

# Global Health, Global burden of disease and the epidemiological transition – challenging health systems?

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# This session will...

- A short background in *Section A. Social determinants of health* as a topic in science (Slides 3-12)
- Then *Section B. Demographic transition* and the *health transition* and other key concepts within Global Health! (Slides 13-39)
- Summary of necessary activities to improve life circumstances in a country....
- *Section C. Public health history and main principles* in short (Slides 40-46)

# Section A. Trends in global health...

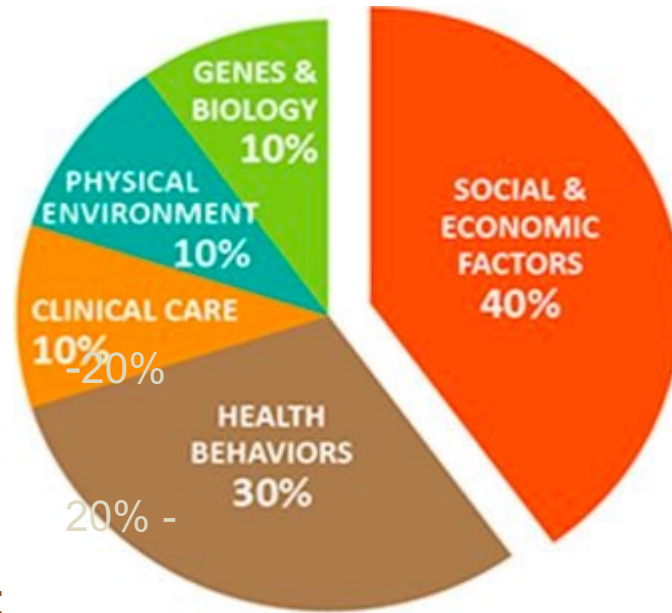
In the past 20-40 years:

- Extreme poverty has been reduced by.....% in 20 years,  
• **50**
- Average number of years at school is for boys....., for girls.....?  
• **8 years      7 years**
- Average number of children /family is....?  
• **2,5**
- Average life expectancy is .... years?  
• **71,5 (males 68,3, females 72,6)**
- How many people have no access to electricity in the world? .....
- **1.2 billion/+325.000 every day**
- How many people do not have access to clean water?.....
- **780 million**
- How many people lack access to improved sanitation?.....
- **2,5 billion**
- How many of the world's children have been immunised against a disease at 1 year of age?  
• **80%**
- Infant mortality rates have declined
- Birth rates have gone down
- Communicable disease mortality/morbidity has declined
- World's population growth also slowed down!
- Wealth has improved in many of the poor/low-income countries

➡ Still millions of people die due to **poverty** every year.  
What is the problem?

# What influence population health?

## Social determinants!



**SOCIAL & ECONOMIC FACTORS:**  
Poverty  
Education  
Income  
Social networks  
Work conditions  
Policy and Laws  
Gender issues, sex, age

**HEALTH BEHAVIOURS:**

Food  
Exercise  
Smoking  
Drinking  
Illicit drug use  
Sexual habits

**DETERMINANTS OF HEALTH**

Poverty is the most serious threat to health...  
How can it be explained?



# How poverty is defined

- 1.2 billion people still live in extreme poverty!
- It is commonly based on an income <1,90 USD/person and day, estimated in 2015, based on prices from 2011 (equiv to 2.16 USD in 2019);
- **MPI** (multidimensional poverty index) **includes lack of basic needs and not only income.**  
If this is used 1.5 billion people are in an extreme poverty situation (UNDP).

# Poverty is a most serious threat to health...

- Poverty leads to malnourishment, diarrhoeal diseases and other infectious diseases with poor access to health services....
  - Worst affected are the children and pregnant women;
  - Poor people have less access to health care services, due to distance, costs, not knowing where to seek care ...
  - Poor people often lack health insurance
  - Poor people may not afford medicines
  - Poor people may be less educated and do not know when it is time to seek health care (health illiteracy), or stigma may stop them (mental disorders)
  - Poor people are often treated badly by health care staff and therefore may hesitate to seek care
- ➡ Mortality rates are considerably higher among the poorest groups
- **Despite this, only a small proportion of the funding for health research is spent on poverty alleviation!**

# The globalised world's problems...

- Climate change with global warming and emissions are not treated seriously by the global society and will push millions of people back into poverty;
- There is a risk of an hunger epidemic according to the World Food Programme (WFP) and food insecurity has increased remarkably since 2019 (the disruption of food intake or eating patterns because of lack of money and other resources, climate change will further increase this);
- The huge and growing socio-economic inequalities within countries is a bigger problem than between rich and poor countries/regions - leading to civil unrest, criminality, violence, and extreme poverty;
- The huge gender inequalities ...where women to a higher extent than men live in poverty;
- The global financial system is unreliable, unemployment rates are high, salaries low... driving poverty levels upwards
- Chronic diseases are a huge threat to population health almost all over the world....Do LICs have the ability to treat this? Recurring pandemics!

# Global Health Risks, WHO 2019 -

The poorest being the most vulnerable

- Air pollution and climate change
- Non-communicable diseases (high blood pressure, overweight, diabetes mellitus type II, cardiovascular diseases)
- Threat of a global influenza pandemic, Covid-19...., other pandemics will come...ebola, dengue fever, HIV, other pathogens...
- Fragile and vulnerable settings, such as regions affected by drought and conflict, hunger and food insecurity
- Antimicrobial resistance
- Weak primary care
- Lack of vaccines and also vaccine hesitancy
- Migration...

