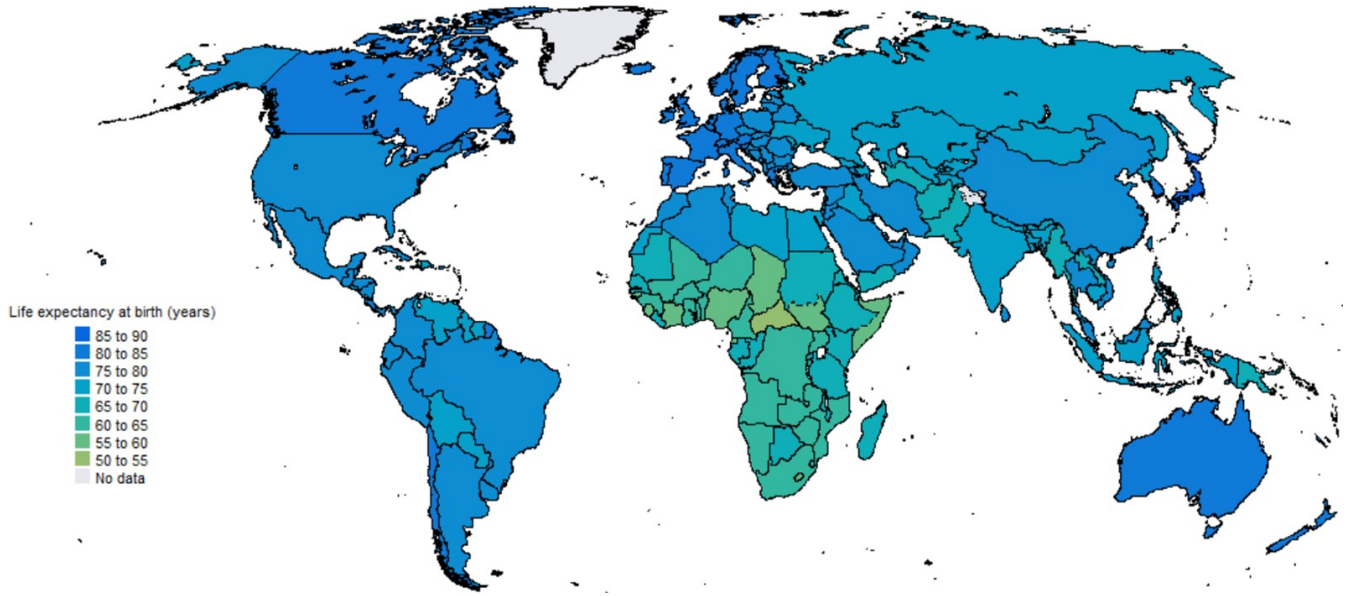
The future of health globally.



Christopher Whitty

Gresham College 2022

Health globally is improving at a remarkable pace due to a combination of medical science and development.

- The biggest change is diseases of childhood, especially in low income areas. Child mortality is dropping fast.
- This is leading to a change in global population structure.
- The health of adults up to mid 70s steadily improving around the globe.
- Health and longevity in older people improving but slower improvements in disability and frailty.
- Some significant risks to progress and in some areas progress has been slow. But a very optimistic picture overall.

Gustav Klimt:
Three ages of woman.

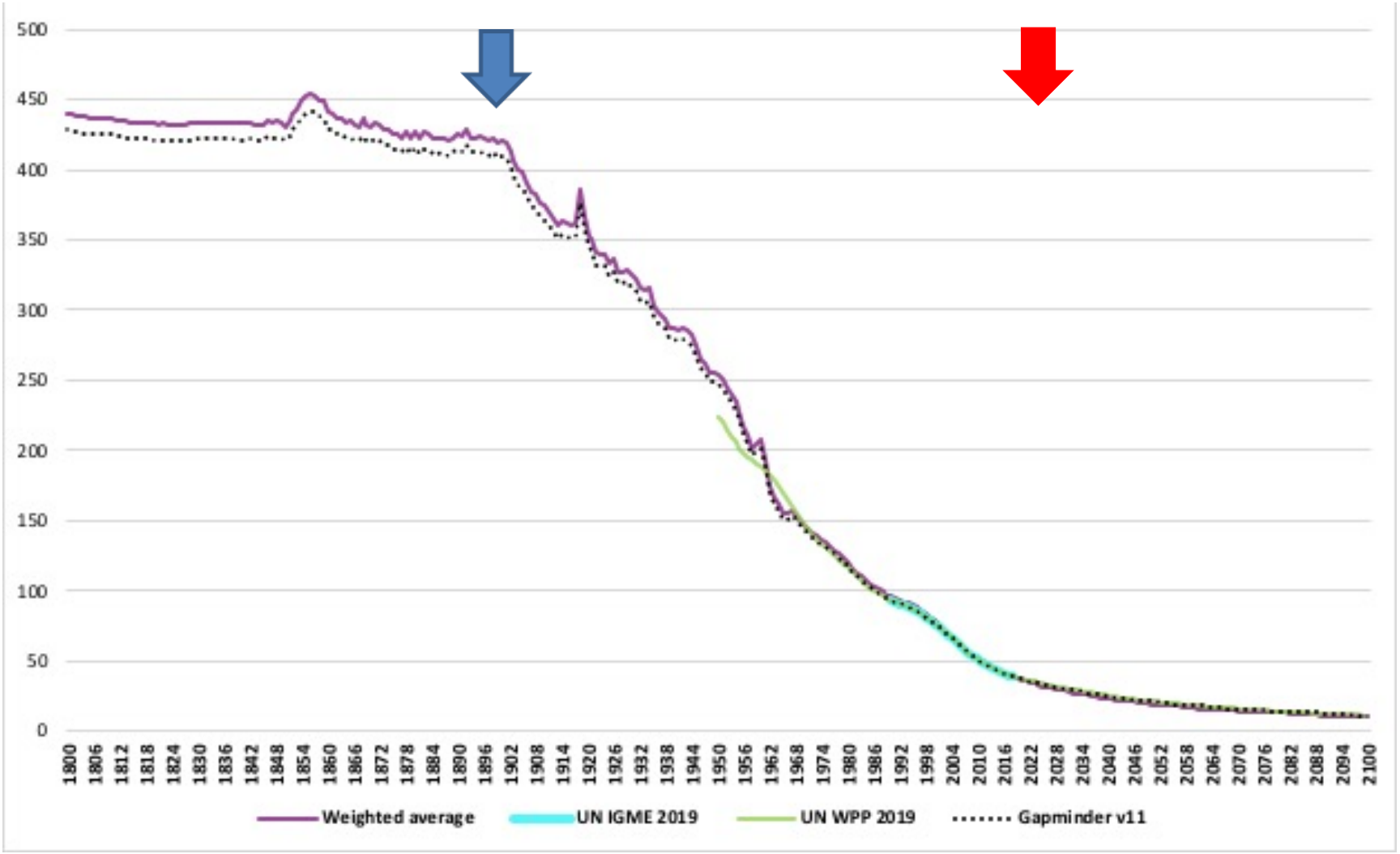
Under 5 mortality, 1990-2020. A 61% decline from 93 to 37 deaths/1000 live births. This improvement will continue.

UNICEF 2021.

Photos- Prof. Sarah Staedke, Dr. Gail Marzetti, Woodleywonderworks.

Under 5 mortality, 1800-2100. 1900 2022.

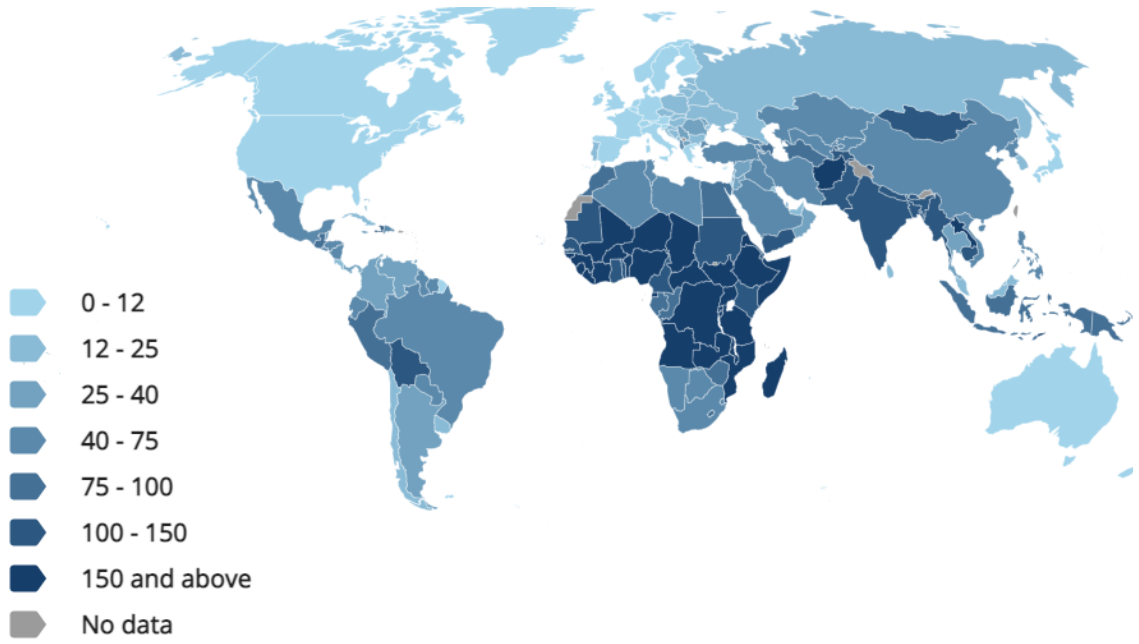
Gapminder 2022



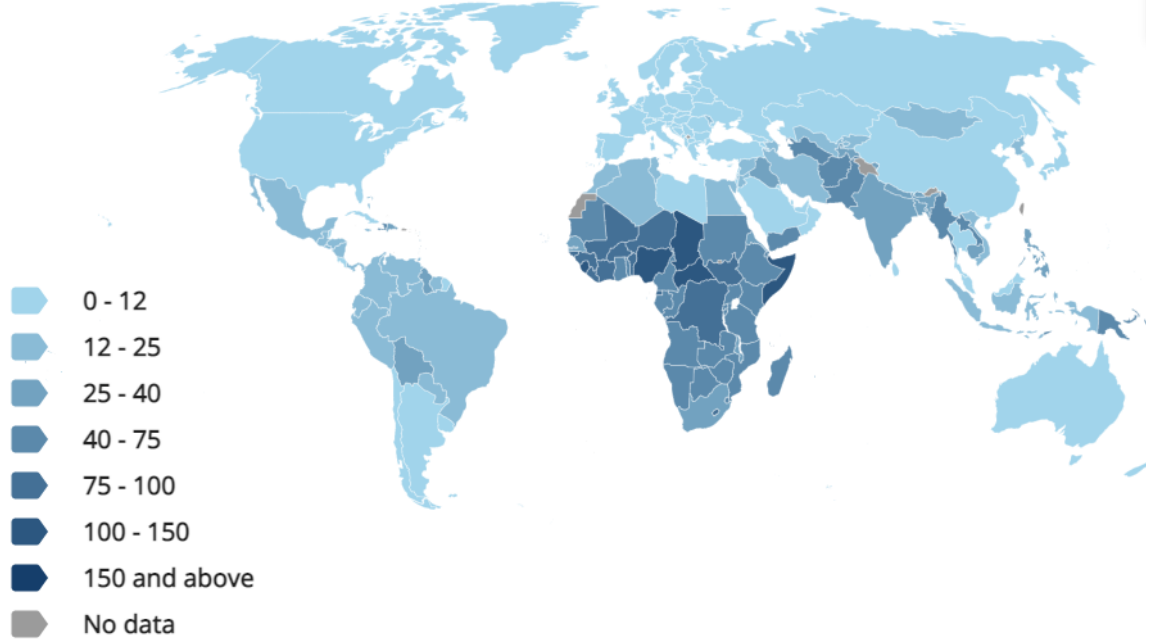
Gapminder/
UN data

Under 5 mortality, 1990-2020.

UNICEF 2021



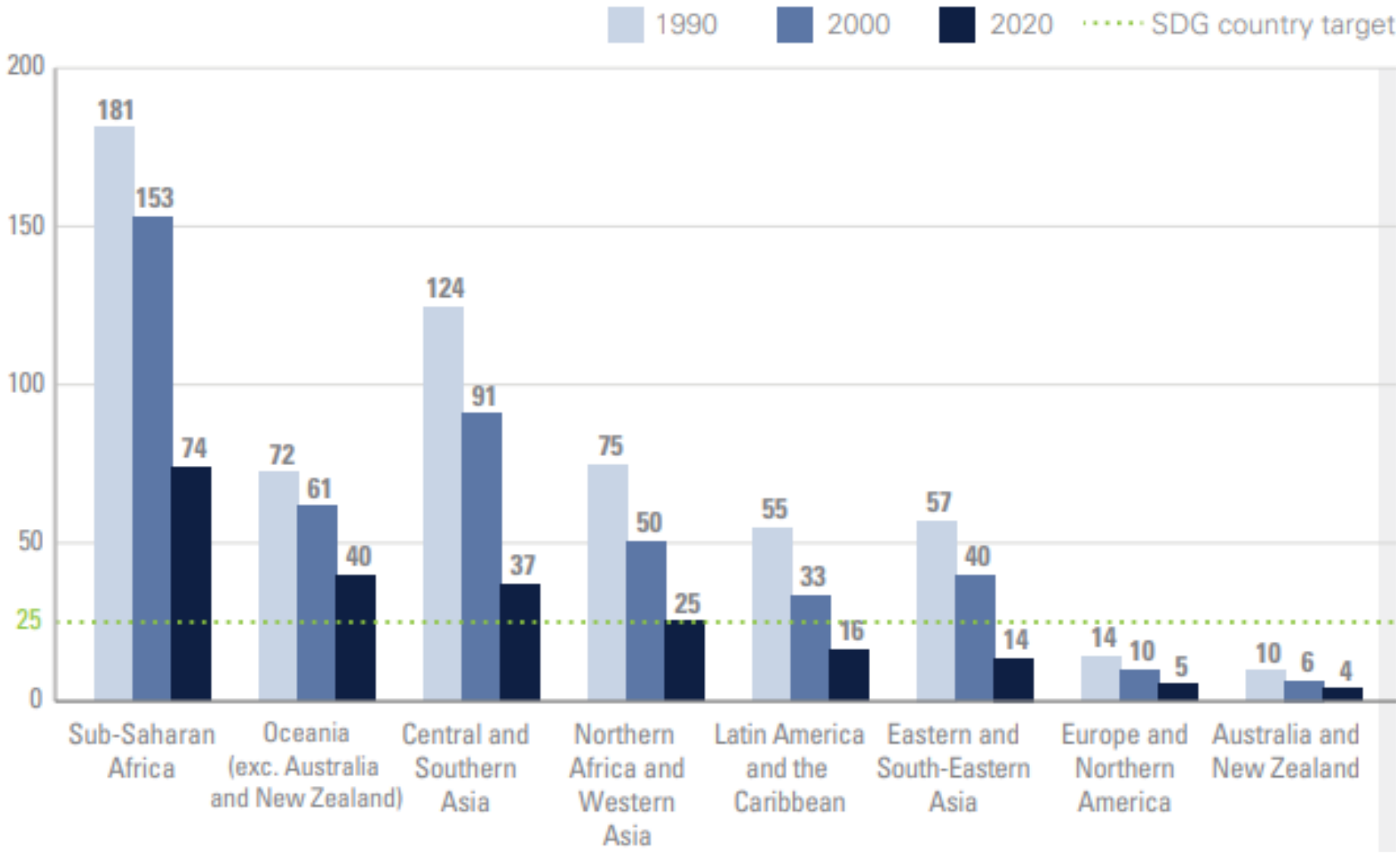
1990



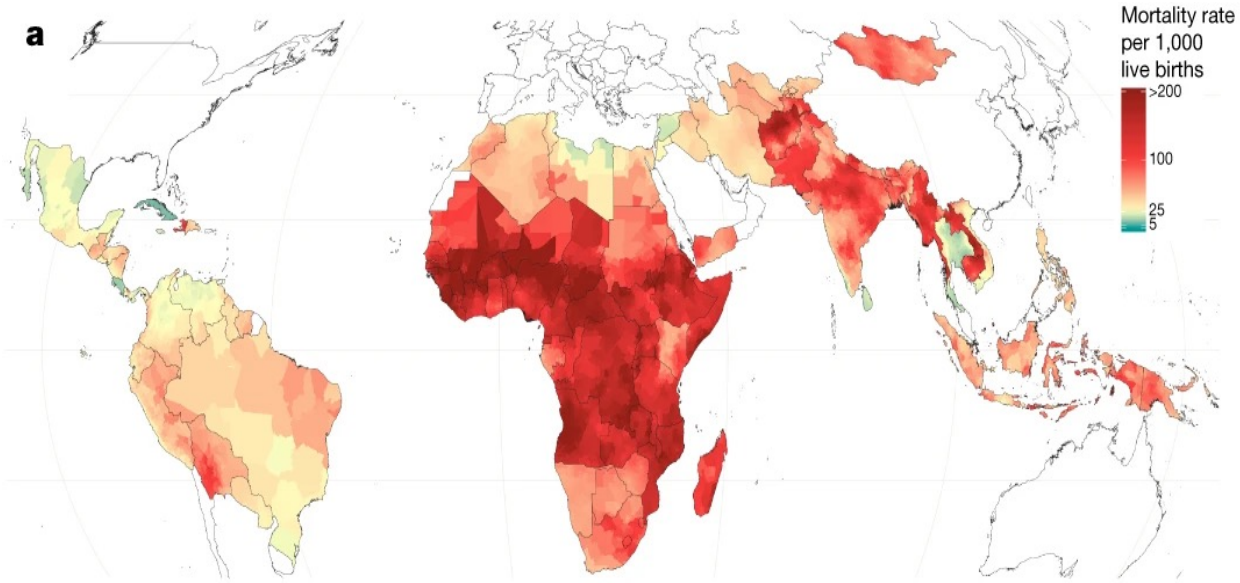
2020

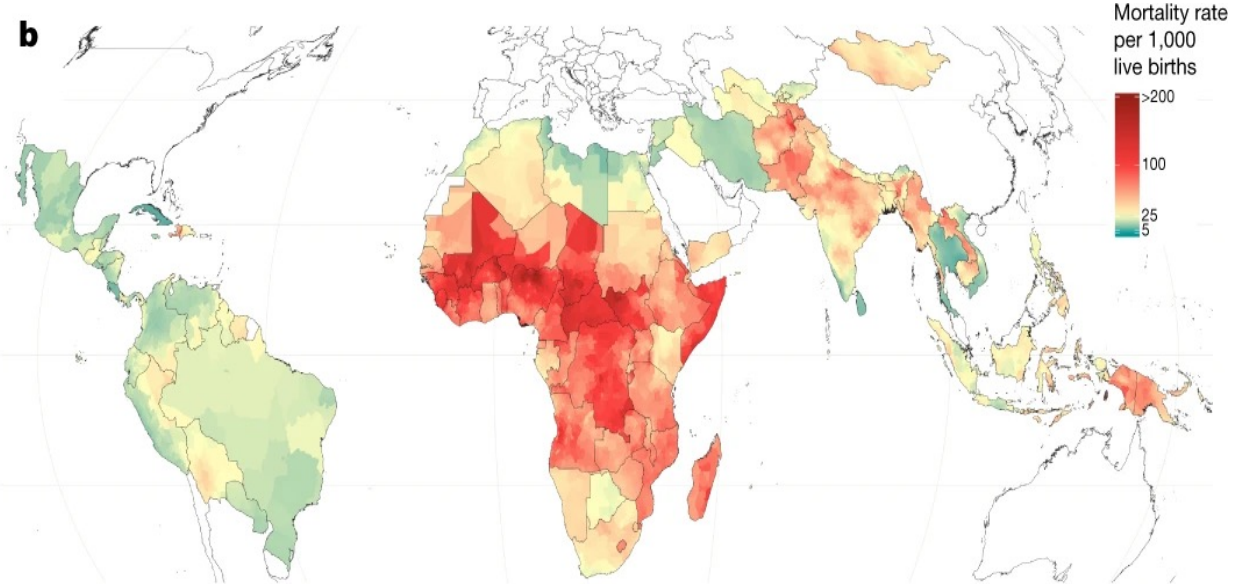
Under 5 mortality rate /1000 live births: 1990, 2000, 2020 by region.

