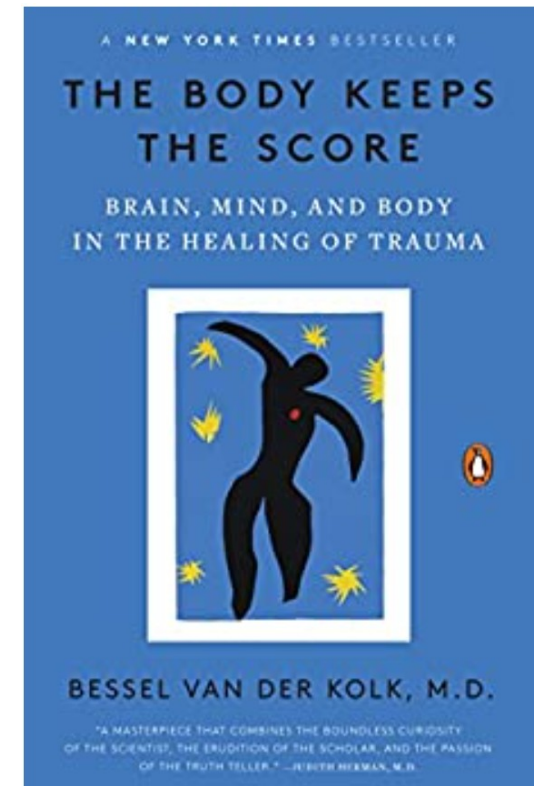


Divorce

Source: Centers for Disease Control and Prevention
Credit: Robert Wood Johnson Foundation

Adverse Childhood Experiences

- ACEs, particularly their accumulation (4+) are correlated with SES
- However, ACEs are prevalent in all social strata
 - **Over 50%** of general population report **at least 1 ACE**
 - Between approx. **6% - 14%** report exposure to **4+ ACEs**
 - **Most common:** emotional abuse/neglect, parental divorce/separation, household substance abuse
 - **Least common:** sexual abuse, incarceration of family member
- Impact on health via exposure to chronic stress
 - Biological and psychological mechanisms



Positive Stress

The body's normal and healthy stress response to a tense situation/event.

Example:

First day of school or work.

Tolerable Stress

Activation of the body's stress response to a long-lasting or severe situation/event.

Example:

Loss of family member, but with supportive buffers in place.

Toxic Stress

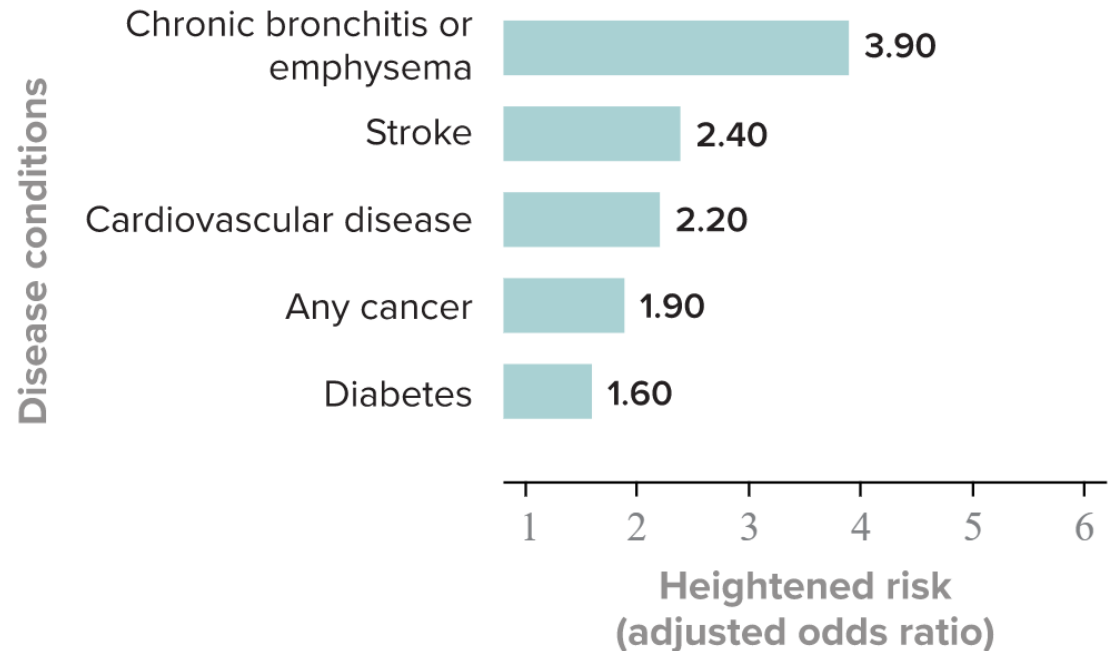
Prolonged activation of the body's stress response to frequent, intense situations/events.