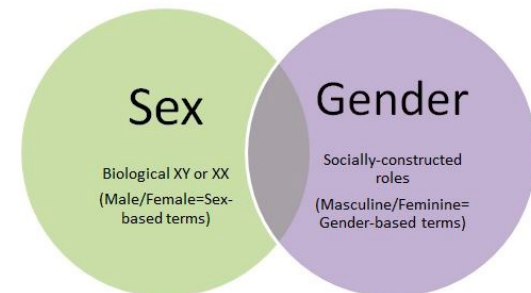
# Poverty means Inequality in Health

Inequality is an unequal distribution of wealth and health!

People of different socio-economic groups (class), ethnic groups, sex/gender, sexual orientation, religion and/or with disabilities face different health developments due to:

- ➡ Unequal access to resources! (jobs, education, money, social networks...)
  - ➡ Discrimination! Human Rights aspects...
  - ➡ In a global perspective, men own 50% more than women; The 22 richest men in the world own more than all women on the African continent!
- Women spend 12,5 billion hours on unpaid household and care work (3/4 of the total), equal to 108 billion USD/year

*(Oxfam, Time to care report, 2020)*



# Health inequalities in Sweden!



## Average life expectancy in Gothenburg

- Within Gothenburg, the difference in average life expectancy is 9 years for men and 6 years for women living in Bergsjön as compared to more affluent parts of Gothenburg (Långedrag)! (74/83 for males and 79/85 for females).
- COPD (KOL sw) is a commonly occurring disease in Angered/Bergsjön – but people hesitate to seek health care...
- Socio-economic conditions are the most important reasons for these differences in average life expectancy; (Education, employment possibilities, income...).
- Socio-economic inequalities also negatively influence feelings of trust in other people, and authorities....risk of feelings of exclusion from society and instead young people may form or join violent groups.

# Health inequalities: Maternal mortality Tanzania and Peru

## Maternal mortality in Tanzania and Peru

- 700/100.000 live born among the poorest segment of the population in Tanzania and in Peru;
- 520/100.000 is the average in the population in Tanzania; 100/100.000 i Peru;

The better educated the mother is,  
the more likely she will be assisted by a skilled birth attendant:

No basic education:	42%	will be assisted during child birth;
Primary school:	65%	”
Higher education:	99%	”

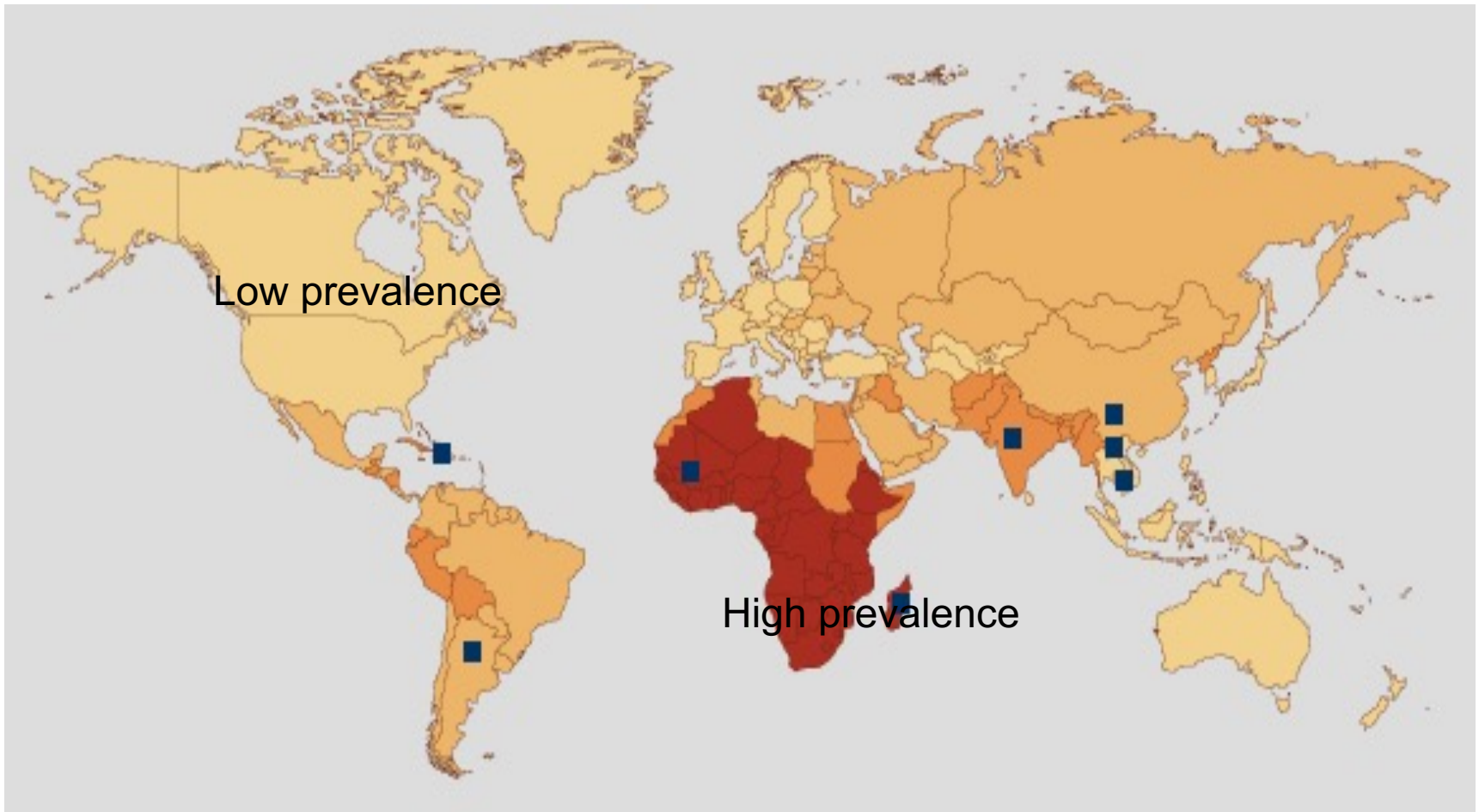
Maternal mortality In Sweden: 4-5/100.000 in the entire population

*UNICEF and World Bank data*



**Section B.** The disease panorama looks different in different parts of the world - some people die of infectious diseases while others die of cardiovascular diseases.