UNICEF 2021



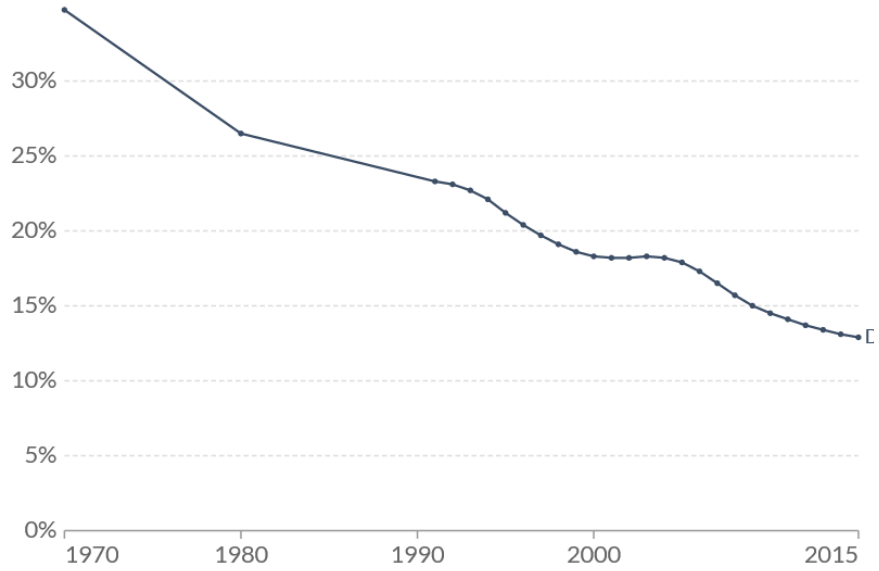
Under 5 mortality 2000 (a) -2017 (b). *Burstein et al 2019, Nature.*





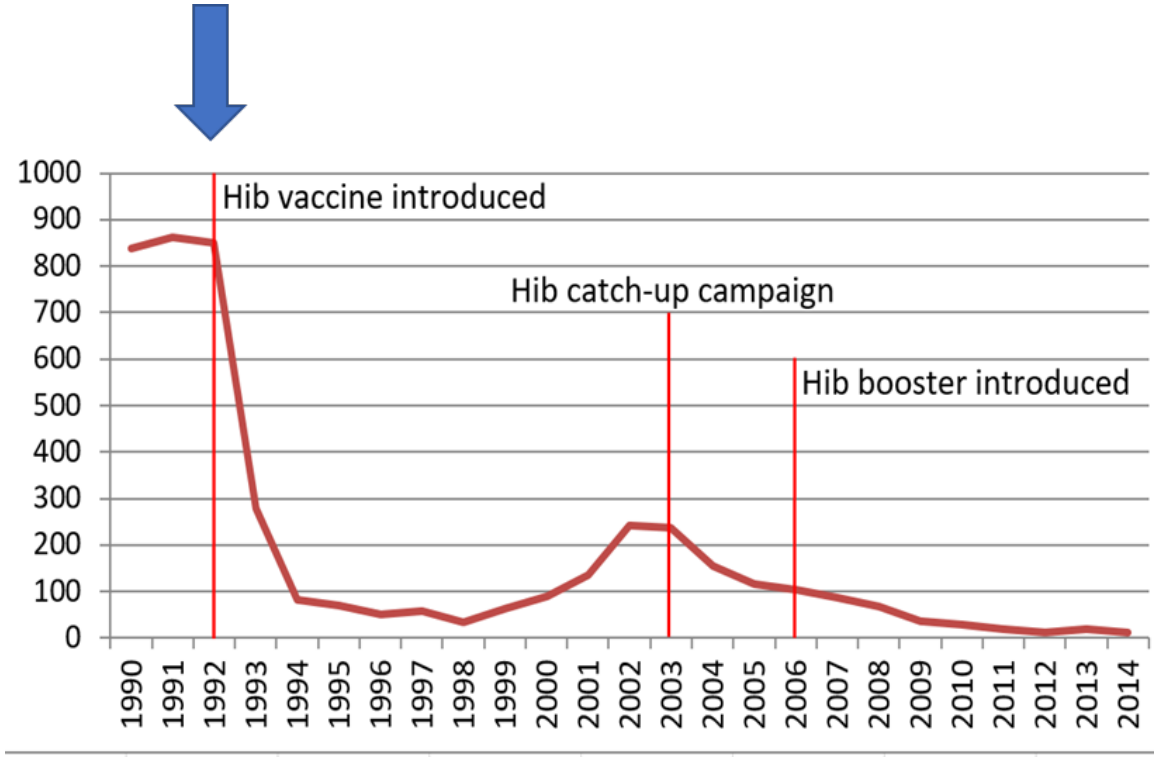
Sanitation and malnutrition. Improving- but a way to go.

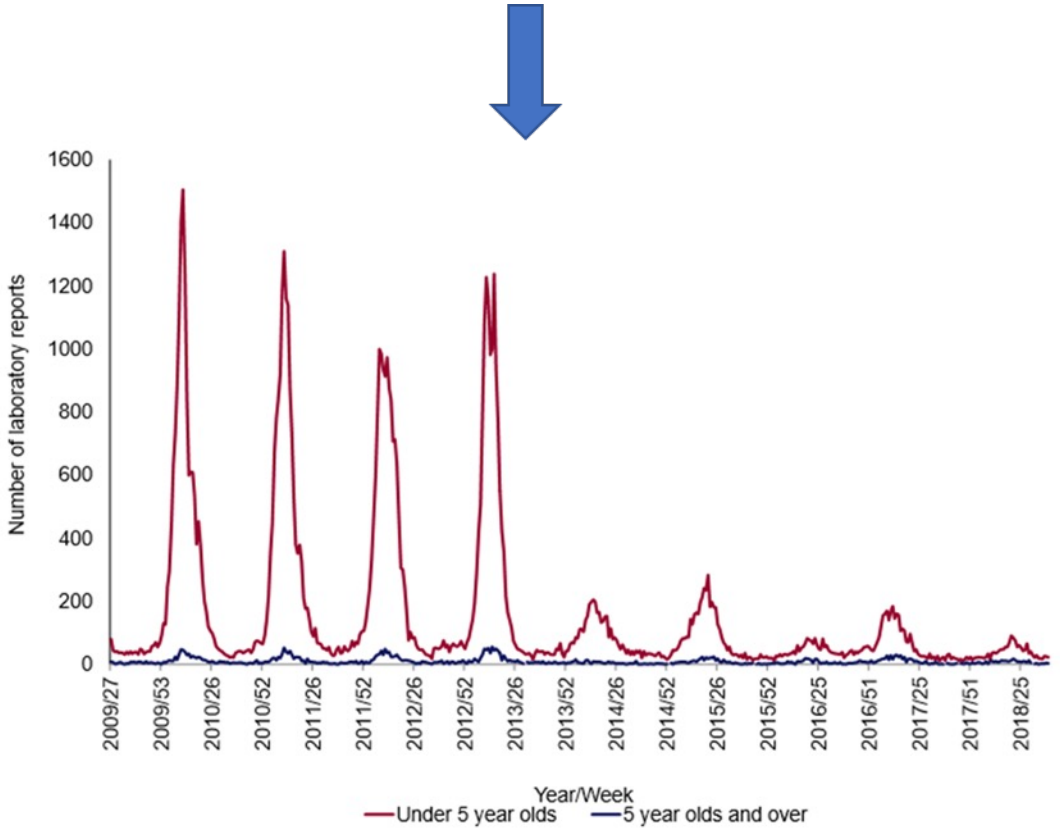
- Clean water and sanitation are improving. This has led to a substantial drop in faecal-oral disease.
- 2.2 billion people lack access to safe drinking water, and still much progress needed in sanitation. (UNICEF).
- Improvements in this, once made, do not go backwards except in disasters.
- Under-nutrition (R, % of children in developing countries since 1970) fallen but still between 720 and 811 m (FAO).
- COVID-19 had a negative impact on hunger.



AusAID/Jim Holmes
Our World in Data

Vaccines. Examples of childhood vaccines: Hib (meningitis) L, rotavirus (diarrhoea) R. UK data- but deployed worldwide.



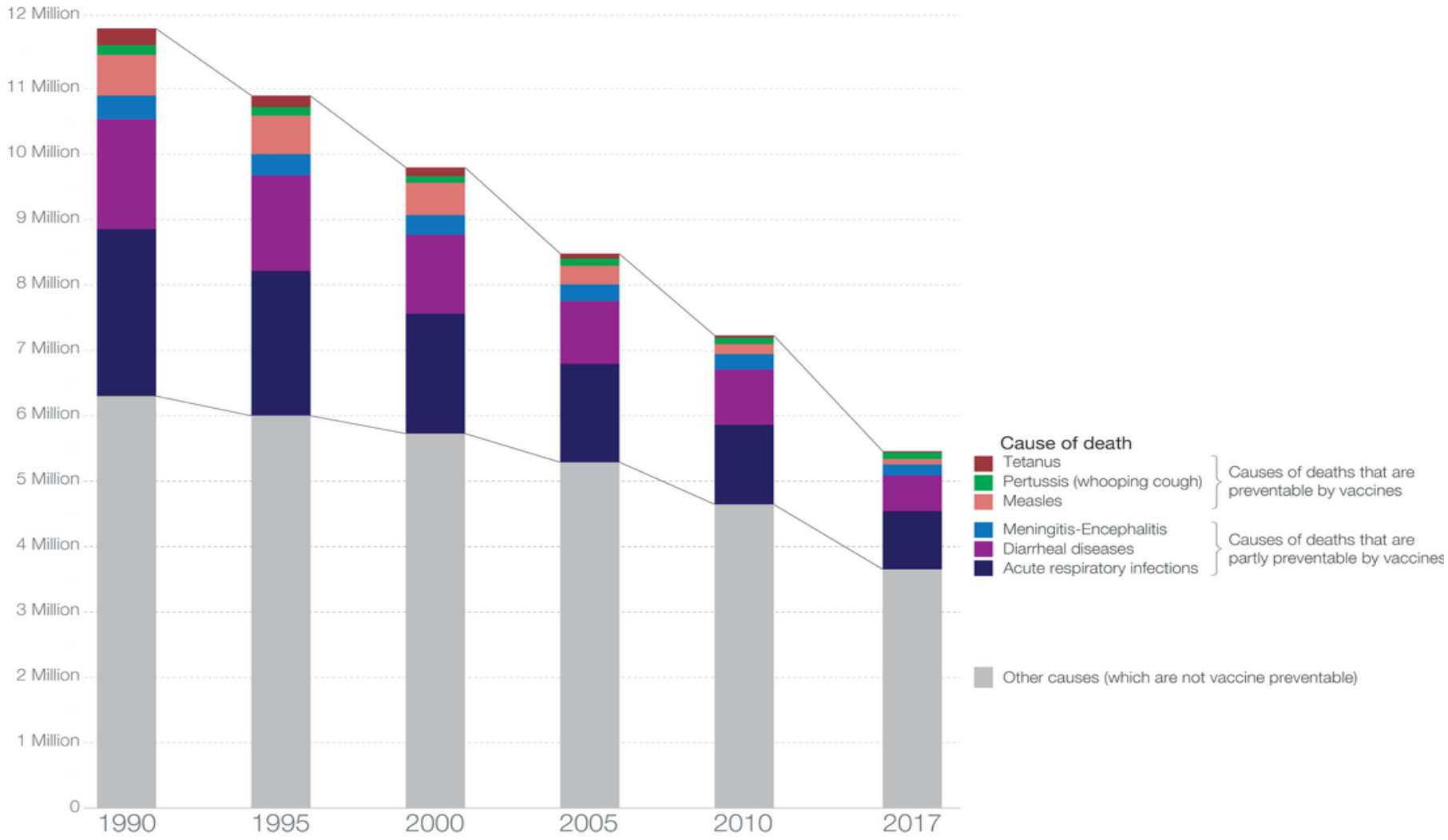


PHE.

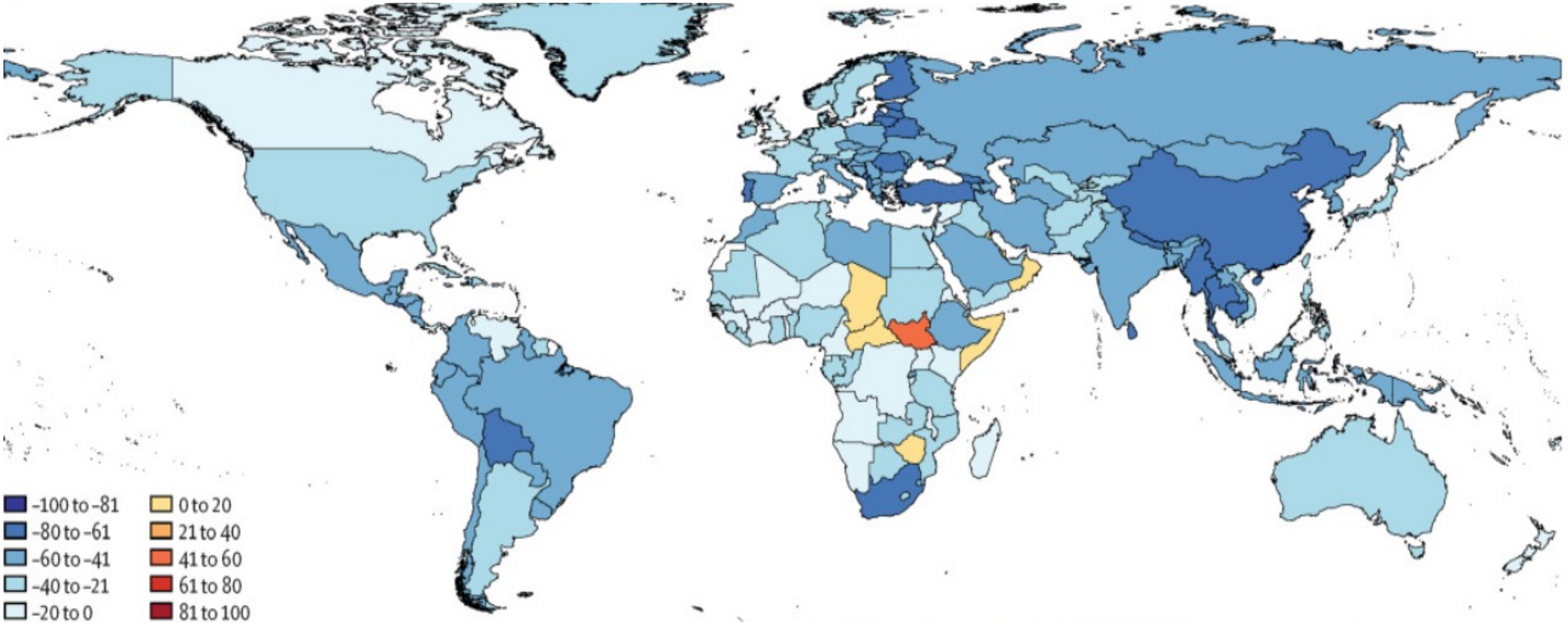
Global number of <5 child deaths by cause- vaccine preventable in colour. 1990-2017. Our World in Data.

12 Million

6 Million



Under-5 deaths due to pneumonia (respiratory transmission) decreased by estimated 37% 2005-2015.



Global Burden of Disease LRTI Collaborators. Lancet 2017

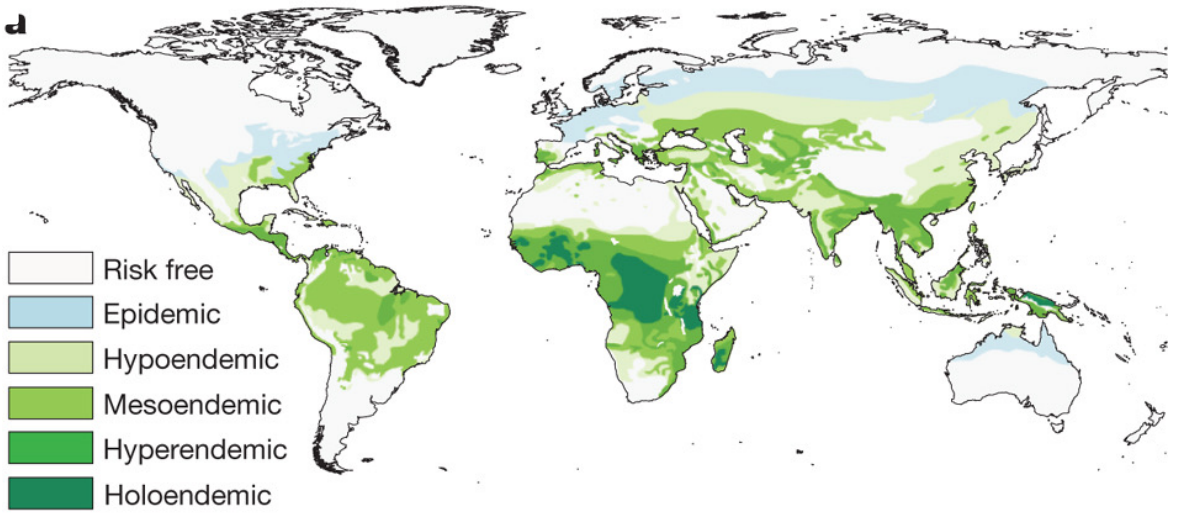
Vector-borne diseases. Malaria: 1900 (top) and early 2000s.

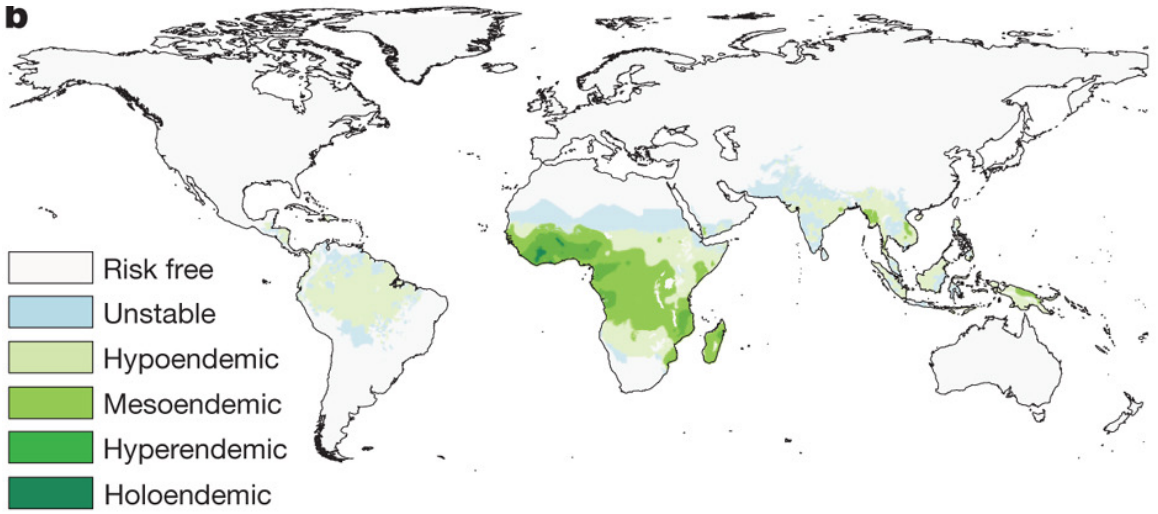
(Gething et al, Nature 2010)

Changing geography, mortality.