Example:

Witnessing domestic violence in the home, chronic neglect.²

- Experiencing 4+ ACEs was associated with greater risk for disease in adulthood (19-92 years)
- E.g., 4+ ACEs were associated with 2.2 times greater likelihood of developing cardiovascular disease

ACEs raise the risk of diseases



SOURCE: M. BUCCI ET AL / ADVANCES IN PEDIATRICS 2016

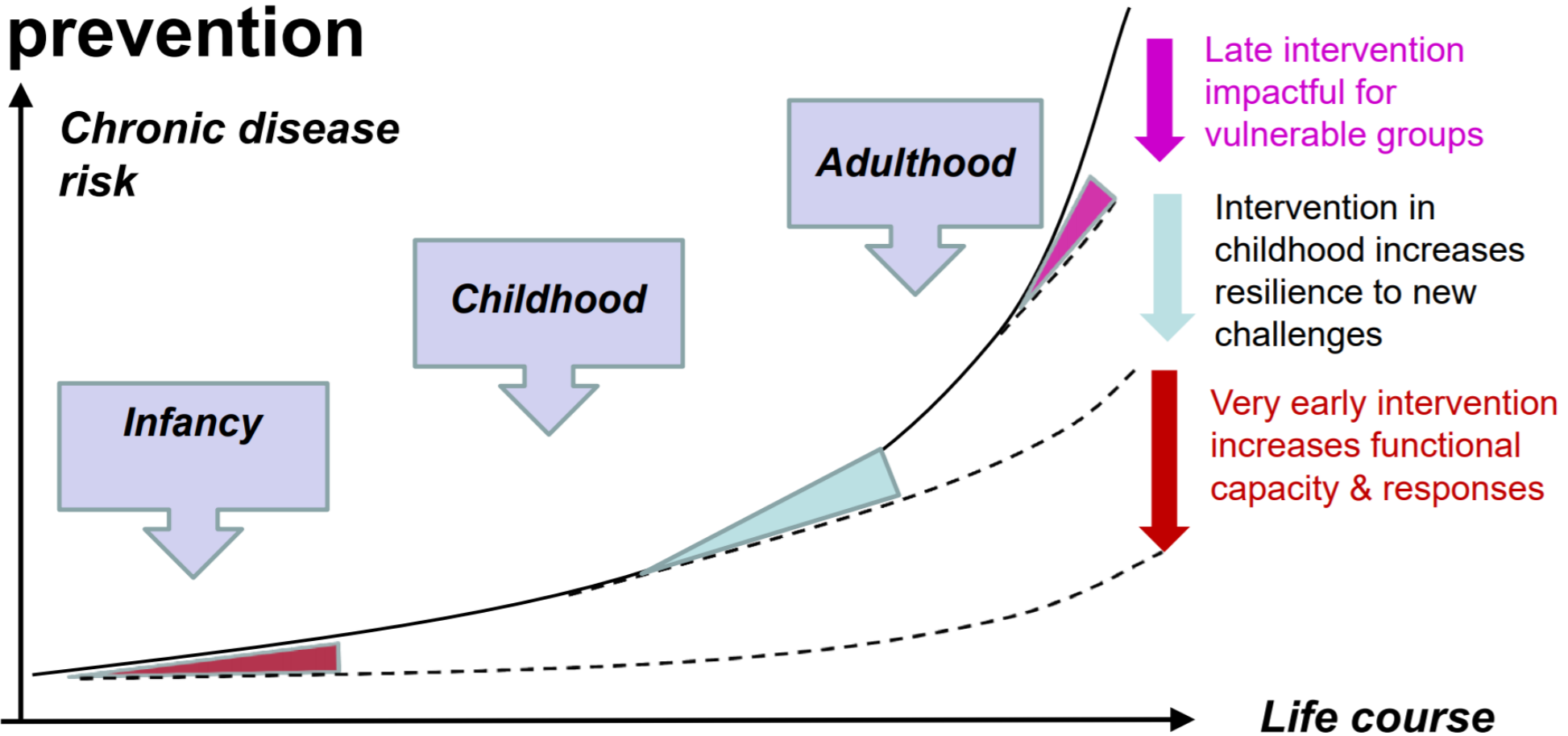
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Preventing Morbidity and Mortality