Prevalence of infectious diseases



# Main causes of mortality/morbidity in different parts of the world...

## High-middle income countries:

### Chronic diseases

Accidents

CVD

Cancers

Lung diseases

Mental illness

Musculoskeletal diseases

Allergic diseases

Osteoporosis

Alzheimer's disease

...

....

 NCDs...

Non-Communicable Diseases

## Low income countries

### Infectious diseases

- TB, Malaria, HIV/AIDS

- Diarrhoeal diseases

- Lung diseases

- Parasitic diseases

- STIs

Maternal mortality, Child mortality

NCDs:

Accidents

Mental illness

Diabetes type II

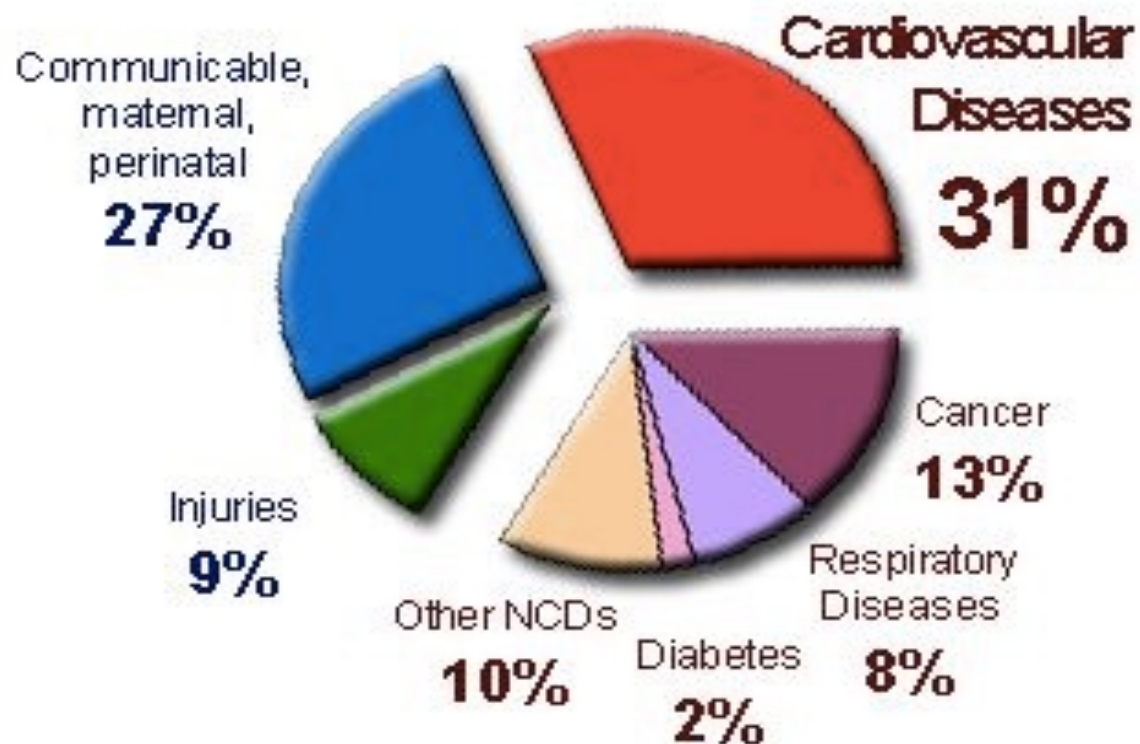
CVD