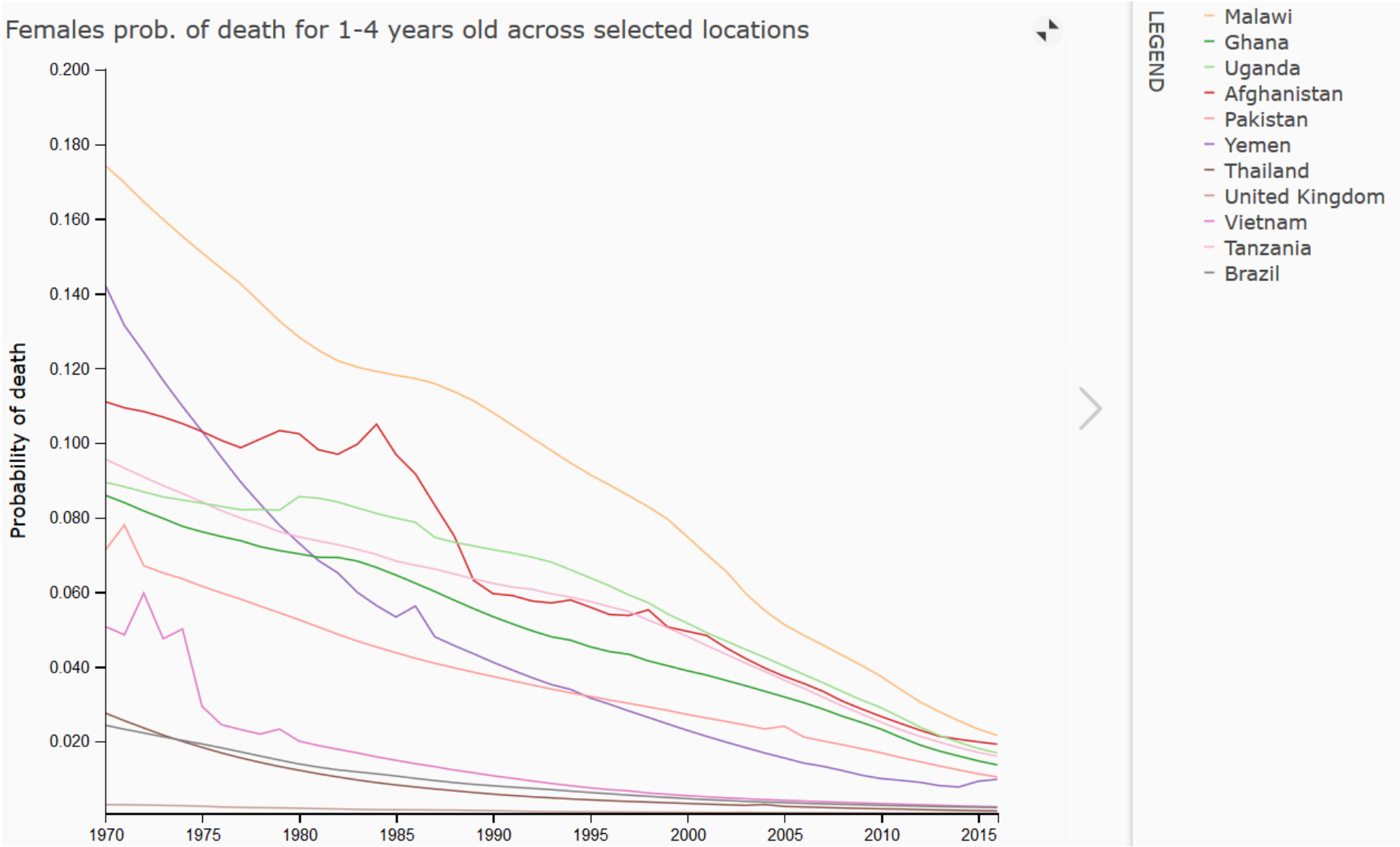
Around 627 000 deaths a year, 77% under 5 (WHO).

Deaths over halved since 2000 (WHO), but COVID-19 and insecticide resistance have led to increase in last 2 years.

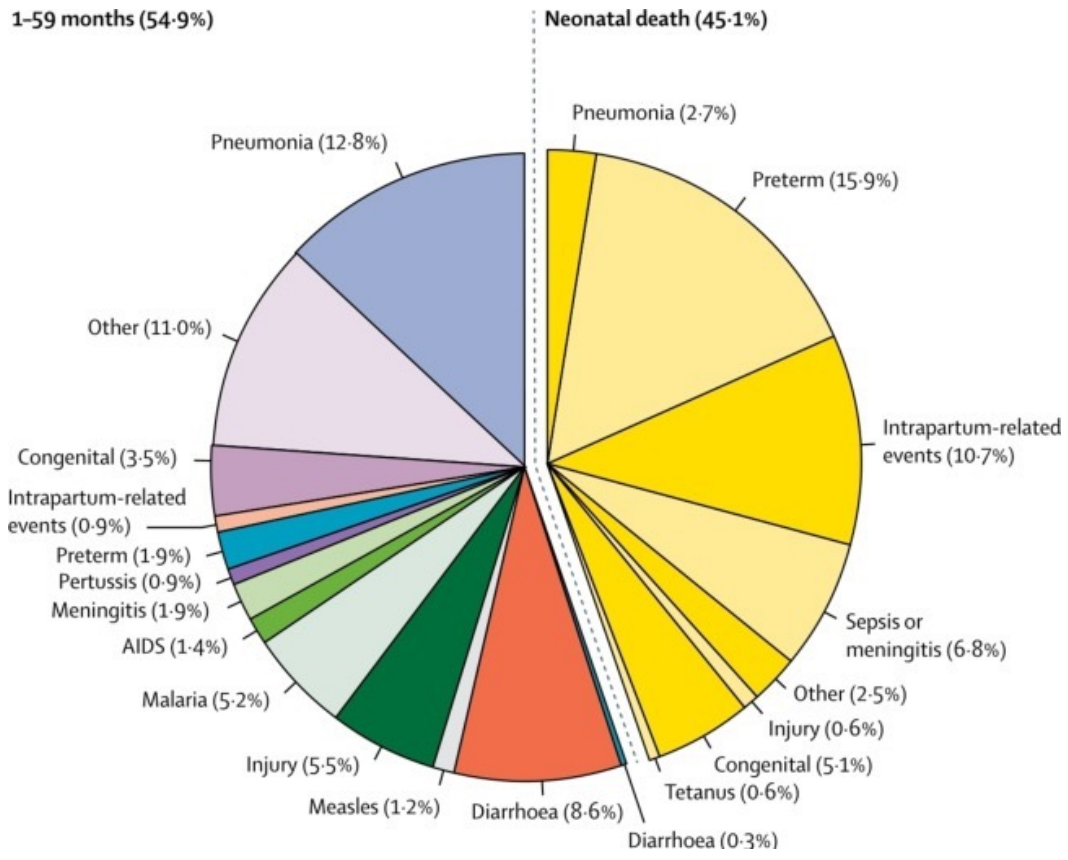




Different rates in different countries, but converging. Mortality in female children 1-4 years in selected countries since 1970. *(GBD 2017)*



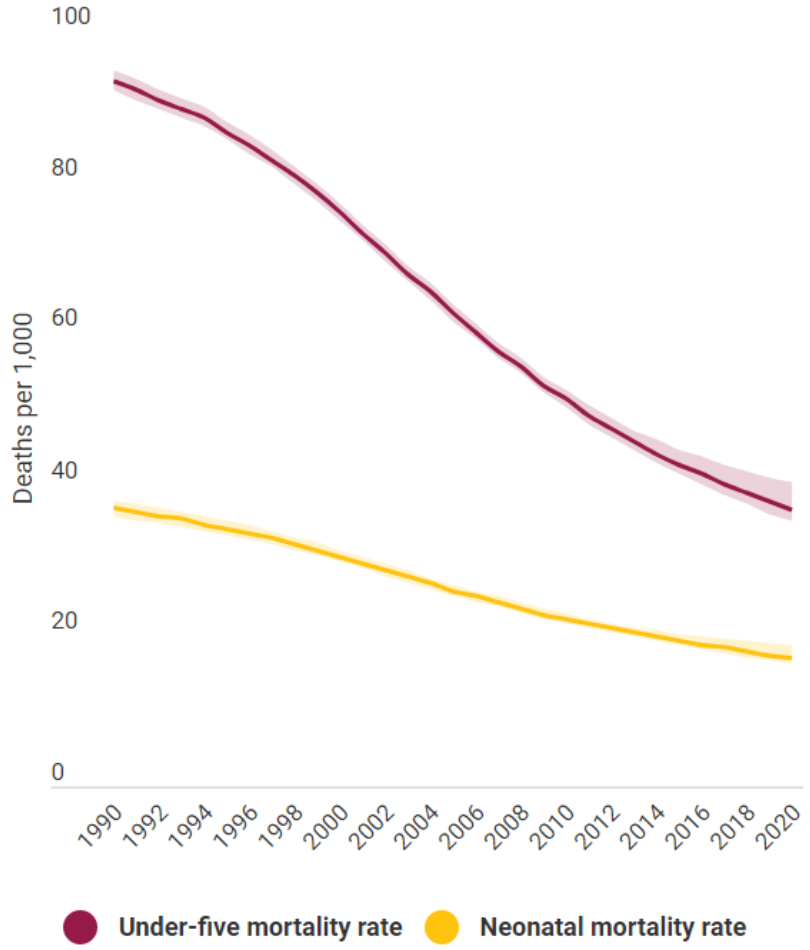
We are making substantial progress against multiple causes of deaths in under 5 year olds.
A high proportion of the remainder are neonatal (first 4 weeks).



Cause of deaths in children <5.
Liu et al, Lancet 2016.

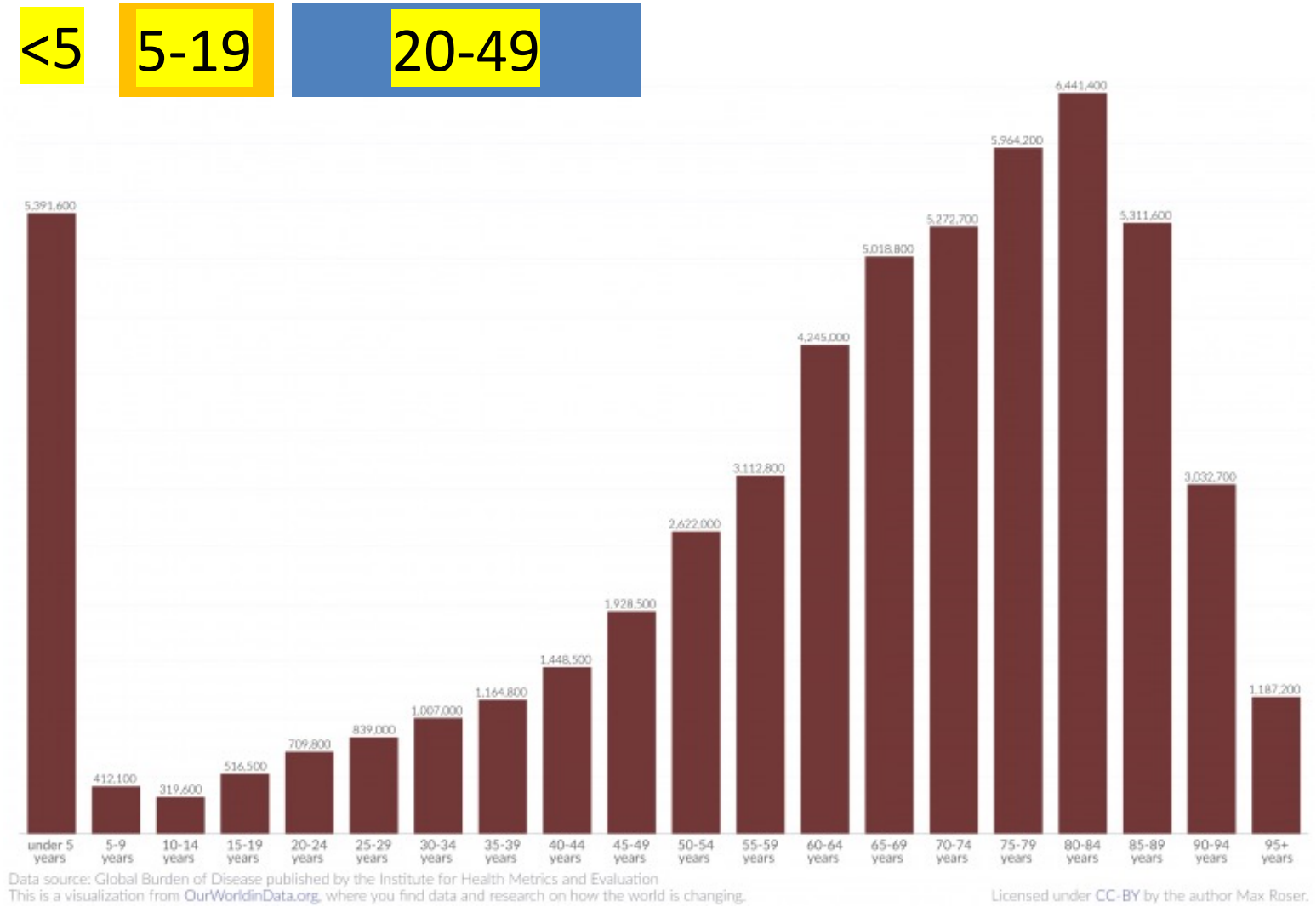
Neonatal mortality an increasing proportion of child deaths.

- Neonatal mortality is falling- by >50% since 1990, but slower than other causes of <5 mortality. Now 47% all <5 deaths.
- We know how to reduce it very substantially. 3/1000 live births high income, 26/1000 low income (Hug et al)
- Preterm birth, birth asphyxia or inability to breathe at birth, infections, birth defects are the leading causes of most neonatal deaths. Most are preventable.



Mortality rates: under 5 and neonates 1990-2020. UNICF 2021.

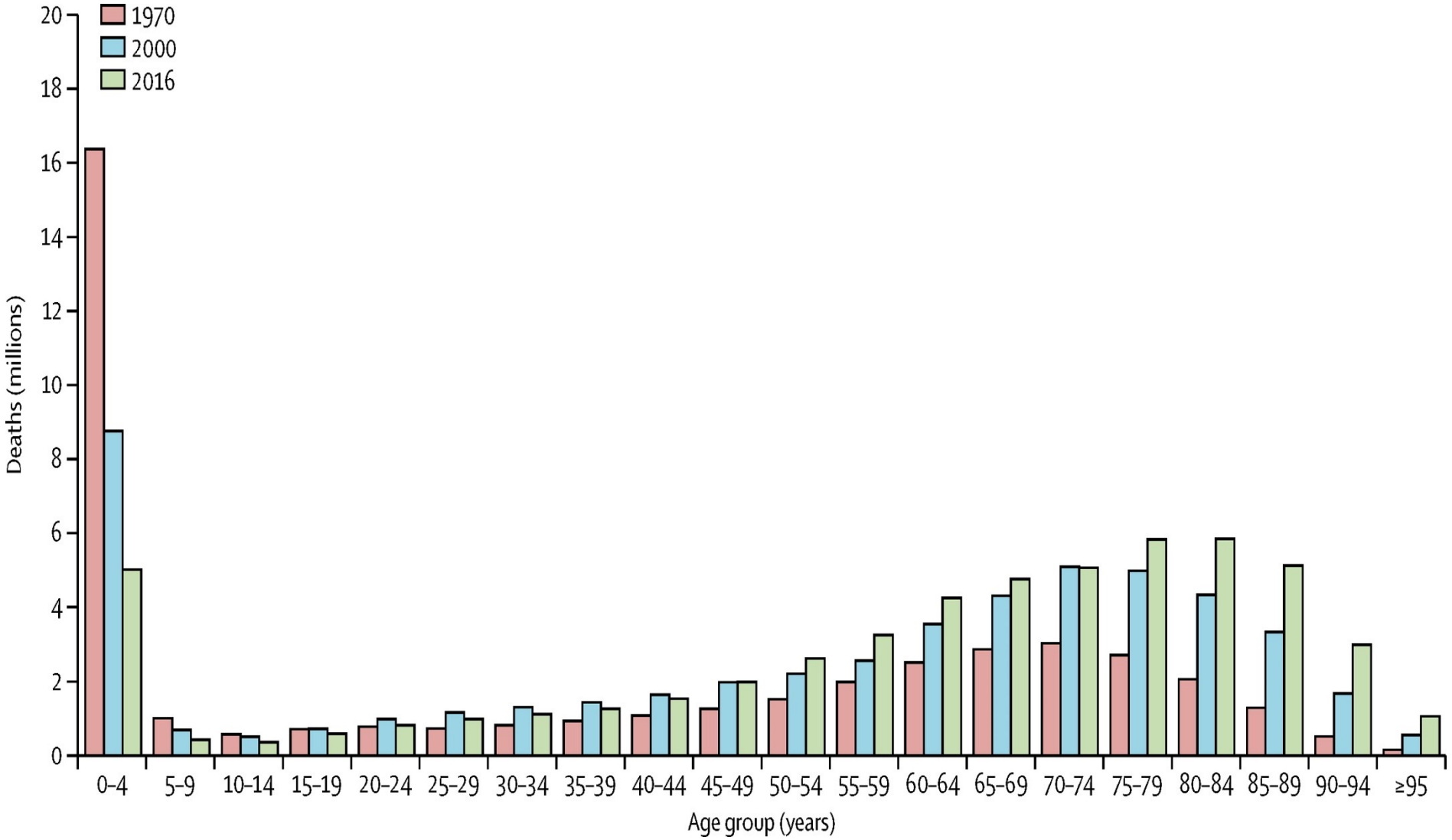
Mortality rates for children 5 or over very low in almost every country- and still falling. Deaths globally by age.



Our World in Data

Deaths (absolute) by age globally since 1970.

(*Global Burden of Disease Study (GBD), Lancet 2017*)



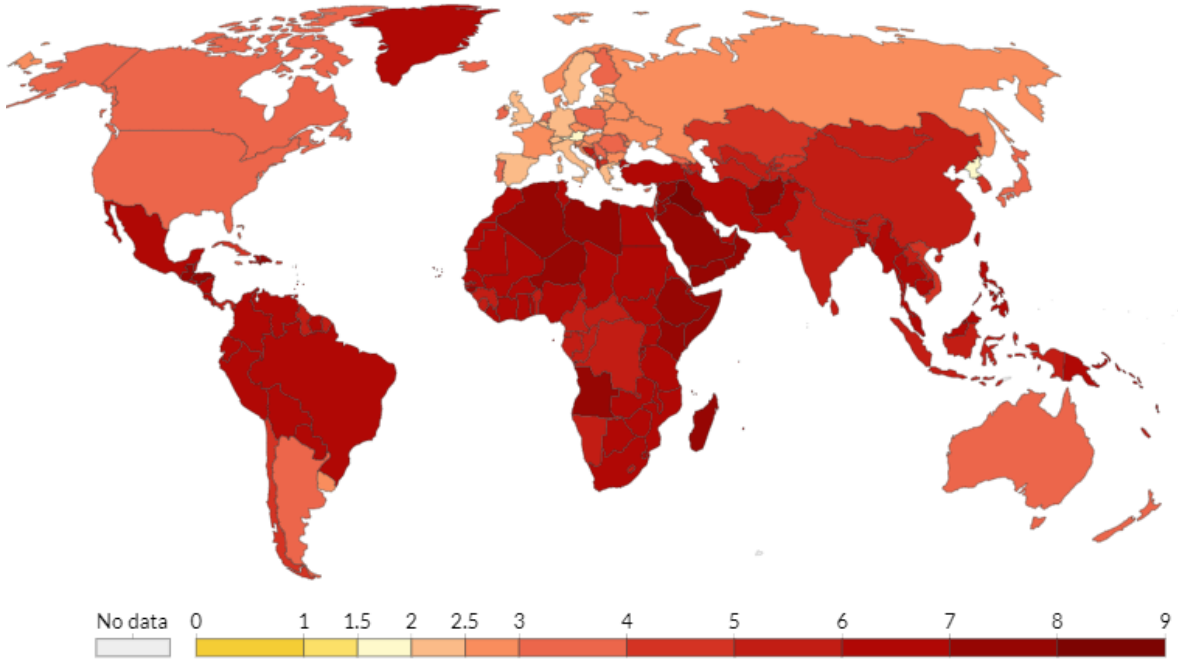
The death of rational Malthusianism. Global population is stabilising.