Prevention, interventions and policy change to address:

- Child and adolescent morbidity and mortality
- Adult morbidity and mortality due to conditions originating in childhood and adolescence
 - Affecting causal pathways that lead to development of the disease

Lifecourse strategy for disease prevention



Preventing Morbidity and Mortality

Example of Safe to Sleep Campaign

The problem

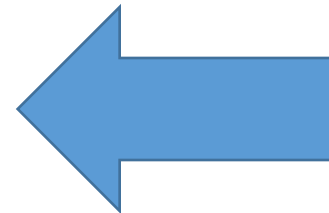
- Sudden Unexpected Infant Death (SIDS) is among the leading causes of infant mortality in developed countries
 - SIDS = unexplained death of an infant under age 1
- Prevalence in the United States was 130.3 deaths per 100,000 live births in 1990
- Potentially preventable deaths?

Preventing Morbidity and Mortality

Example of Safe to Sleep Campaign

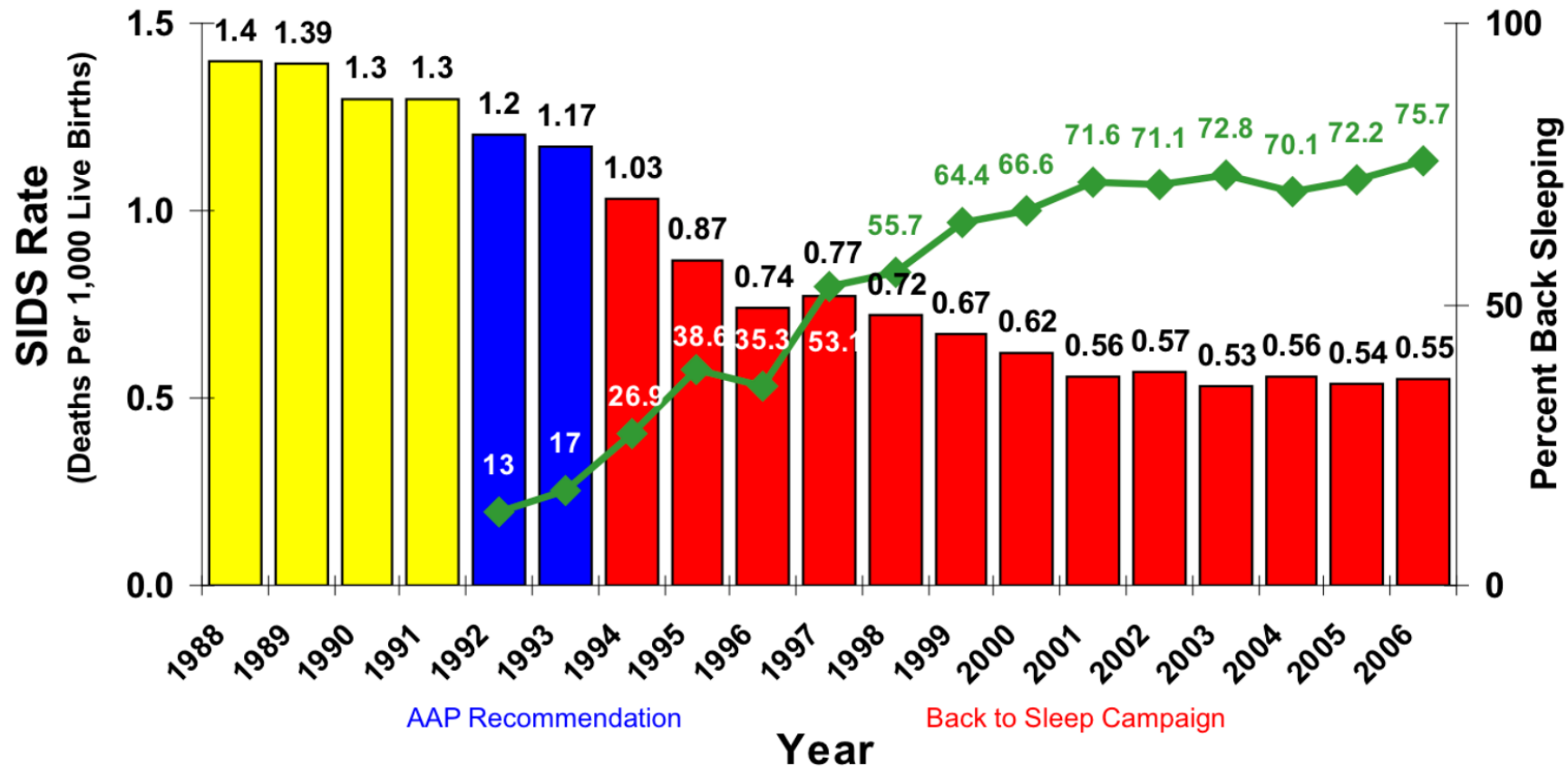
SIDS risk factors:

- Sex of the baby
- Ethnicity and SES of the family
- Prematurity
- Family history
- **But also:**
- Stomach sleeping
- Bed-sharing
- Exposure to secondhand smoke



**Risk factors modifiable
by an intervention**

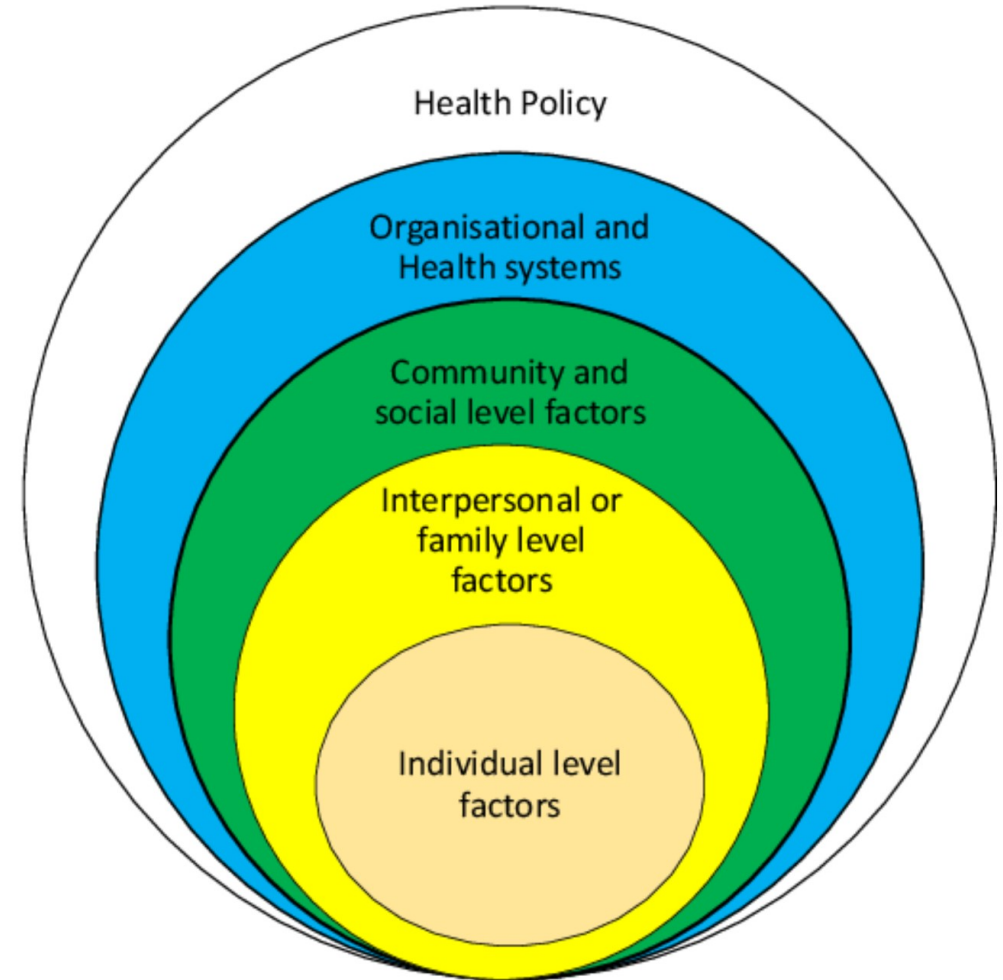
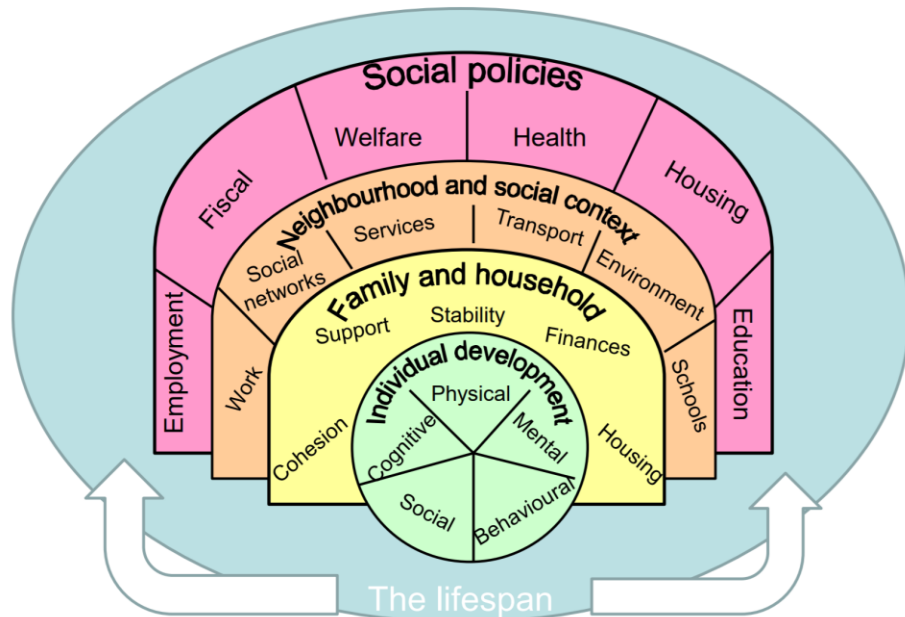
SIDS Rate and Back Sleeping (1988 – 2006)