Cancer

 mainly CDs

Communicable Diseases

# Global Causes of All Deaths



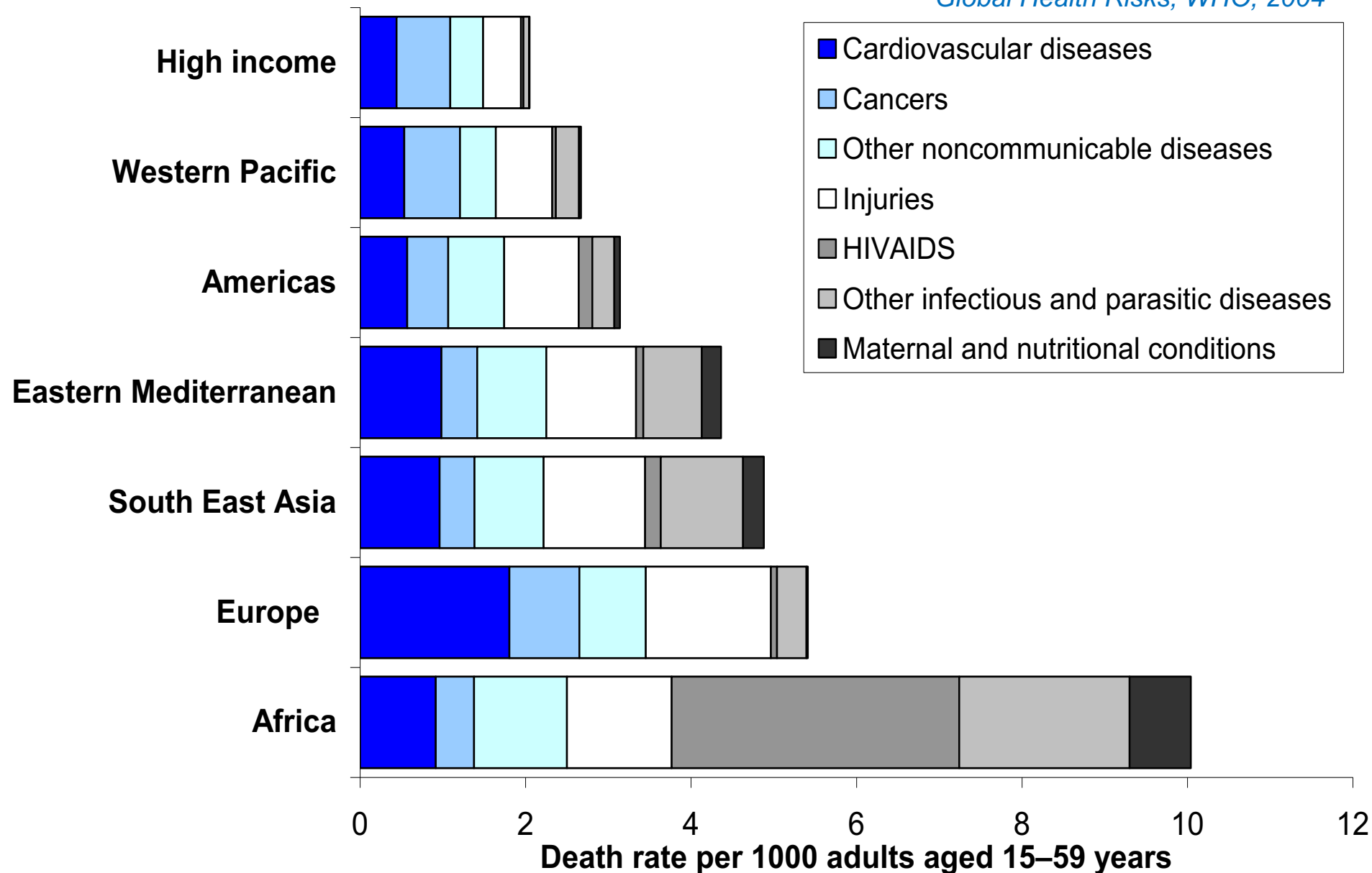
NCDs = 73%  
CDs = 27%

Legend: Non - Communicable Diseases (NCDs)  
Other Causes of Death

Source: World Health Organization  
Global Atlas on cardiovascular disease prevention and control  
Geneva 2011

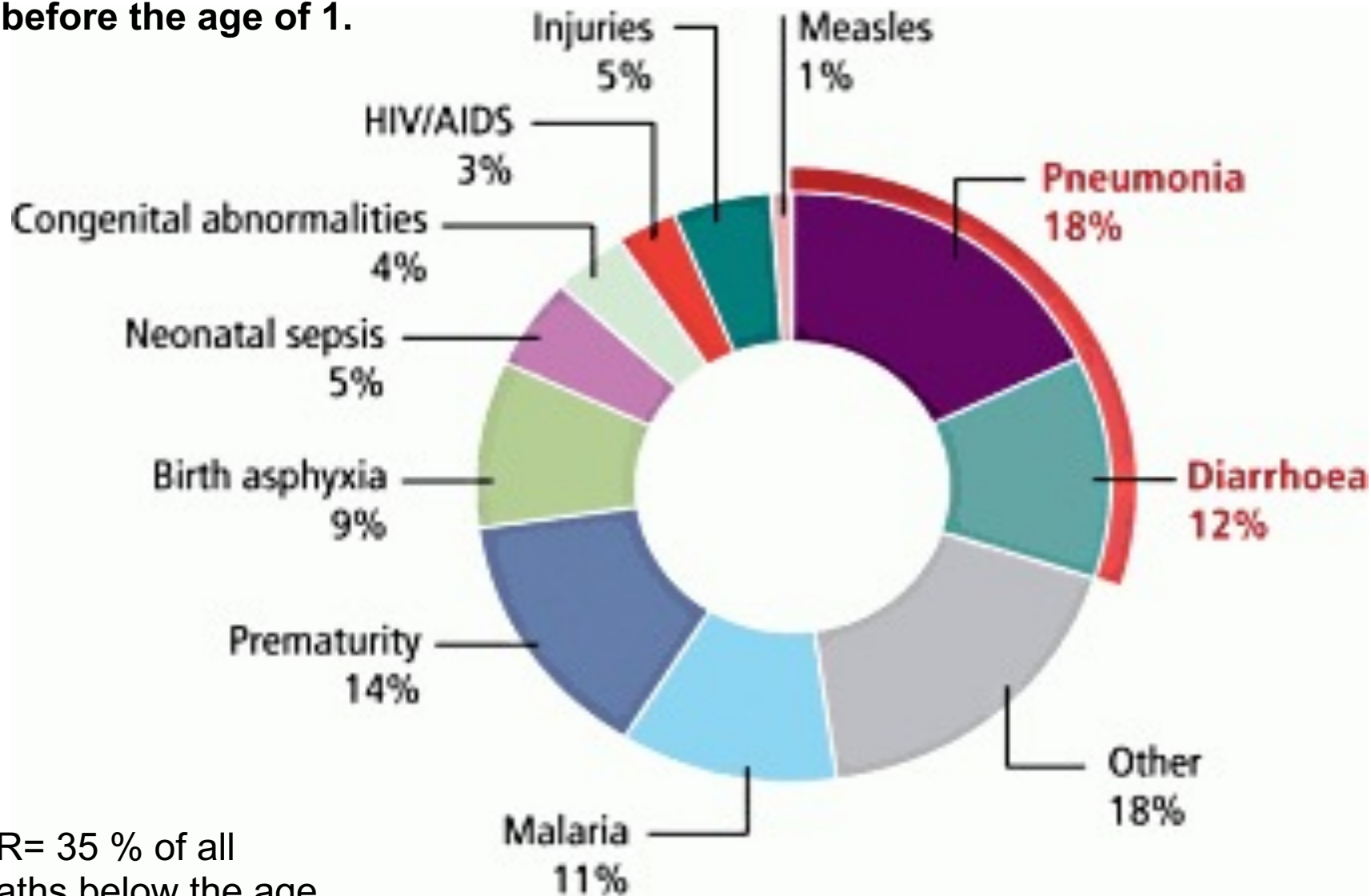
# Adult mortality rates by major cause group and region, 2004

*Global Health Risks, WHO, 2004*



## Causes of **under-five child** deaths in low-income countries

Infant mortality rate, IMR, no of deaths per 1000 children born alive who die before the age of 1.