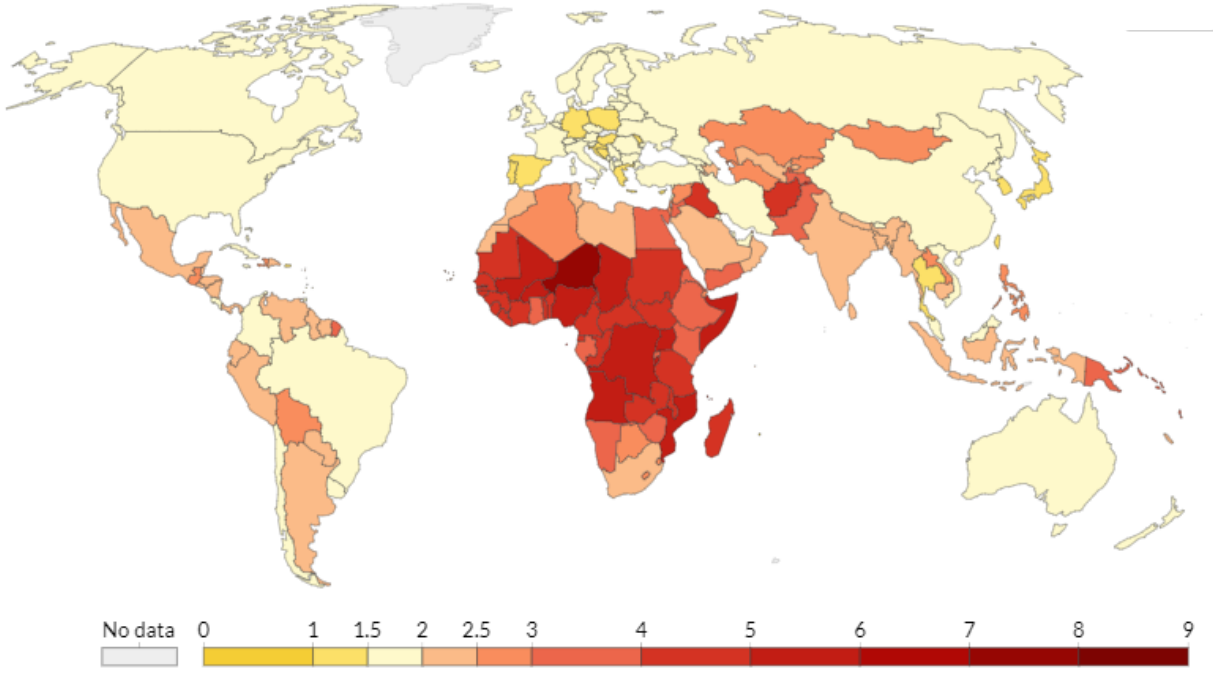
- Malthus postulated that populations inevitably increase until limited by resources.
- Neo-Malthusianism lives on- but is wrong on the data.
- Reduced child mortality, widely available contraception, female education, reduced poverty.
- The result has been a rapid drop in global fertility.
- Global fertility currently 2.5. Europe around 1.5.

Rev Thomas Malthus 1766-1834

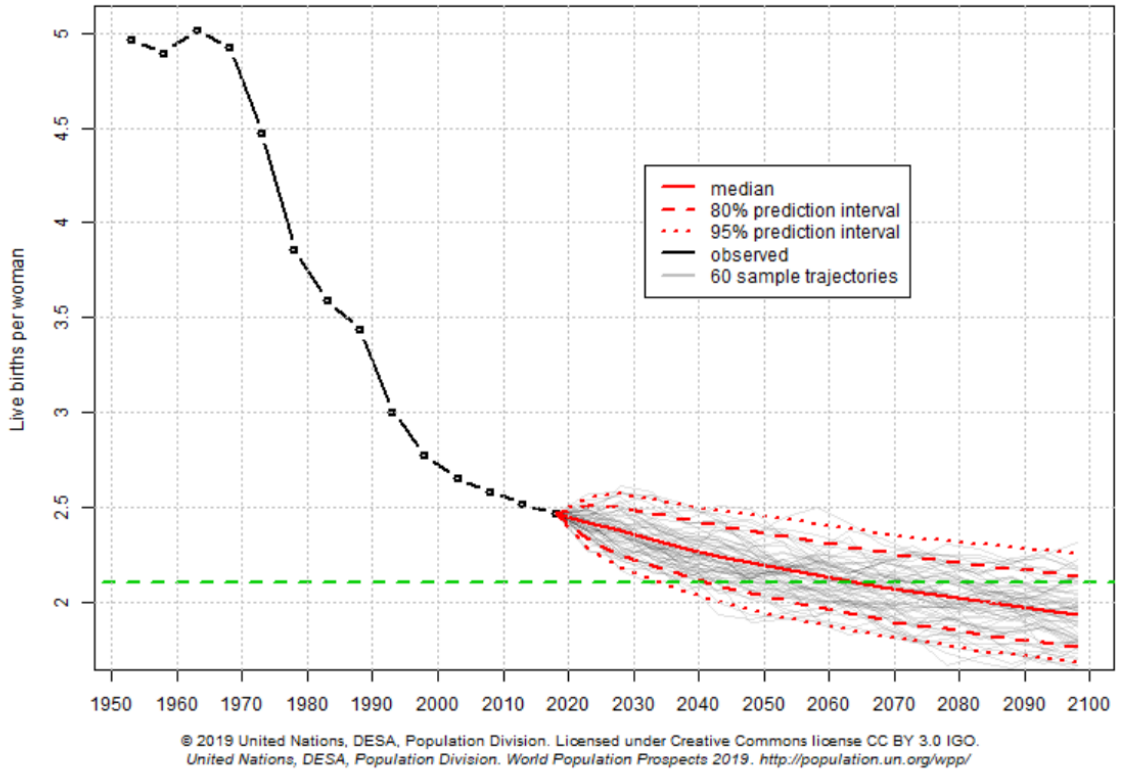
Children born per woman (fertility rate) 1950 (L)-2019.

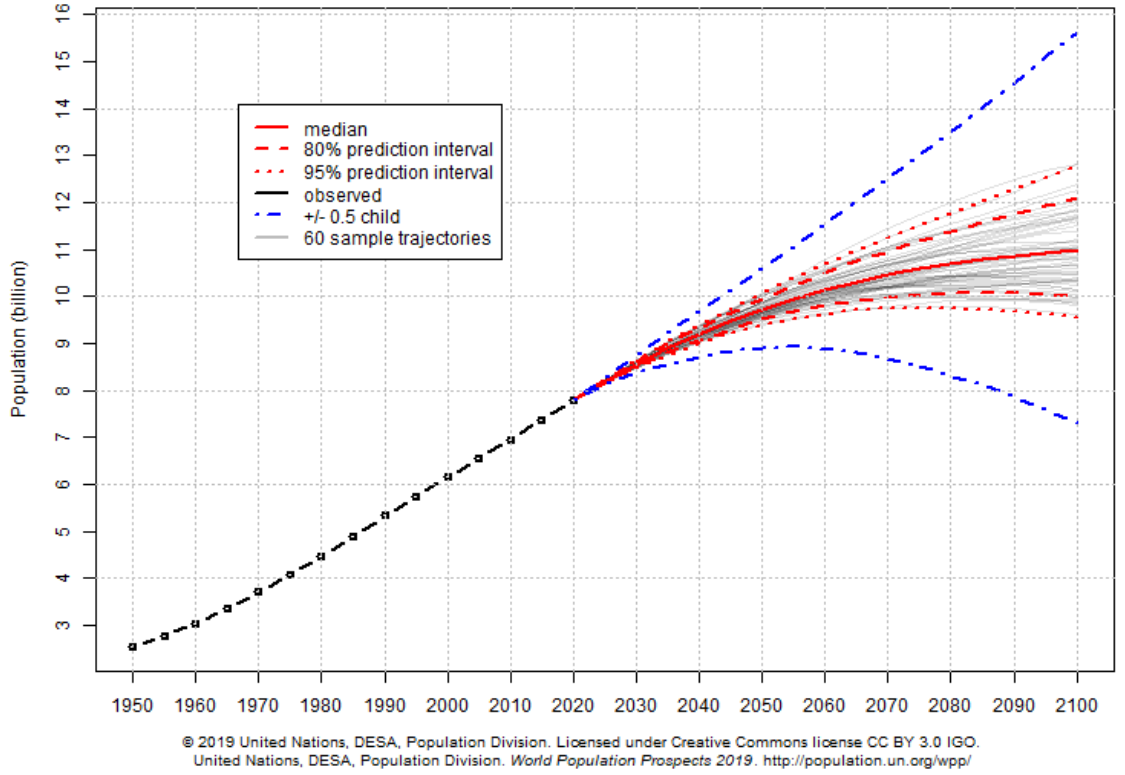
(Gapminder/Our World in Data)





UN Population Division projections: global fertility (L), total global population (R) 1950-2100. (UNPD 2019)

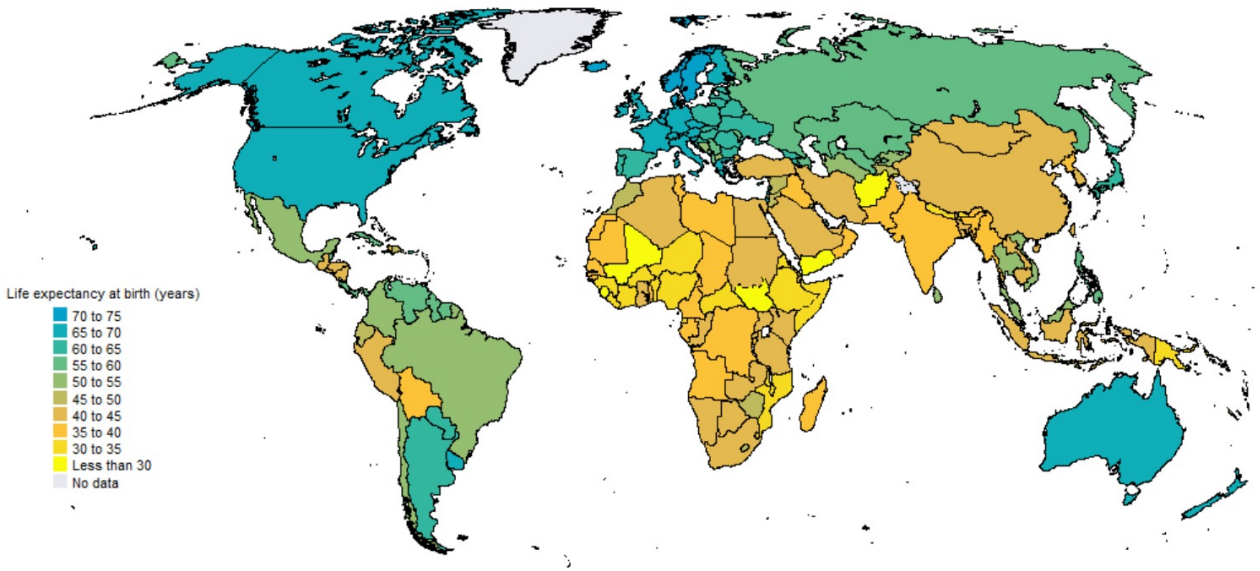


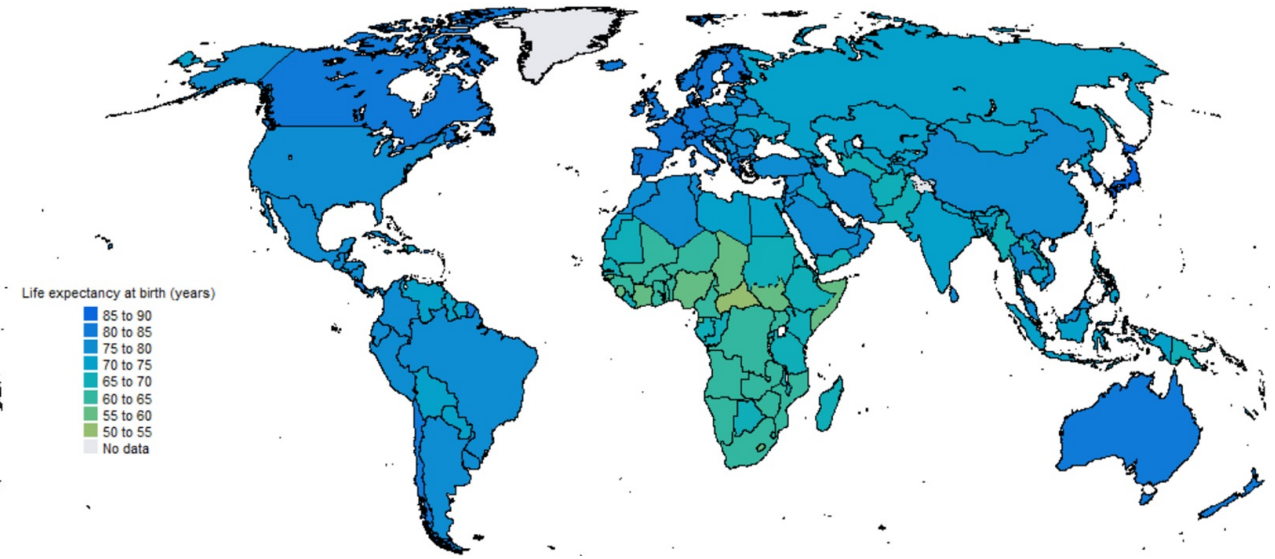


Massive change in the geography of ill health over the last 70 years.

Life expectancy at birth 1950 (L), 2020. UN 2019.

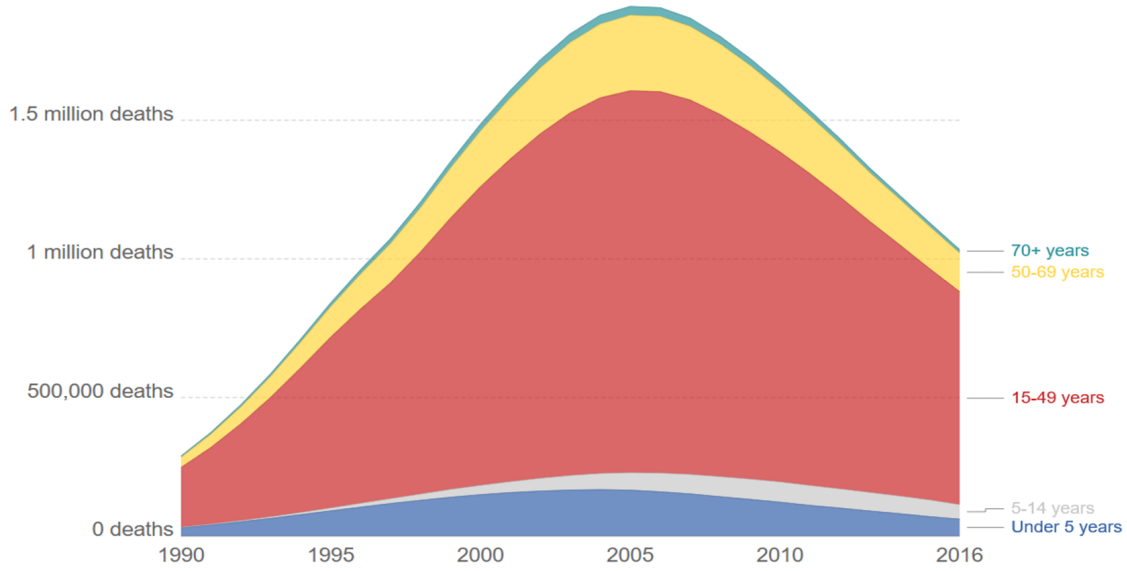
Under 50 60-65 75-90





The physical health outlook for young people and younger adults (<50) is good- and getting better almost everywhere.

- If someone gets through their first 5 years they have a very low probability of dying before 50.
- Infections like TB, cholera that would have killed in previous generations can be prevented or treated.
- Important infections of young adults include HIV for which we have treatment, cancer-causing viruses (cervical and liver cancer) for which we now have vaccines.



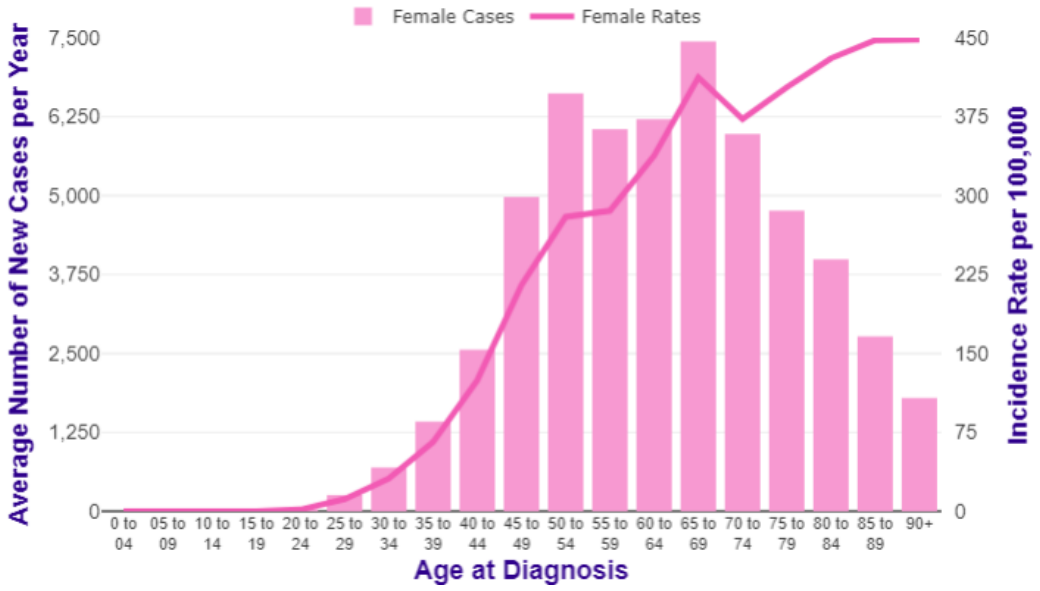
HIV/AIDS deaths by age 1990-2017.
(UNAIDS/IHME/Our World in Data)

Non-communicable diseases in young people and younger adults. Most fatal diseases are rare, and improving.

- Most cancers rare under 50. Treatment improving for the exceptions such as breast cancer, some lymphomas.
- Cardiovascular disease (fatal heart disease, stroke) also rare under 50.
- Some chronic diseases can have significant impact on life, even when normally not fatal. Examples:

-Diabetes an increasing problem, driven by obesity.

-Asthma increasing in some areas.

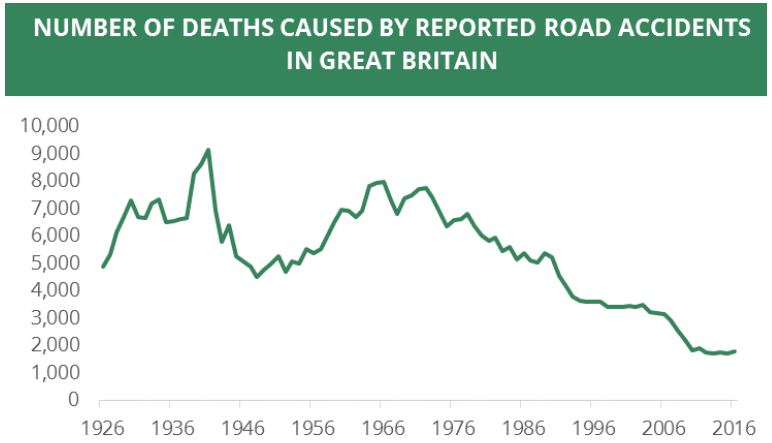


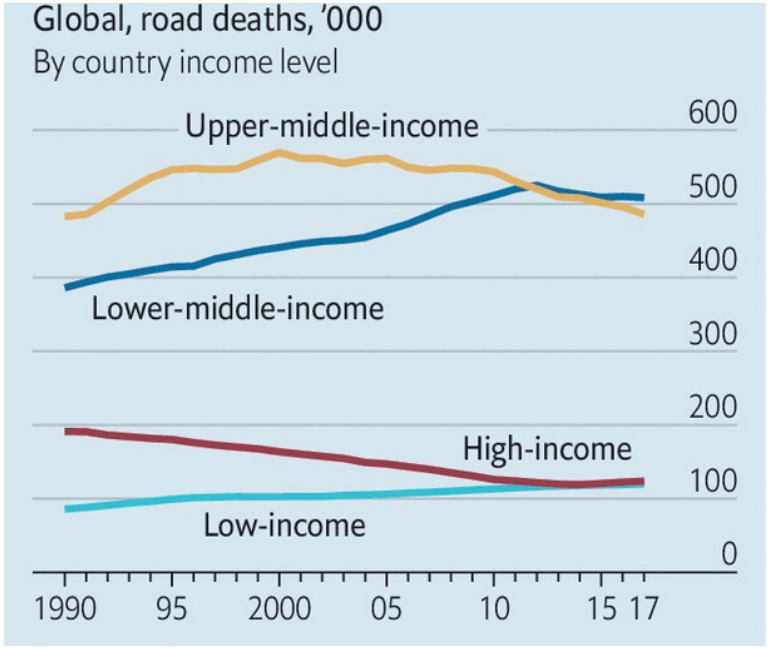
Breast cancer new cases by age, UK data. CRUK.