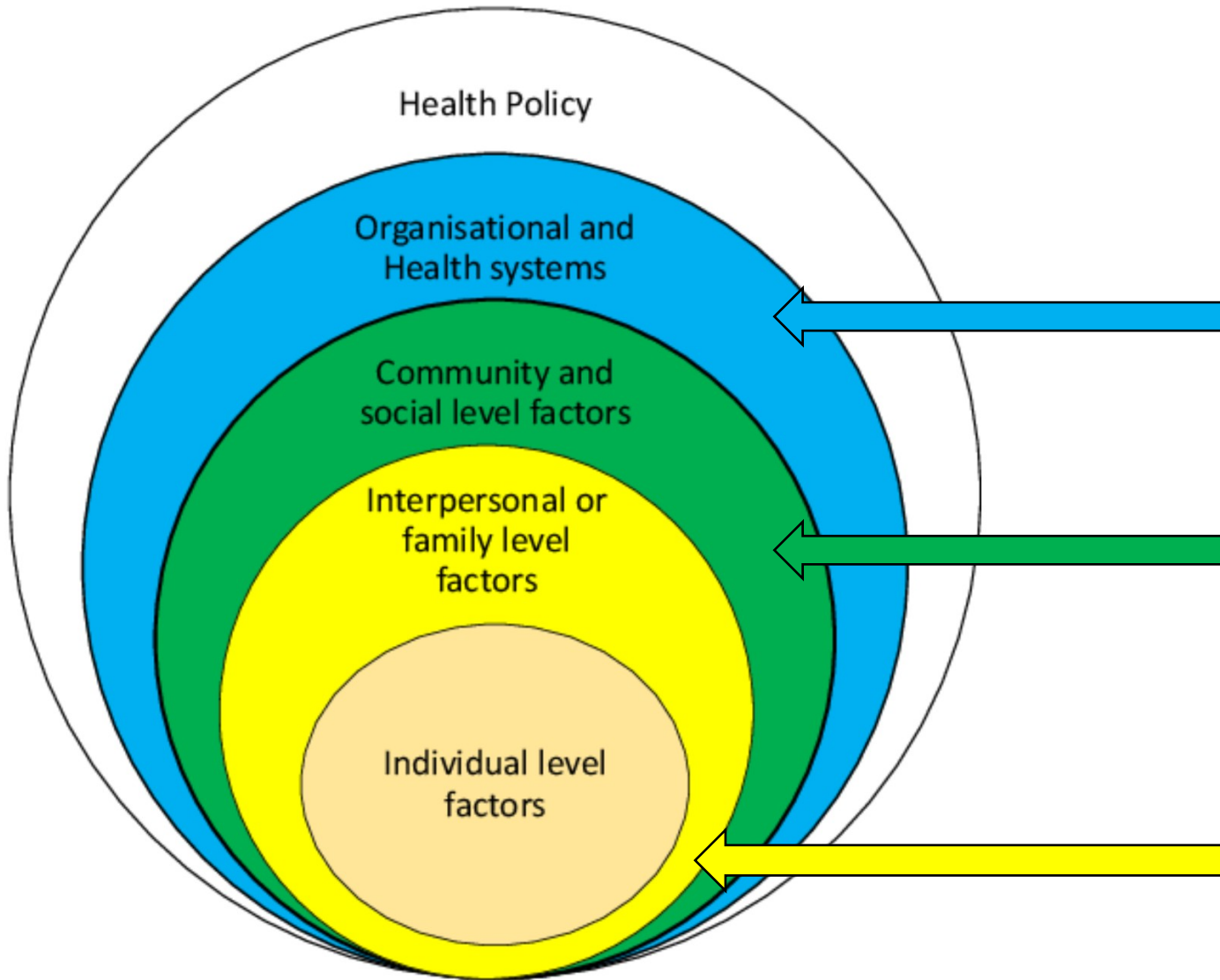
SIDS Rate Source: CDC, National Center for Health Statistics,
Sleep Position Data: NICHD, National Infant Sleep Position Study.

Multilevel Interventions

Ecological model of health across the lifespan



Implementation of Safe to Sleep at different levels of influence



- Including safe sleep guidelines to education of nursing students
- Addressing cultural practices related to infant sleep (e.g. bed-sharing)
- Educating parents on safe infant sleep

Summary

1. Burden of disease in child and adolescent populations
 - Global DALYs driven by under 5 mortality due to communicable, maternal, neonatal and nutritional diseases
 - Large differences between regions in causes and number of DALYs
2. Childhood social circumstances and health
 - Childhood adversity have lasting impact of physical and mental health
 - Adversity such as childhood poverty and ACEs present chronic stress that leads to increased morbidity and mortality
3. Prevention of child and adolescent mortality and morbidity
 - Prevention of health loss in children/adolescents as well as later in the lifespan
 - Multilevel interventions to increase the chance for success

Thank you

for your attention!