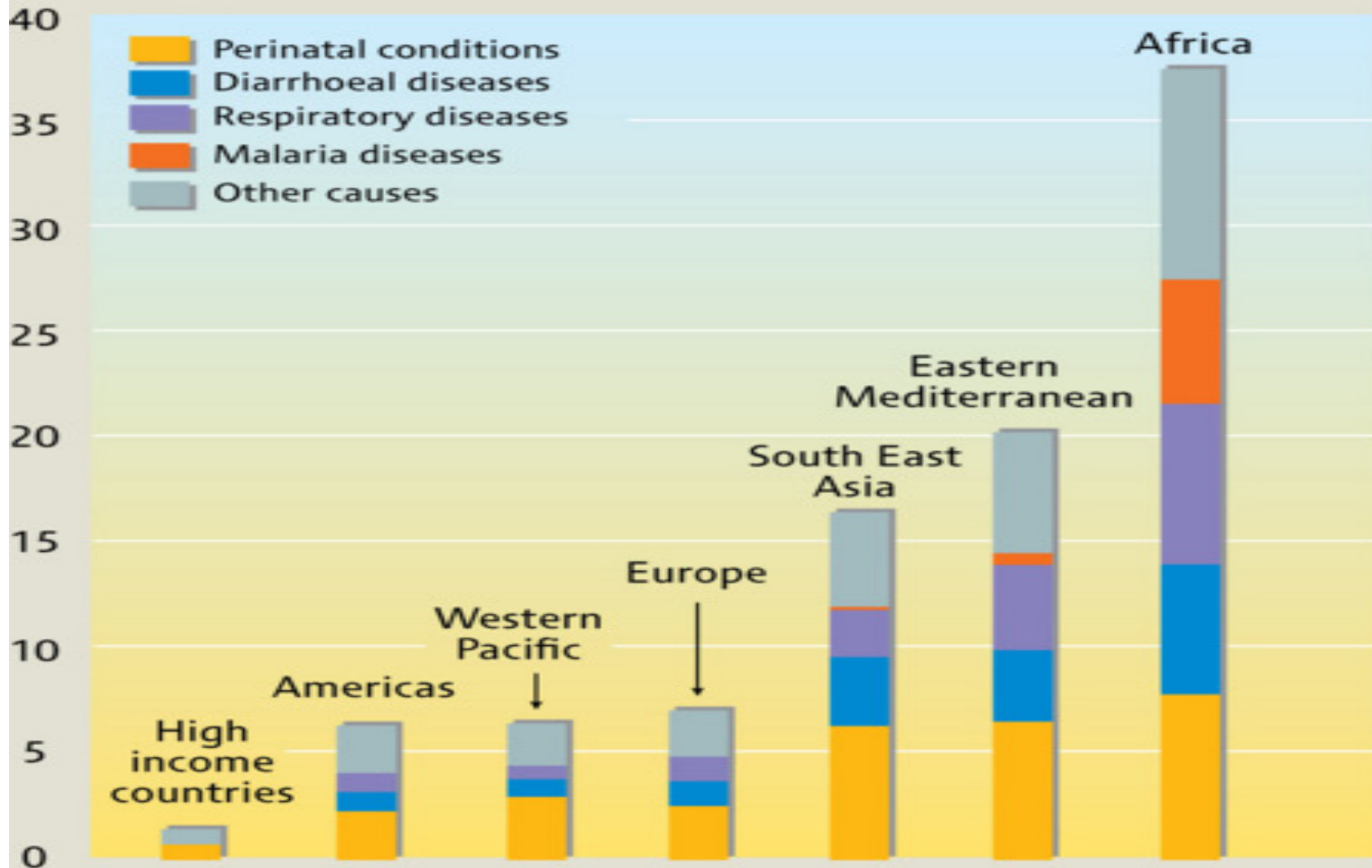


IMR= 35 % of all deaths below the age of 5

Source: WHO, World Health Statistics 2012

# Child mortality rates