Accidents and injuries in young people and young adults up to 50.

Leading causes of mortality in this agegroup include:

- Road traffic accidents (RTA).
- Accidents at work.
- Accidental poisonings.
- Suicide.
- Homicide.

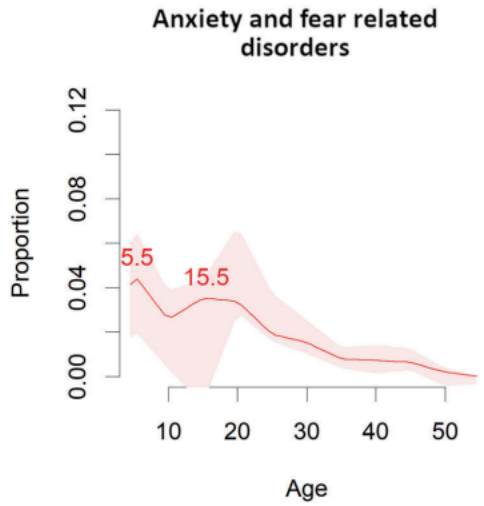


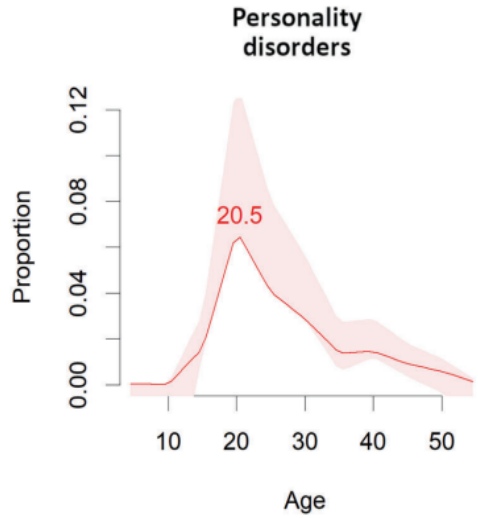


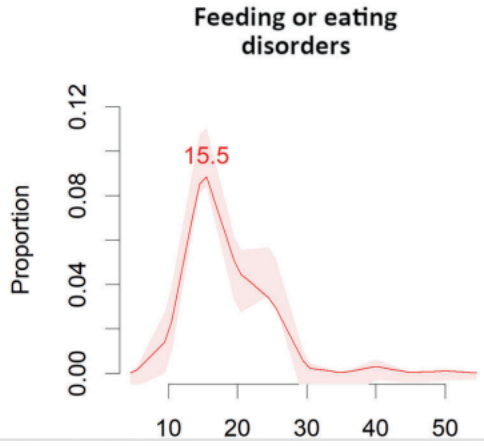
Department of Transport, UK; Economist/IHME

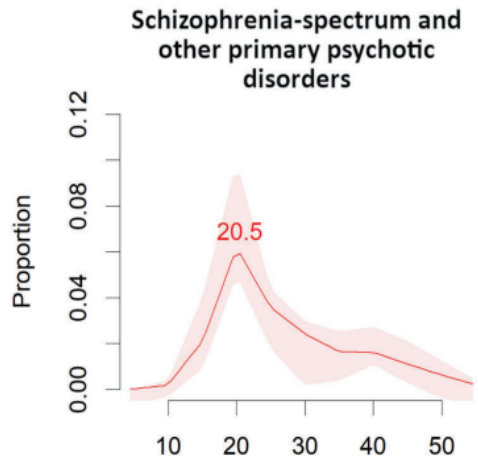
From later childhood to first decades of adulthood is peak time for first developing significant mental health disorders.

- As physical causes of illness have decreased, the relative importance of mental health is increasing.
- We have made less progress in the prevention and treatment of mental health disorders than physical ones.
- The relative (although not necessarily absolute) importance of mental health will increase everywhere.



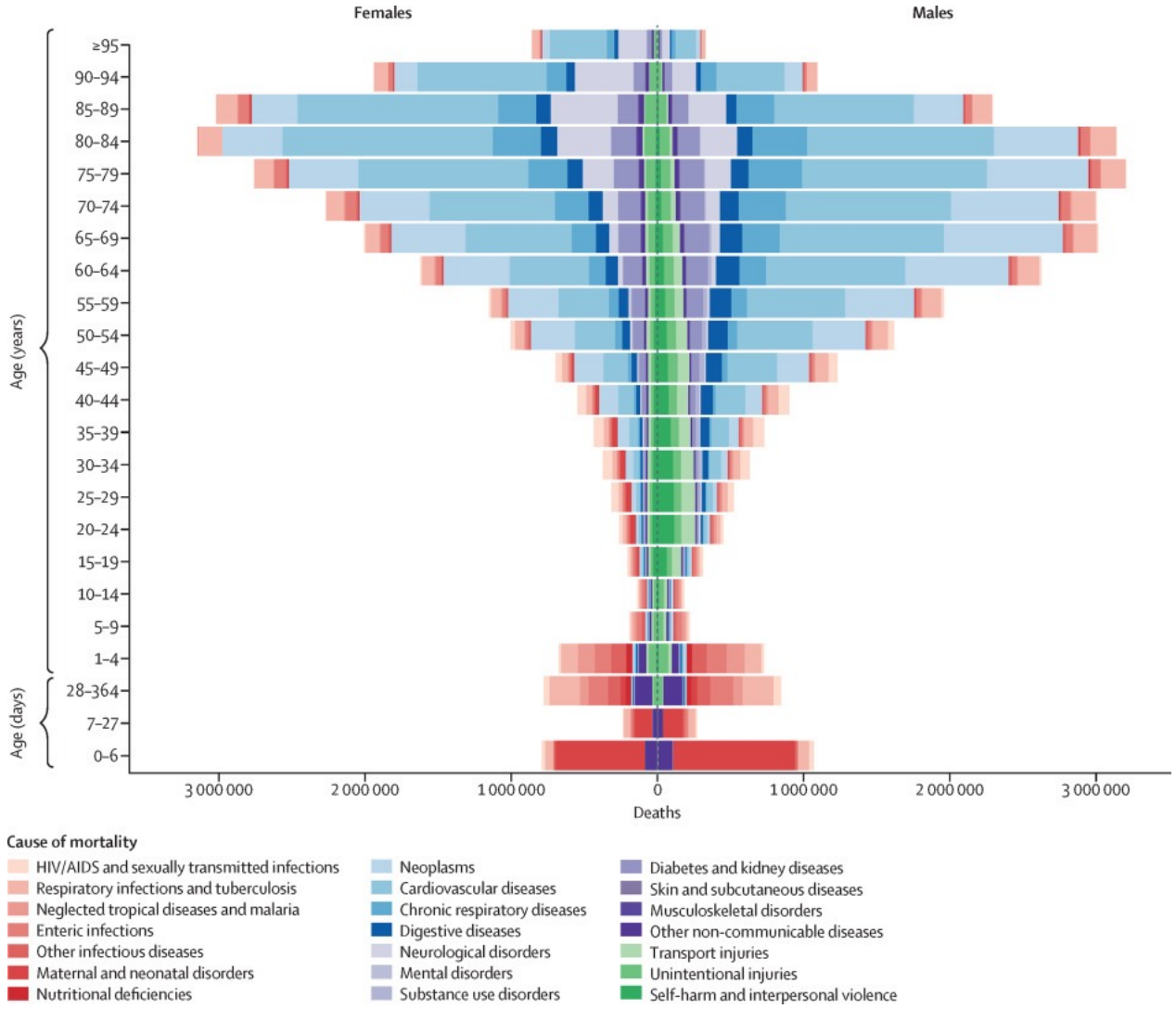




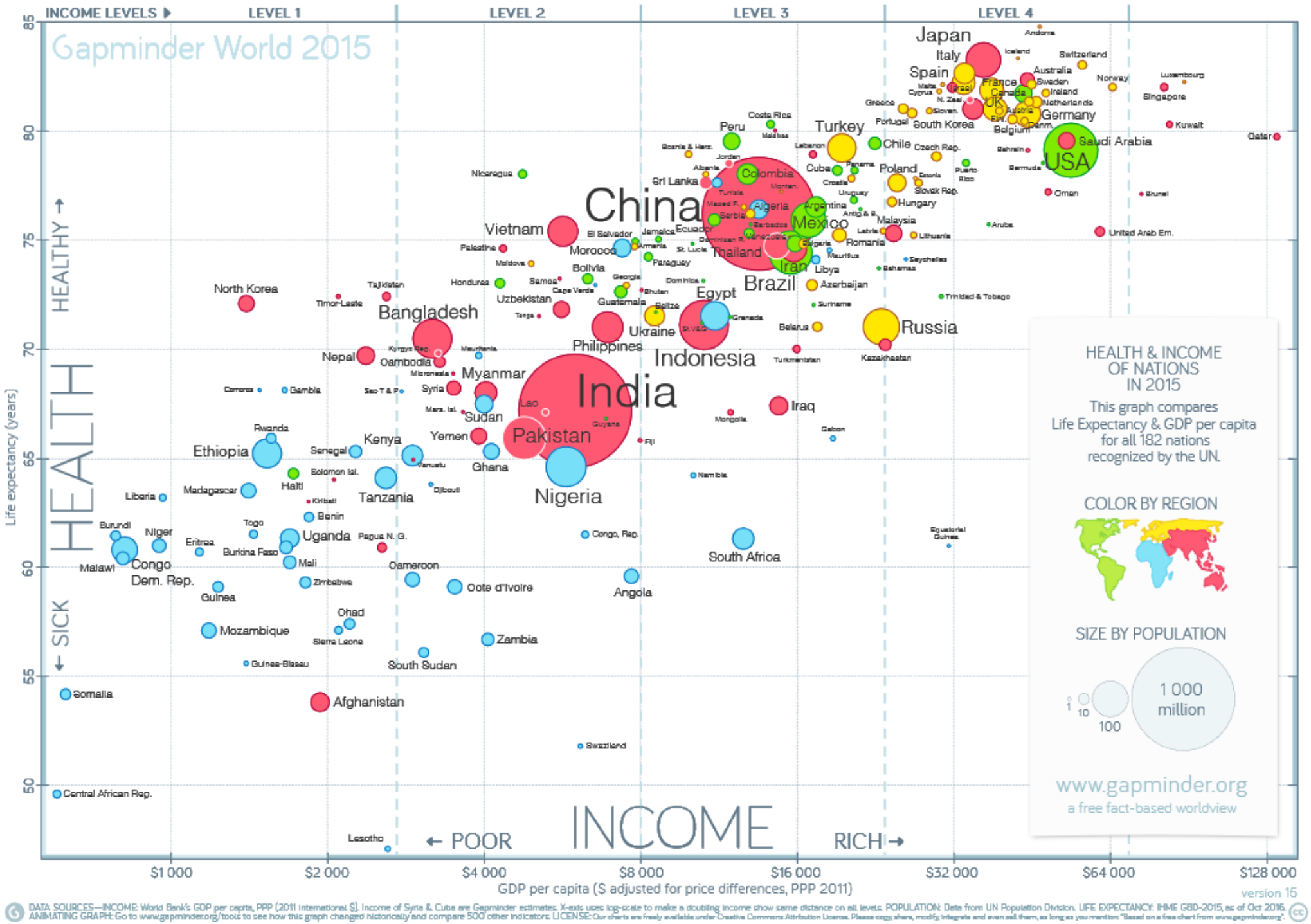


M. Solmi et al Mol Psy 2021

Globally, in children infections, neonatal and nutrition dominate as causes of mortality. From middle age it is cardiovascular and cancers.



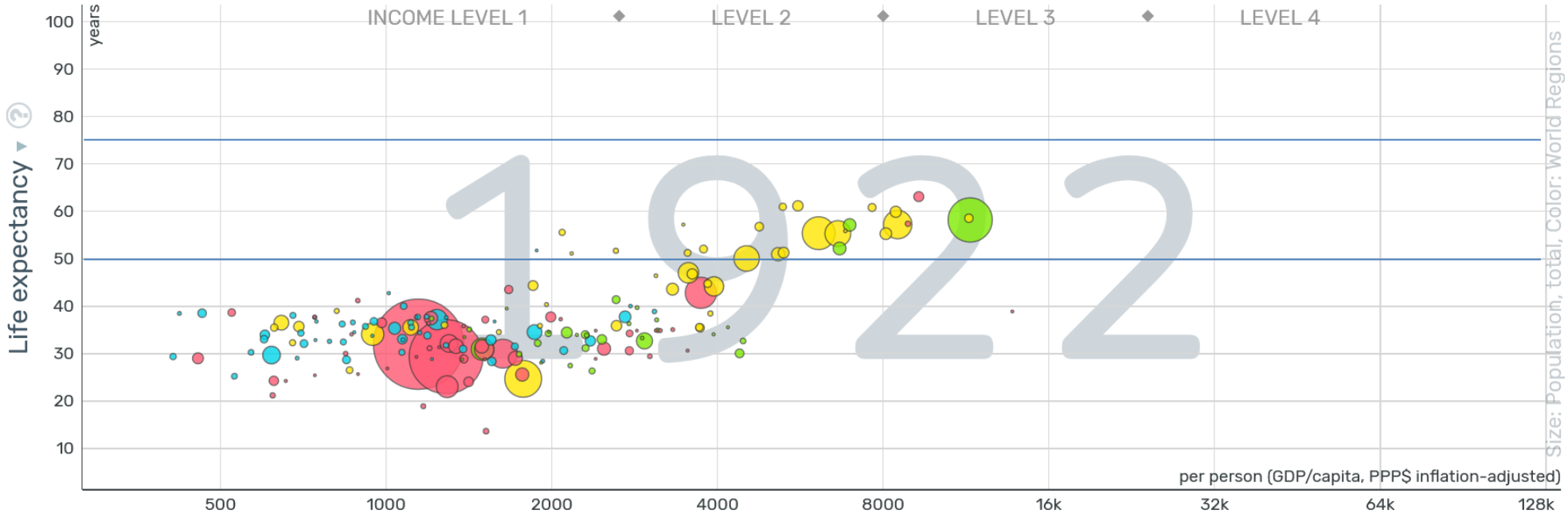
Global Burden of Disease Study, Lancet 2018.



75

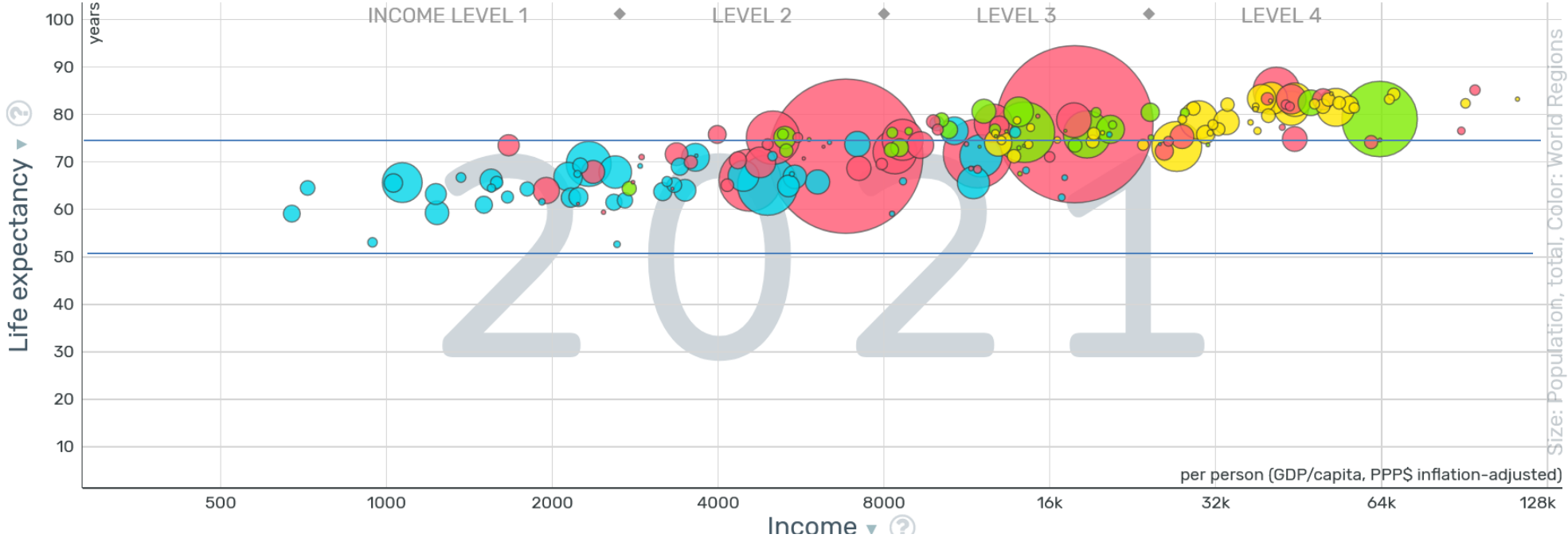
50

Rosling



75

50

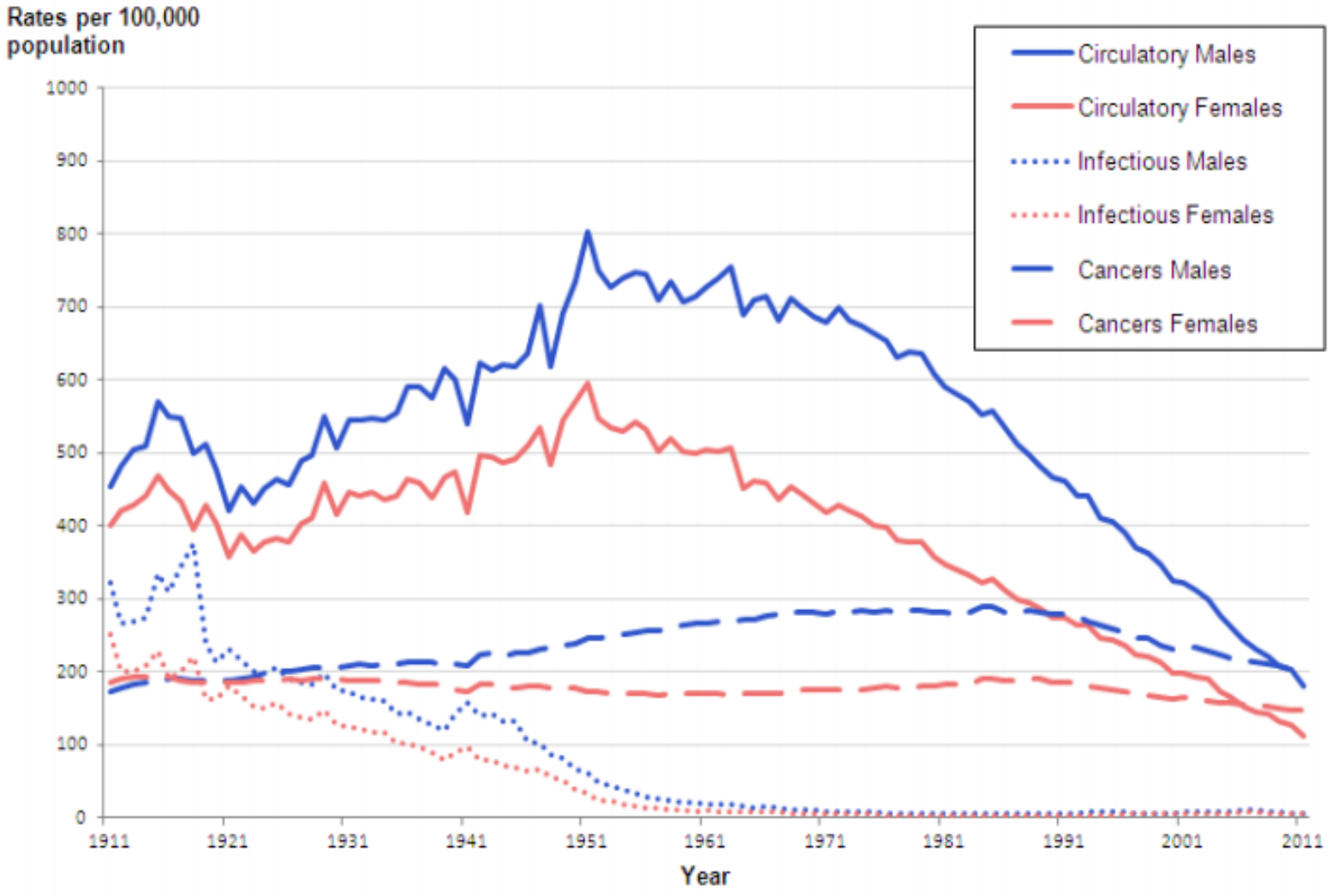


75

50

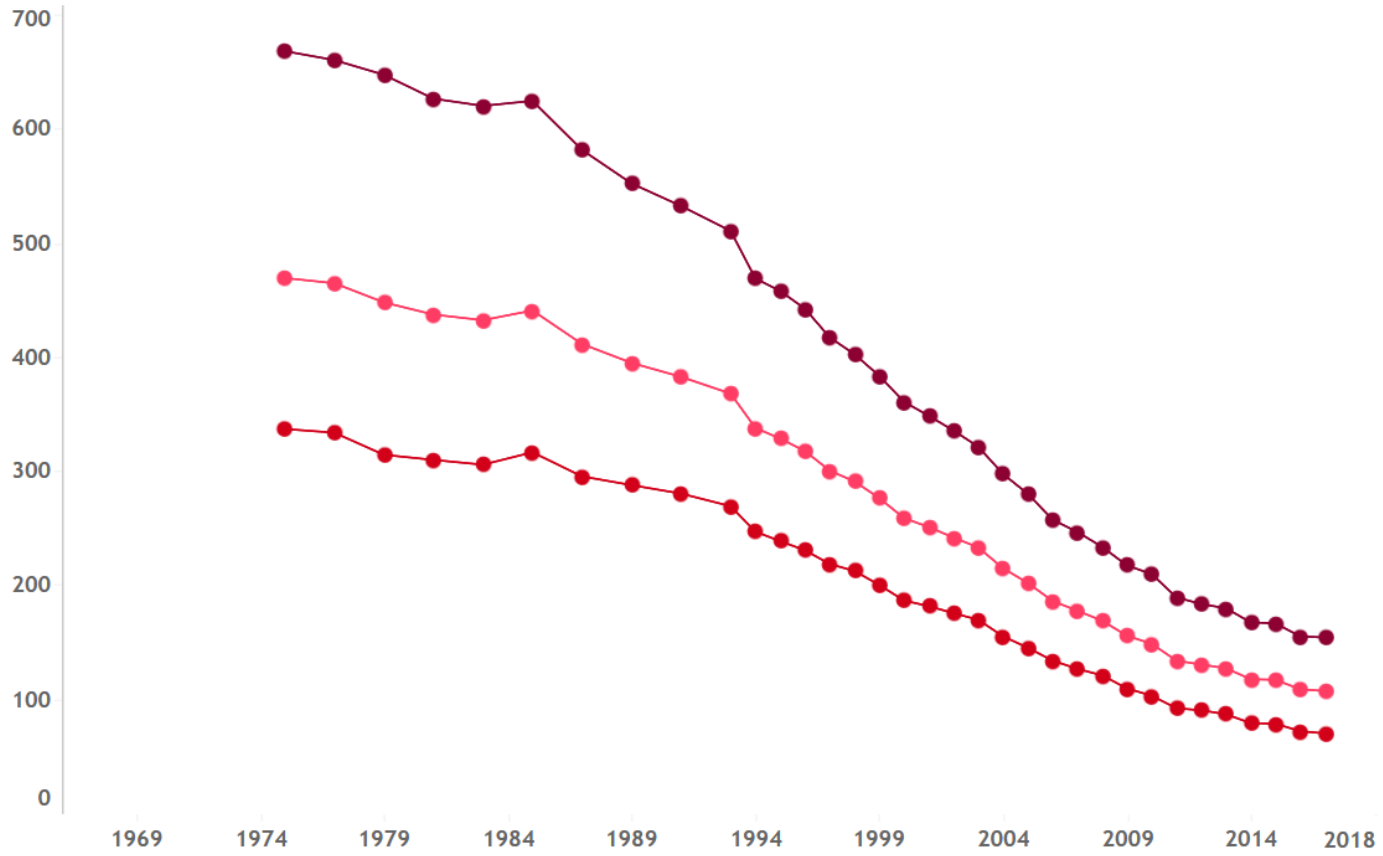
Gapminder

Age-standardised mortality rates England and Wales as an example of a country in transition, 1911-2012. *(ONS)*



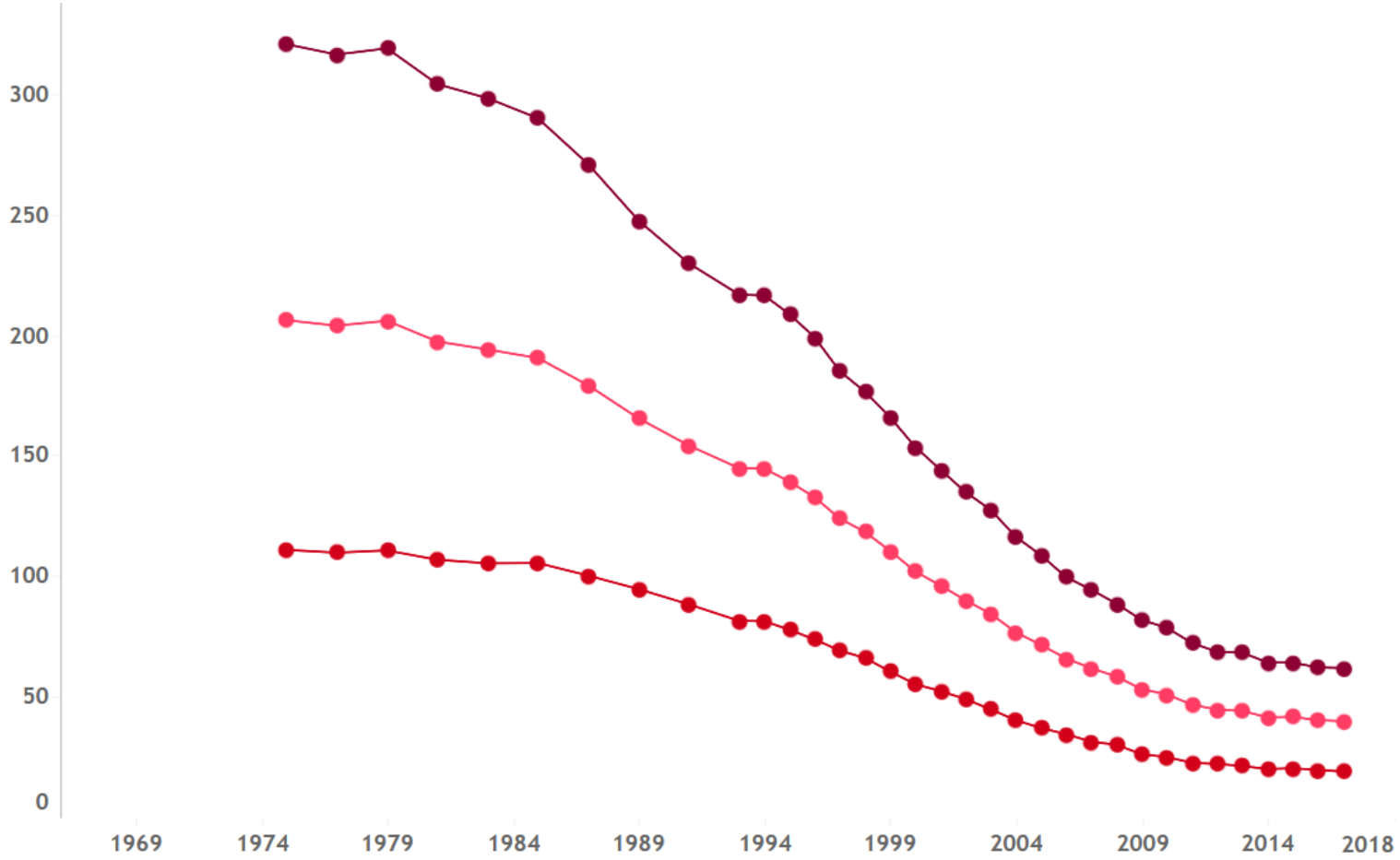
Age-standardised coronary heart disease mortality rates, UK 1975-2018. Male, female, overall. Around 73% reduction.

(BHF 2021)



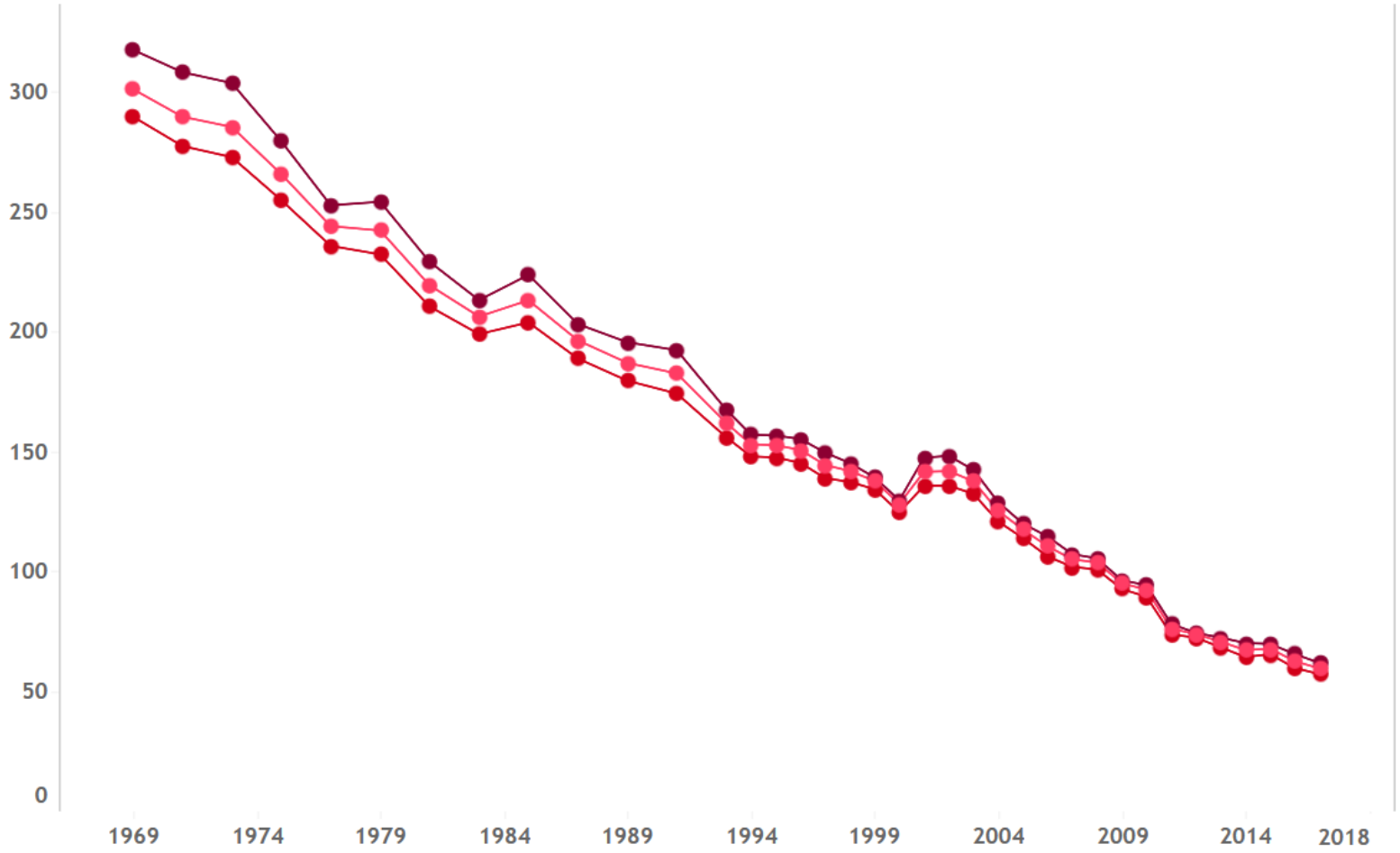
Under 75 year old age-standardised coronary heart disease mortality, UK 1975-2018: 206 to 36/100k. Male, female, overall.

(BHF 2021)

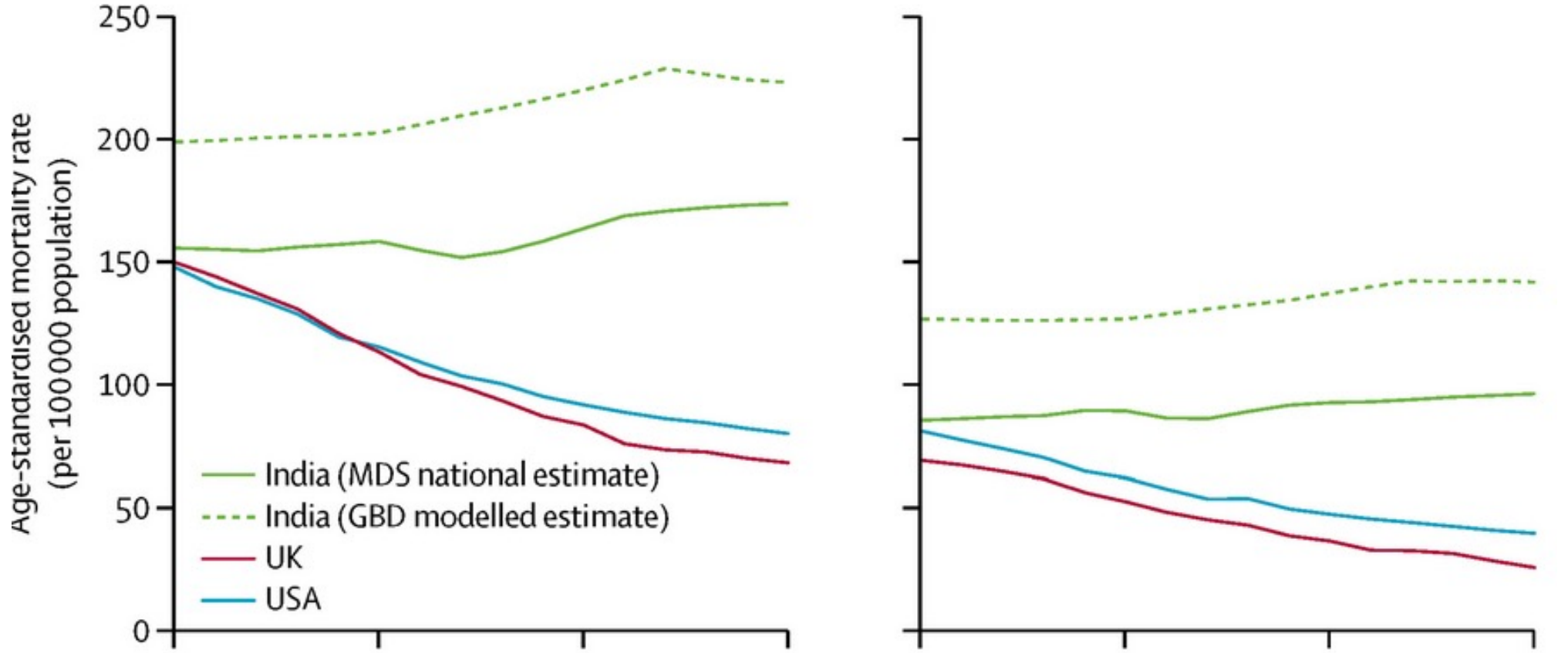


Age-standardised mortality from stroke, 1969-2018, UK.

(BHF 2021)



Deaths from ischaemic heart disease- India compared to UK and USA, 2000-15. *C. Ke et al Lancet Global Health 2018*



Reduction in cardiovascular deaths <75yr due to multiple, incremental steps. Most are widely available to middle-income countries.

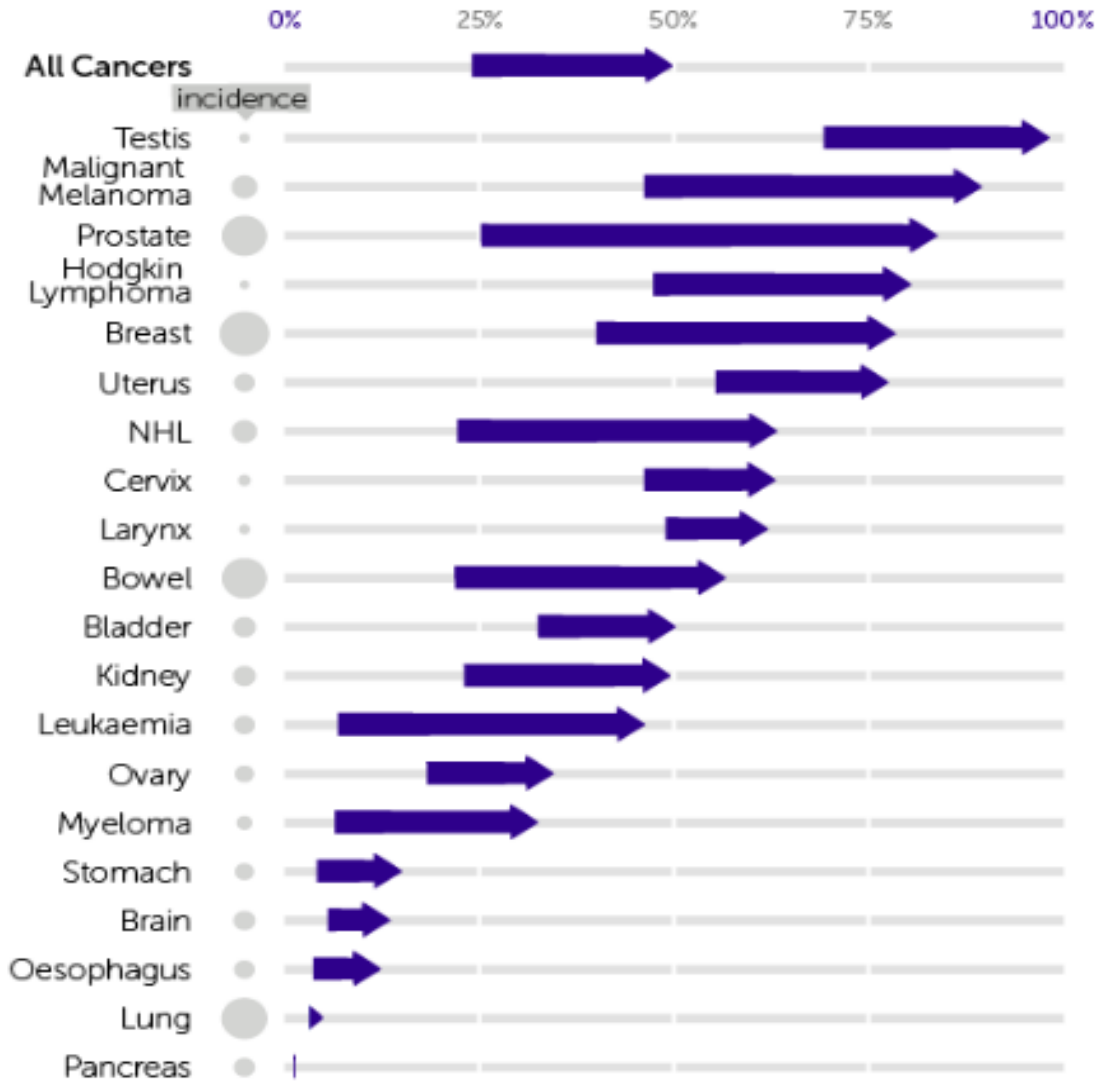
Important interventions include:

- Reductions in smoking.
- Reductions in air pollution.
- Statins, antihypertensives, β-blockers, ACE inhibitors, aspirin.
- Clot-busting drugs.
- Cardiac stenting, cardiac surgery.