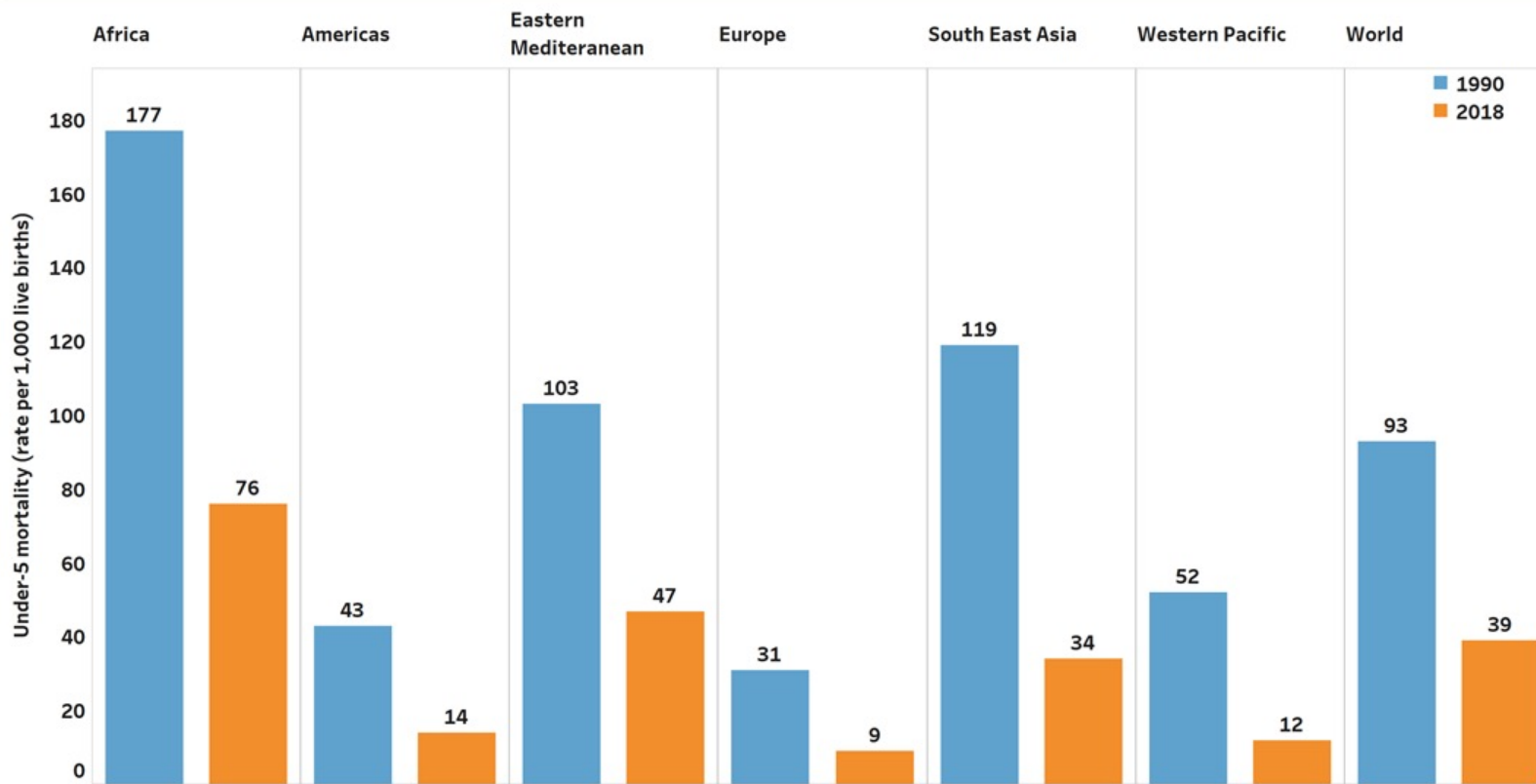
Percentage



Source: WHO, 2008.

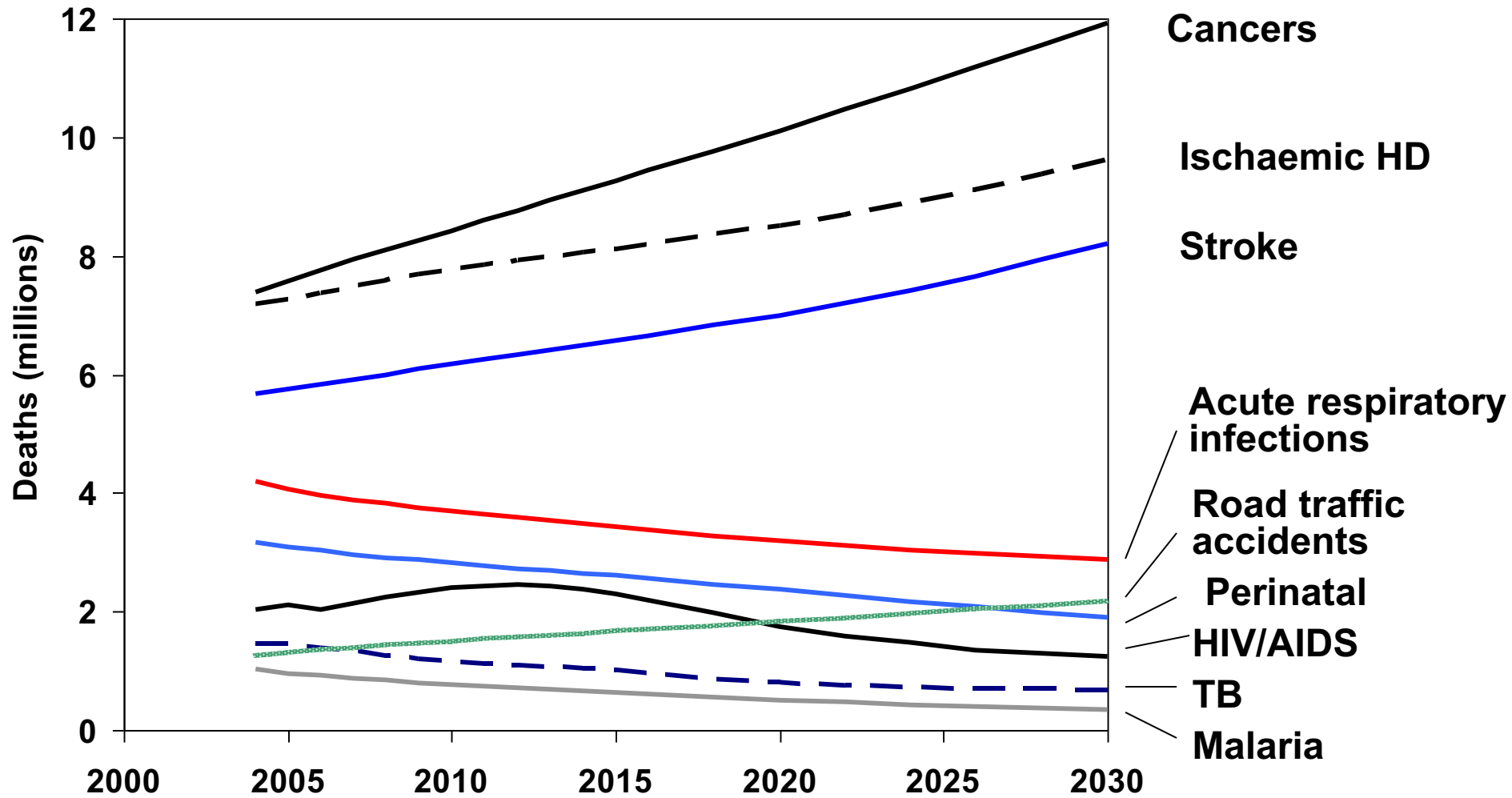
# Under -5 mortality in all regions in the world declined...