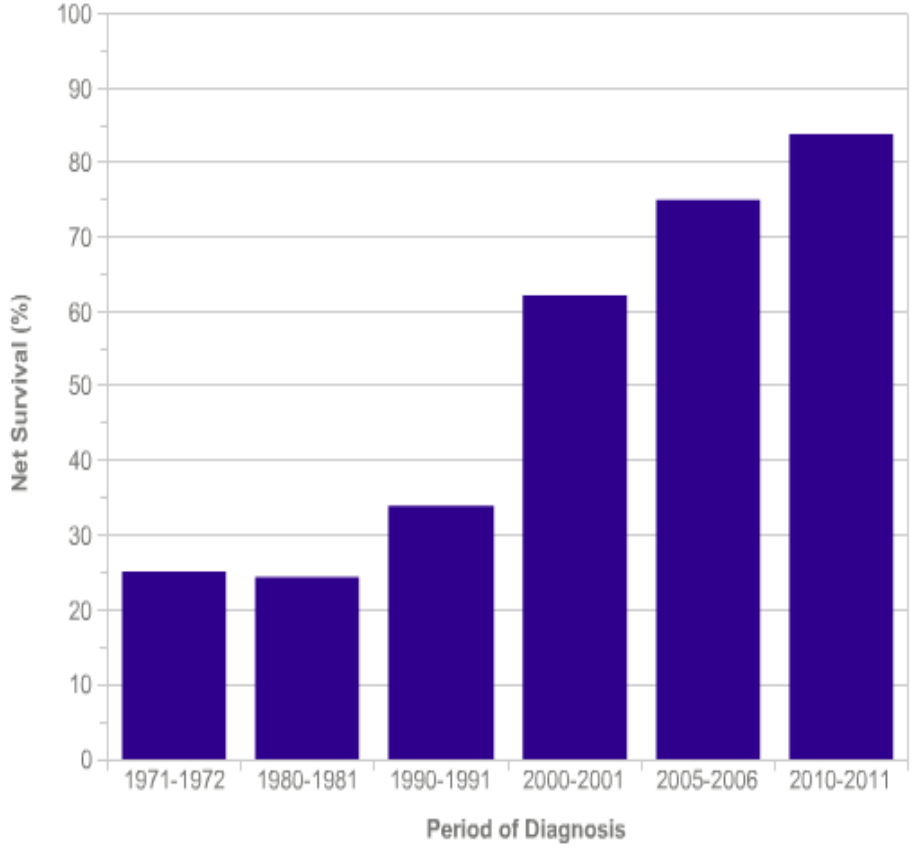
Working against this- rising obesity and consequent diabetes, smoking.

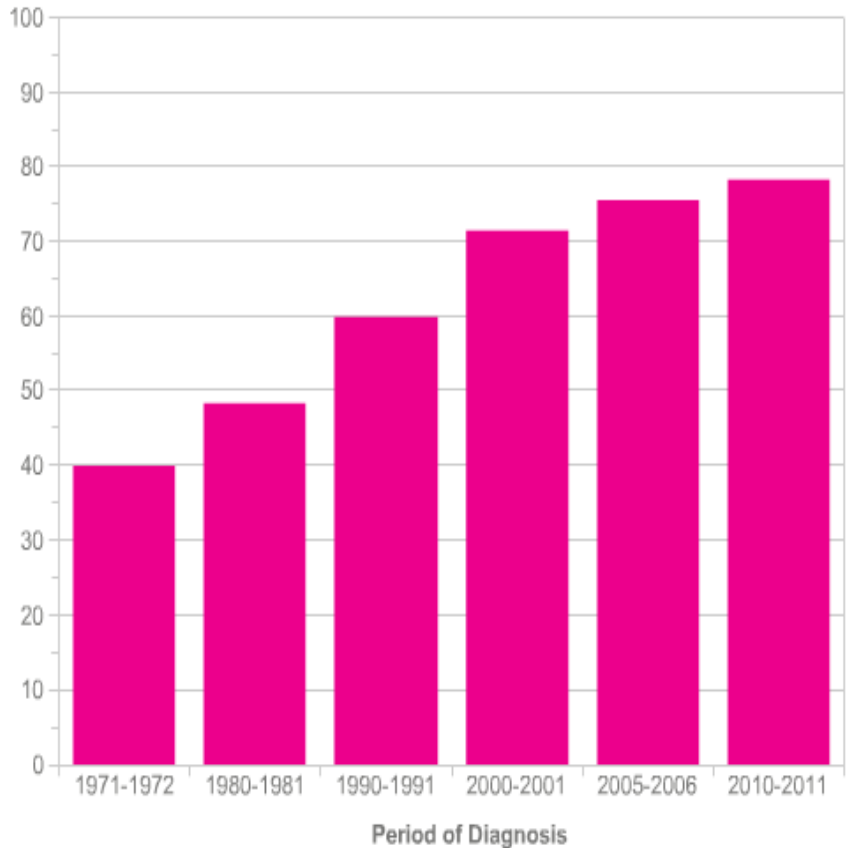
Leh, Ladakh. Wiki.

Mortality dropping for most cancers. Changes in 10 year survival 1971 to 2011, UK as example of high-income country. *(CRUK)*



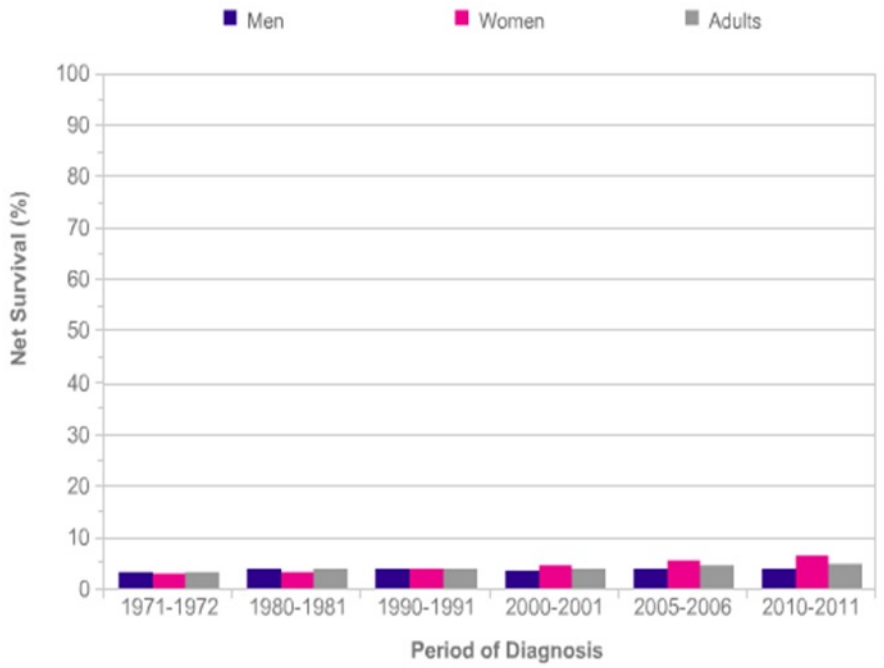
Most cancers outlook is steadily improving where treatment is available. This is increasingly relevant to middle-income countries. UK 10 year cancer survival, prostate (L) breast (R). *(CRUK)*



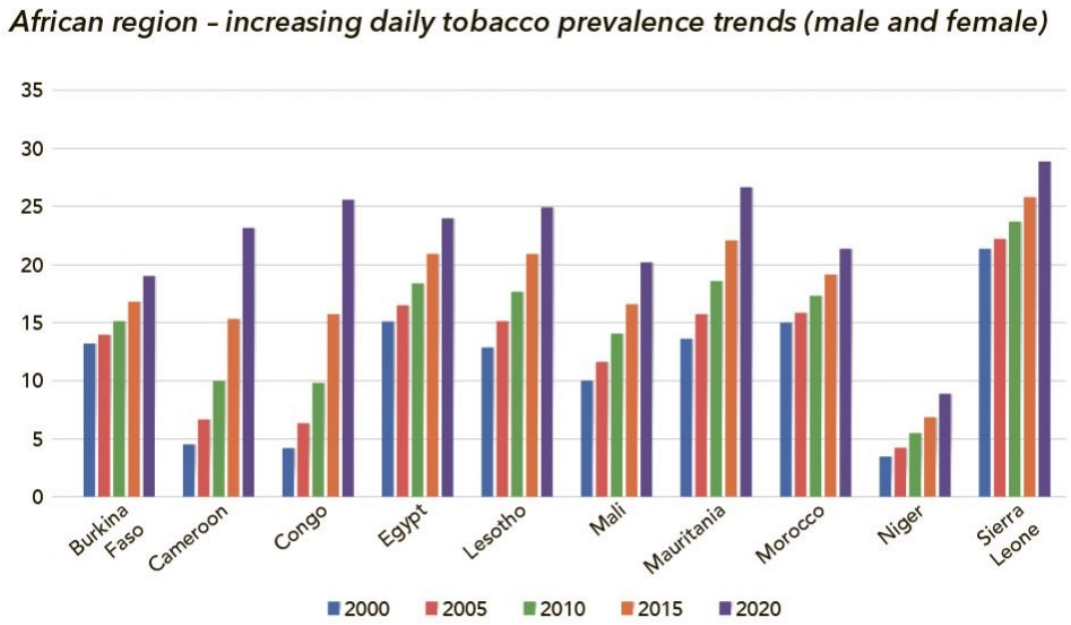


Lung cancer and other diseases of smoking.

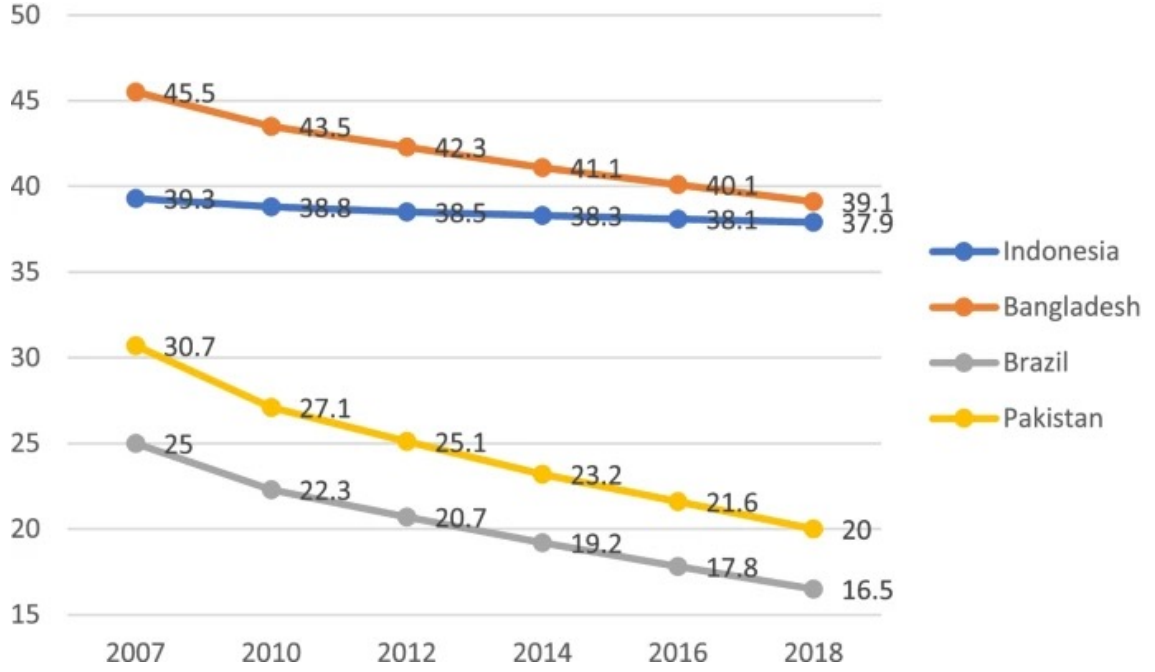
- The long term outlook for lung cancer remains poor. R- UK 10 year survival over time.
- Smoking contributes massively to avoidable mortality and morbidity.
- As people in almost all countries are surviving beyond 50 the effects of this disaster will become clearer.



Smoking- selected countries in Africa (L) and Asia (R).

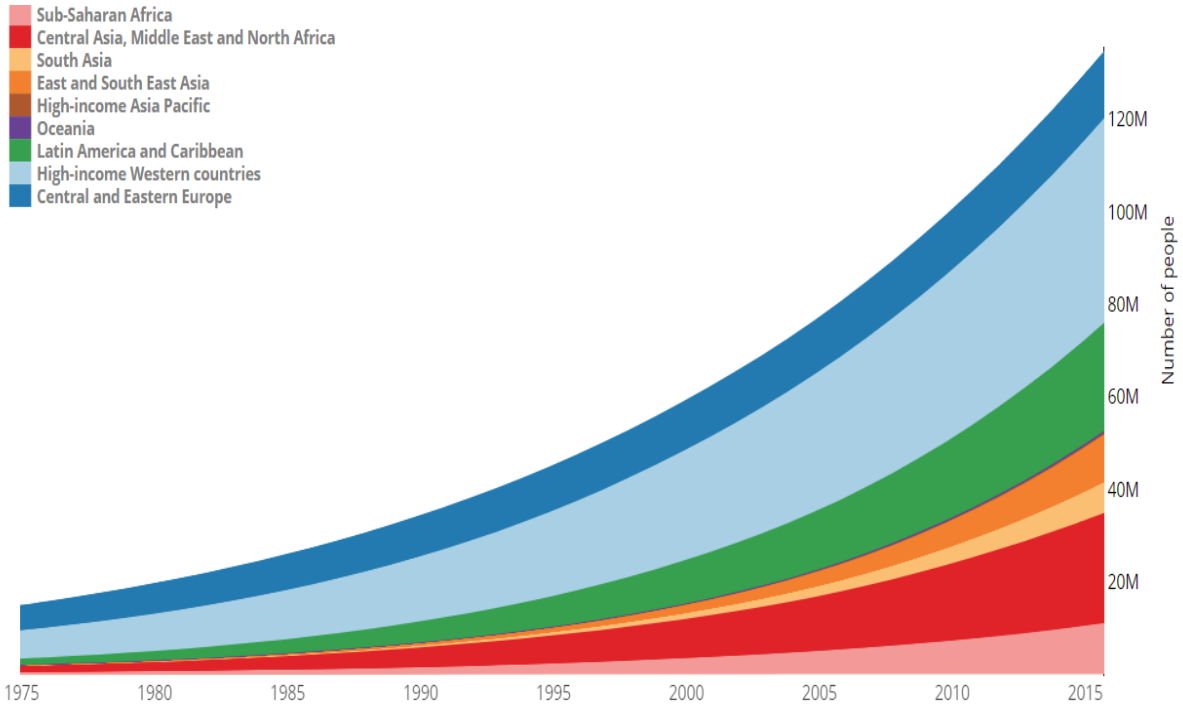


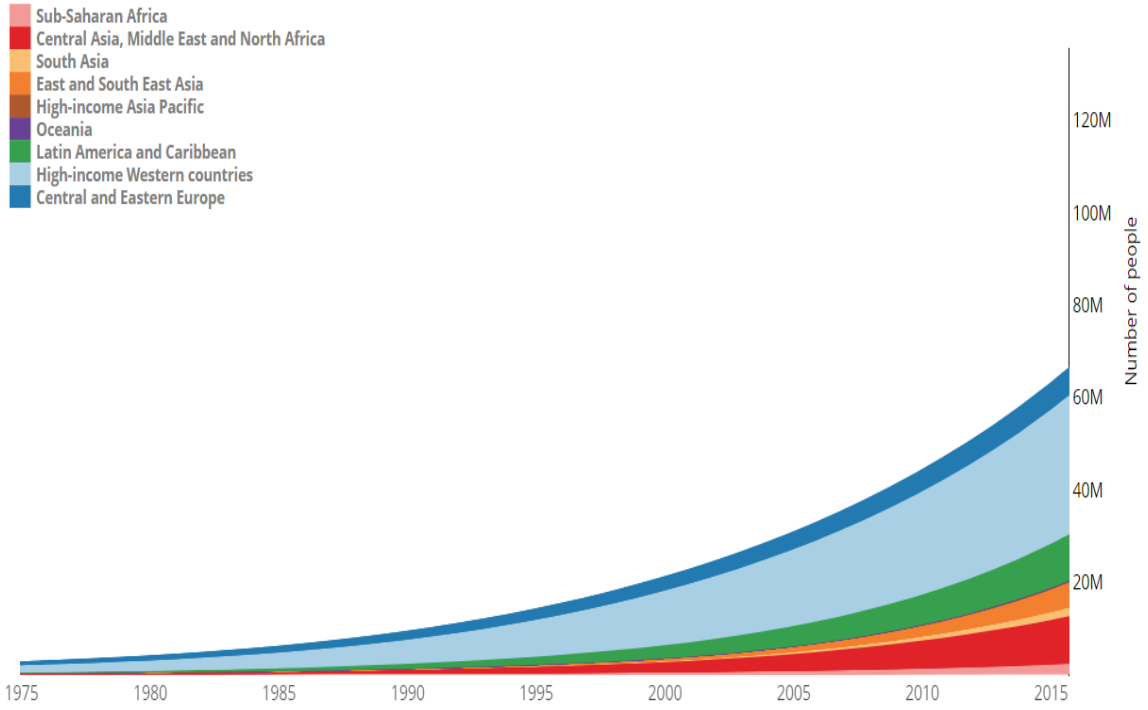
Global state of tobacco harm reduction.



Ahsan A et al 2022 / World Bank.

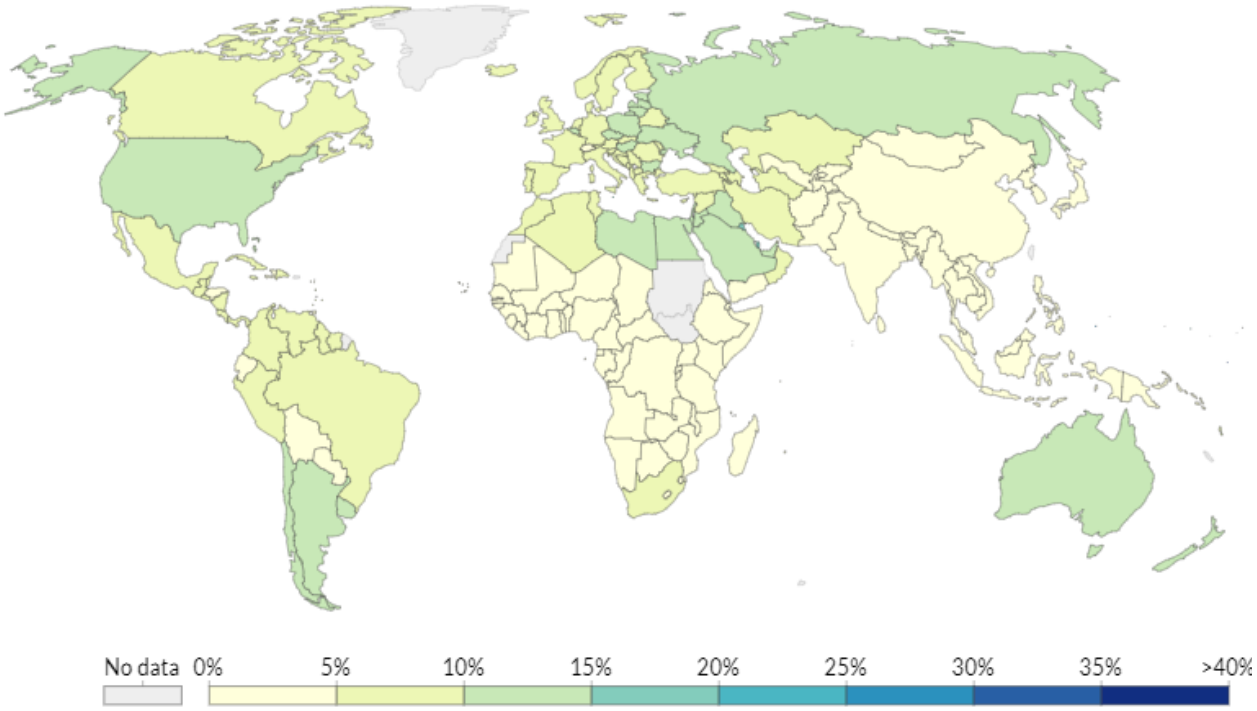
Female (L) and male (R) obesity globally 1975-2016. NCD.RisC

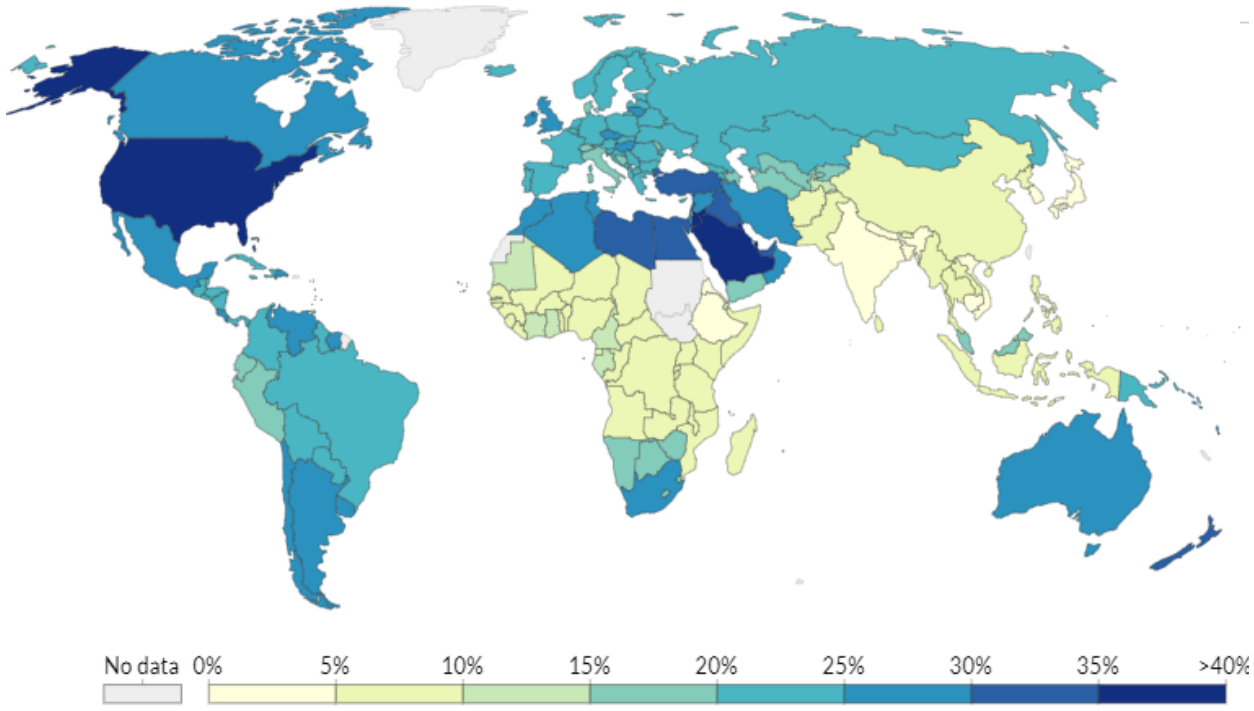




Proportion of adults that are obese (BMI≥30) 1975 to 2016.

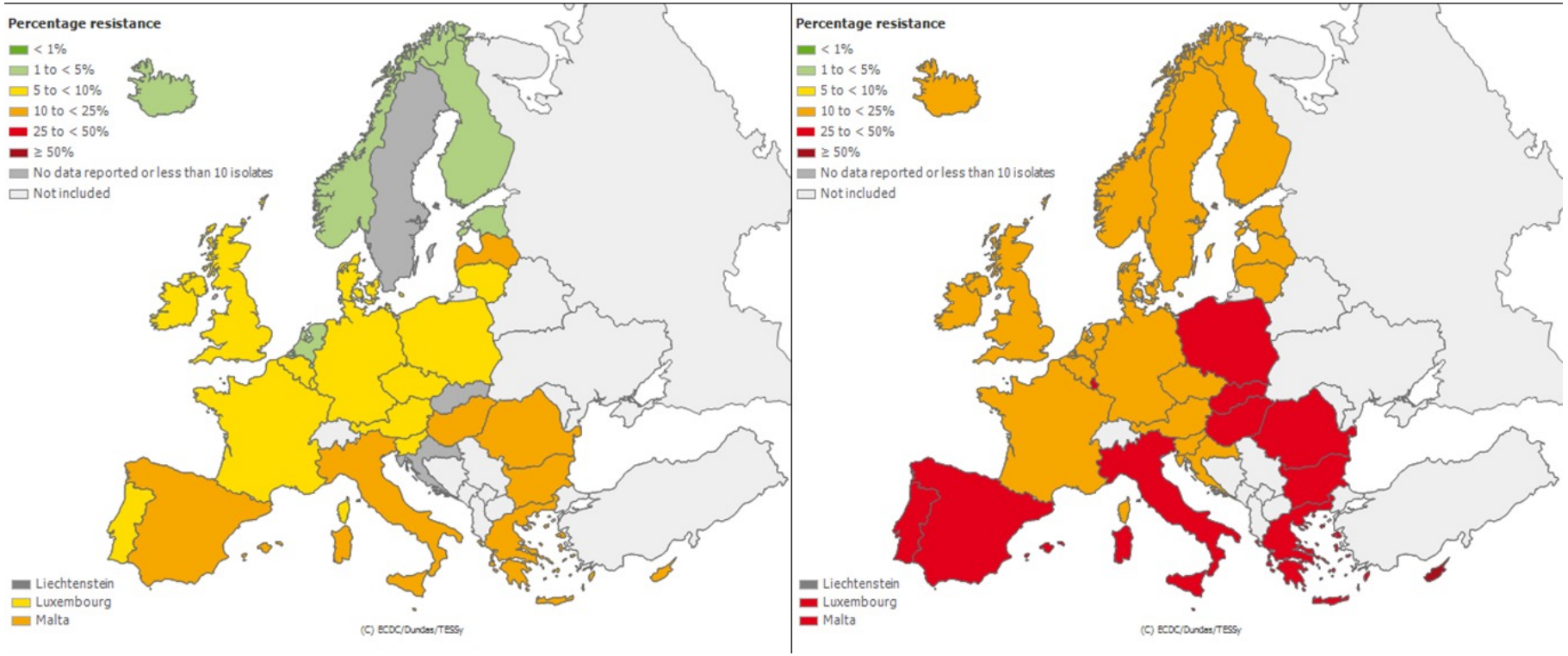
Our World In Data /IHME/ WHO.





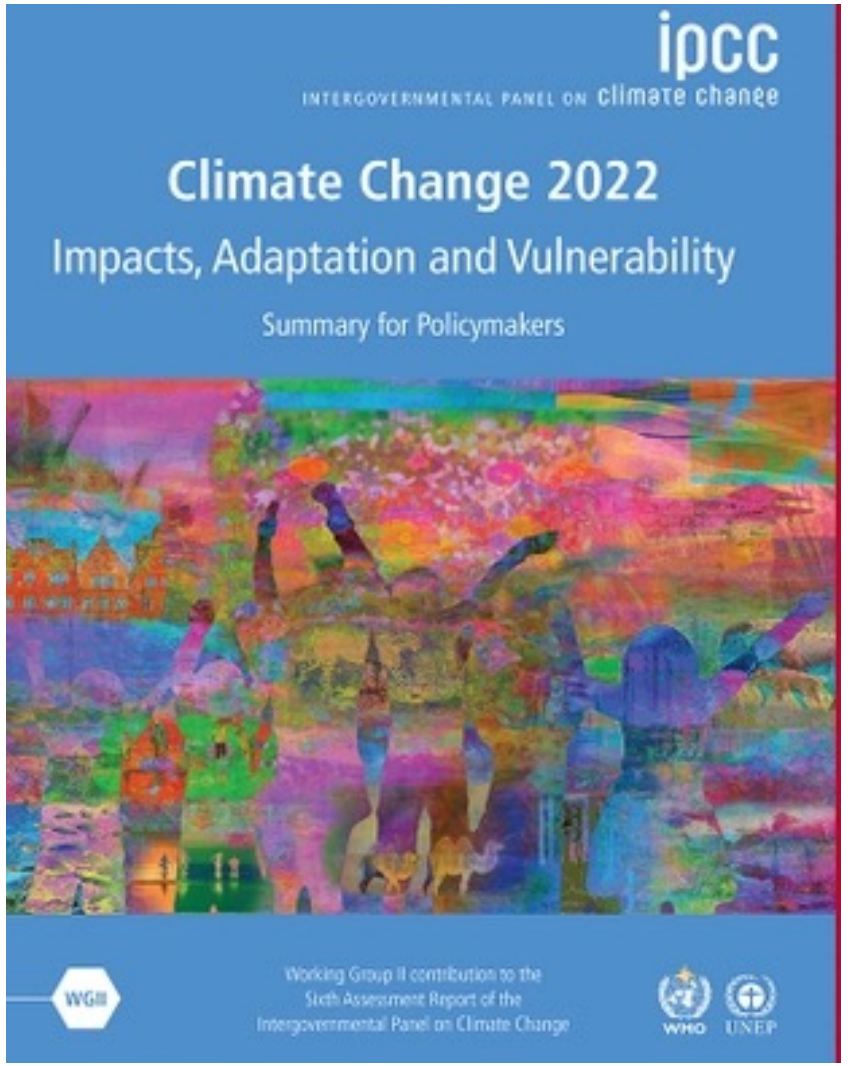
Antimicrobial and insecticide resistance threatens some of the gains in reduced infectious deaths <75 years.

Escherichia coli **resistant to cephalosporins across Europe in a) 2009 and b) 2013**

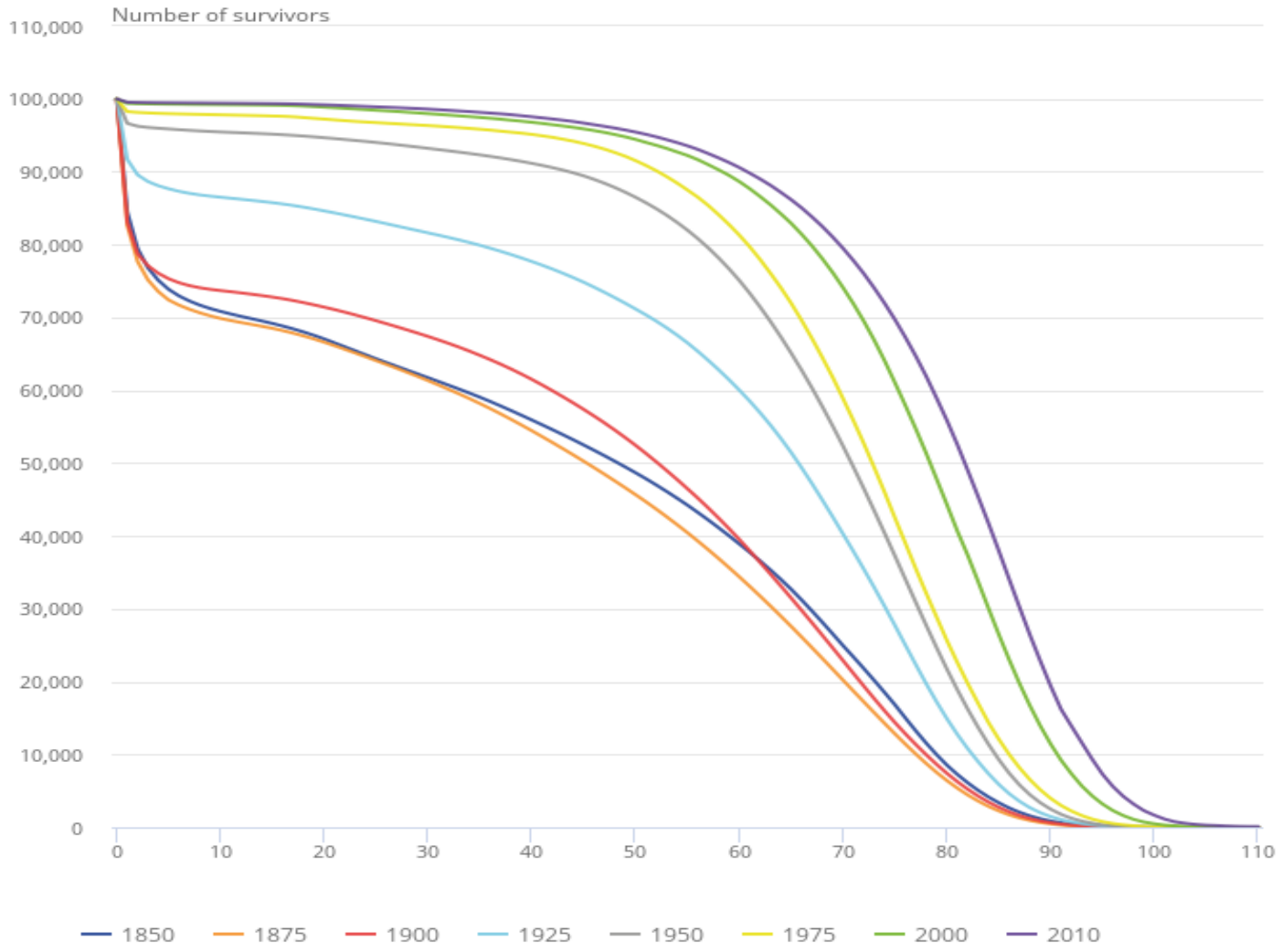


ECDC.

Climate change a backward impact on health.



Mortality increasingly concentrated by age- UK as an example of a country evolving to current high income health patterns. *(ONS)*

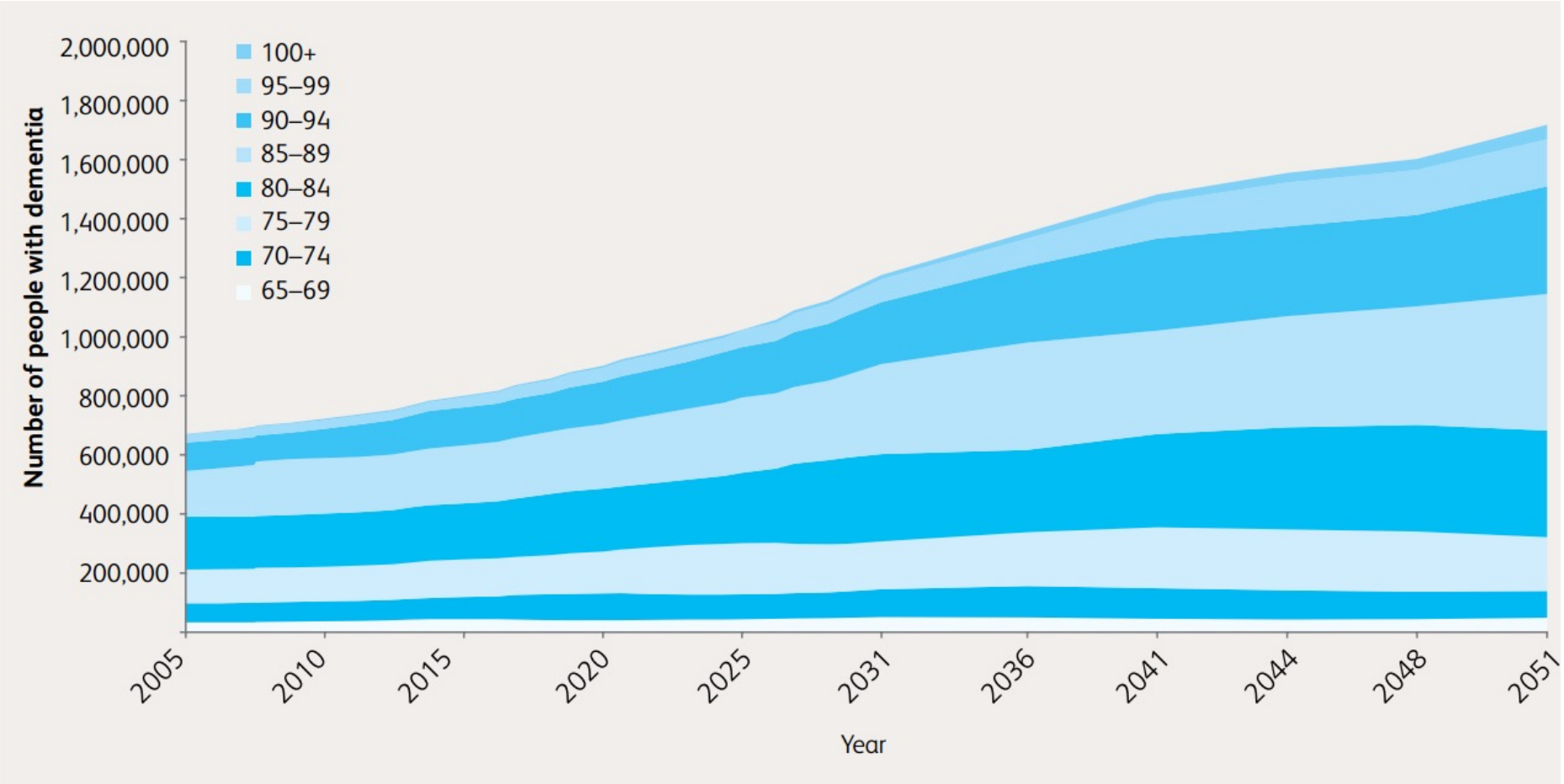


Older age- health after 75 globally.

- The outlook for individual conditions such as heart disease or cancer improving.
- Many degenerative conditions such as arthritis can be treated.
- These improvements will disseminate as countries become wealthier.
- This improvement in health will be faster than it was in existing high-income countries because medical science has already occurred. It is a matter of being able to afford them.

Vincent Van Gogh. Old woman seen from behind. 1882.

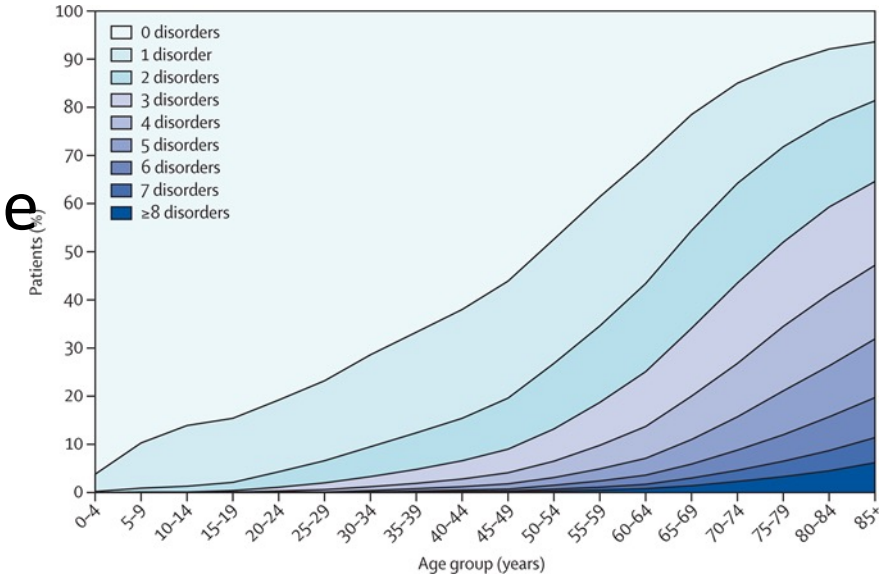
There are however diseases of old age we do not have good treatment for, such as dementias. Projected prevalence UK. *(Prince et al 2015)*



In old age individual chronic conditions accumulate.

- Medical science, and organisation, is designed around single diseases.
- Increasingly as populations age there will be a preponderance of older people with multiple conditions simultaneously.
- Increasing frailty and dependence.

- There is less clarity about how science will develop in this area.



Barnett et al 2012- UK data.

How we support people in older age as they become frailer is a societal as much as a medical question and may vary by society.

Peter van der Sluijs/Vasanddave/Wiki/Wlodek Cieciura

Health globally is improving at a remarkable pace due to a combination of medical science and development.

- Child mortality dropping fast, although slower improvements in the neonatal period.
- The health of adults under 50 steadily improving everywhere.
- The health of those 50-75 also improving globally but some risks including smoking, obesity.
- Longevity in older people over 75 improving but much slower improvements in disability and frailty.
- We should recognise the triumphs, but also the limits, of medical science in supporting the oldest.

Gustav Klimt:
Three ages of woman.