**Under-five mortality declined in all WHO regions between 1990 and 2018**



Source: UNICEF, WHO, The World Bank Group, UN DESA/Population Division. *Levels and trends in child mortality 2019*. UNICEF, 2019.

# Global projections for selected causes of death, 2004 to 2030



Updated from Mathers and Loncar, PLoS Medicine, 2006

# Time for reflection!

- Why is it that the African continent south of Sahara is so burdened by high morbidity and mortality rates?
- Colonial powers
- Poverty
- Poor management and leadership, lack of accountability, corruption, internal conflicts
- Seldom democracy, vulnerable state economies
- Low education
- Human Rights and women's status - inequalities
- .....

Now...

The demographic transition...

?

# The demographic transition, will it come true?

A shift from a pattern of high fertility and high mortality - to low fertility and low mortality rates with stabilisation of population growth

Is this a dream scenario or a realistic one?



Demographic Transition

Pre-Transition      Early Transition      Middle Transition      Late Transition

Rates (per thousand people)

50  
40  
30  
20  
10  
0

Death Rate

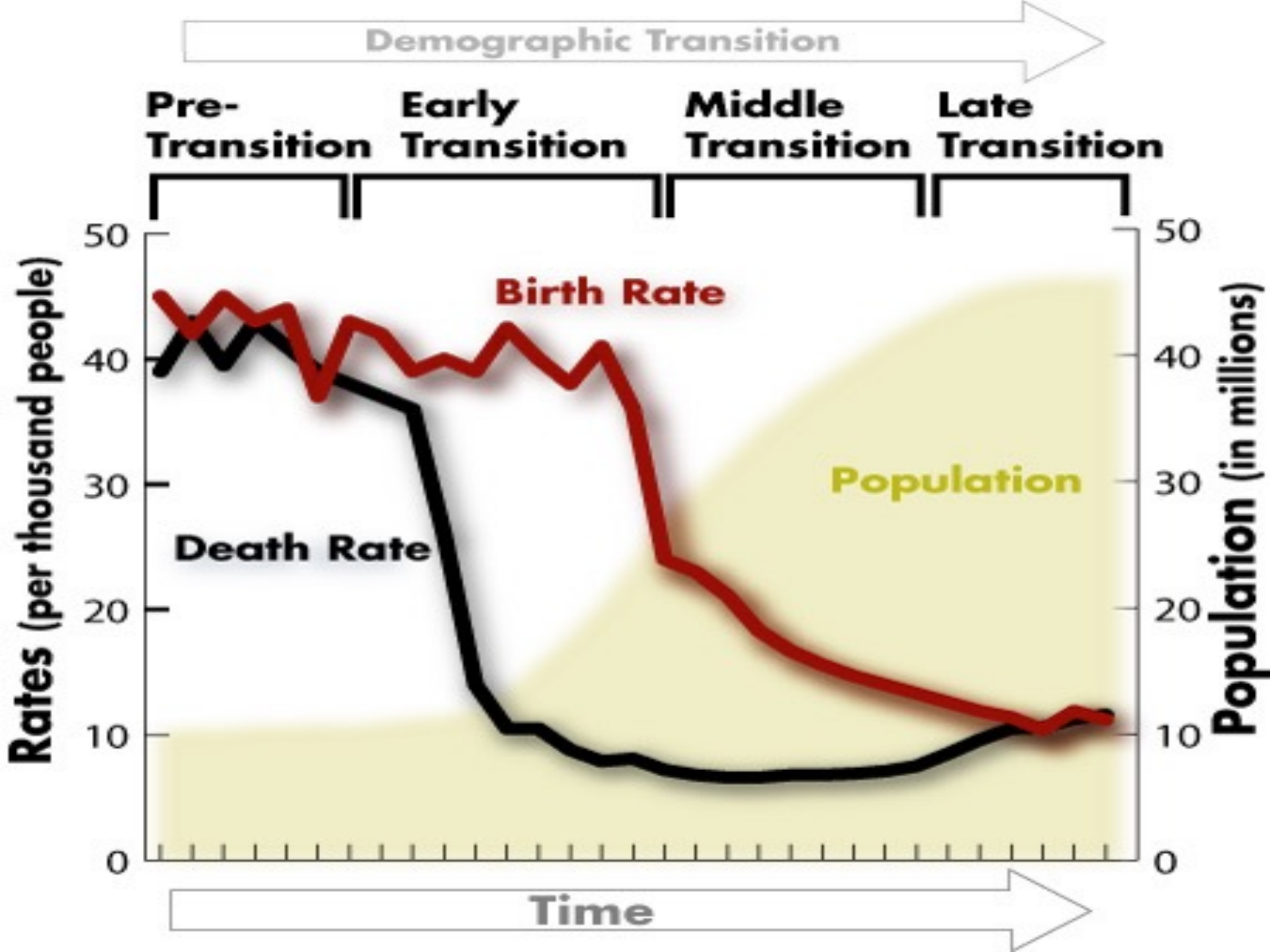
Birth Rate

Population

Population (in millions)

50  
40  
30  
20  
10  
0

Time



# But is there a problem with this scenario on population growth?

- A main discussion today is:  
**How many people live on the earth in 2100?**
- Can we believe in present projections?
- Taking into consideration where we are today in terms of global politics, trade restrictions/trade wars, climate change, state internal conflicts, migrating populations, poverty, pandemics...

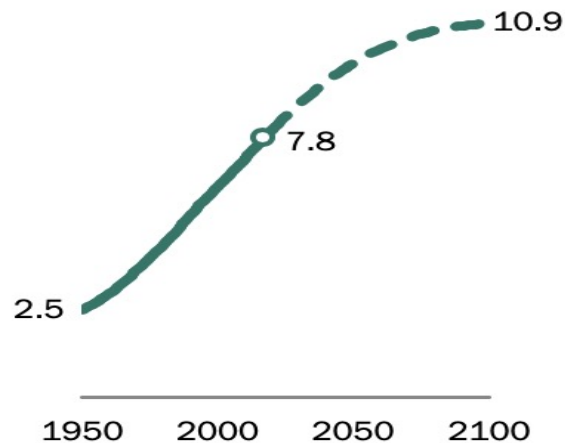
What do you think?

# World population growth...

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## World population growth is projected to flatten in coming decades

*World population, in billions*



Note: Data labels shown for 1950, 2020 and 2100.

Source: United Nations Department of Economic and Social Affairs, Population Division, "World Population Prospects 2019."

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The assumption being that birth rates are going down!

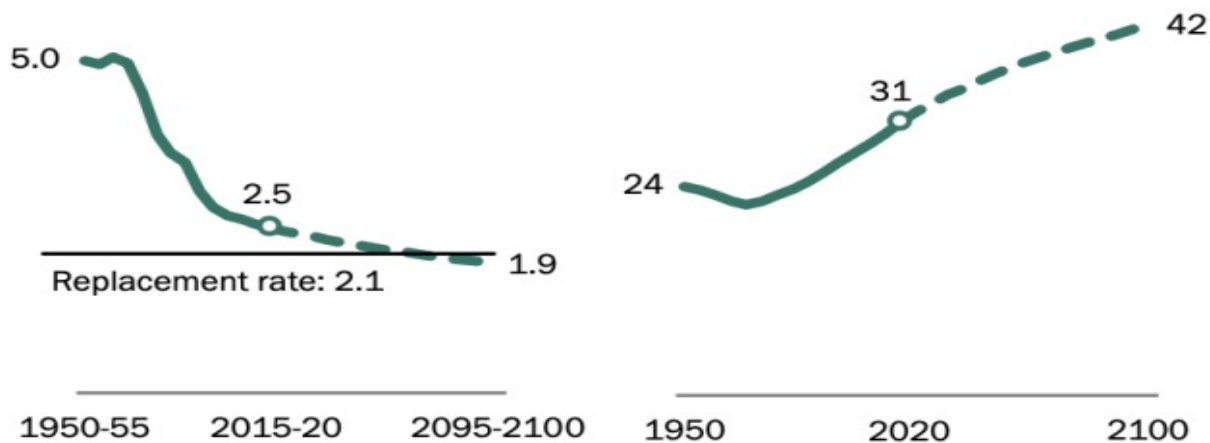
*Source: Pew Research Center, an independent research institute, based in Washington DC.*

# Child mortality is falling- Birth rates are falling....

## Global fertility is falling as the world is aging

*Number of live births per woman (total fertility rate)*

*Median age of the world population*



Yes, it means death rates are falling...in all age groups

Note: The replacement rate is the number of births per woman required to maintain a population at a constant size.

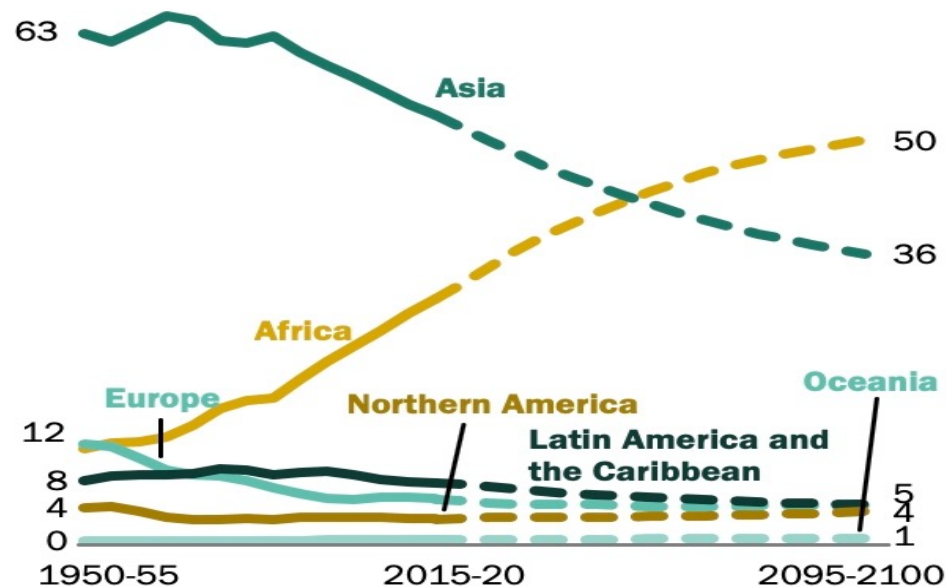
Source: United Nations Department of Economic and Social Affairs, Population Division, "World Population Prospects 2019."

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# Africa is the continent with the fastest growing populations...

## By 2100, half of babies born worldwide are expected to be born in Africa

*% of babies born, by region*



12.5 bill people will live in Africa by 2100 if birth rates do not decrease!

Note: Regions follow United Nations definitions and may differ from other Pew Research Center reports.

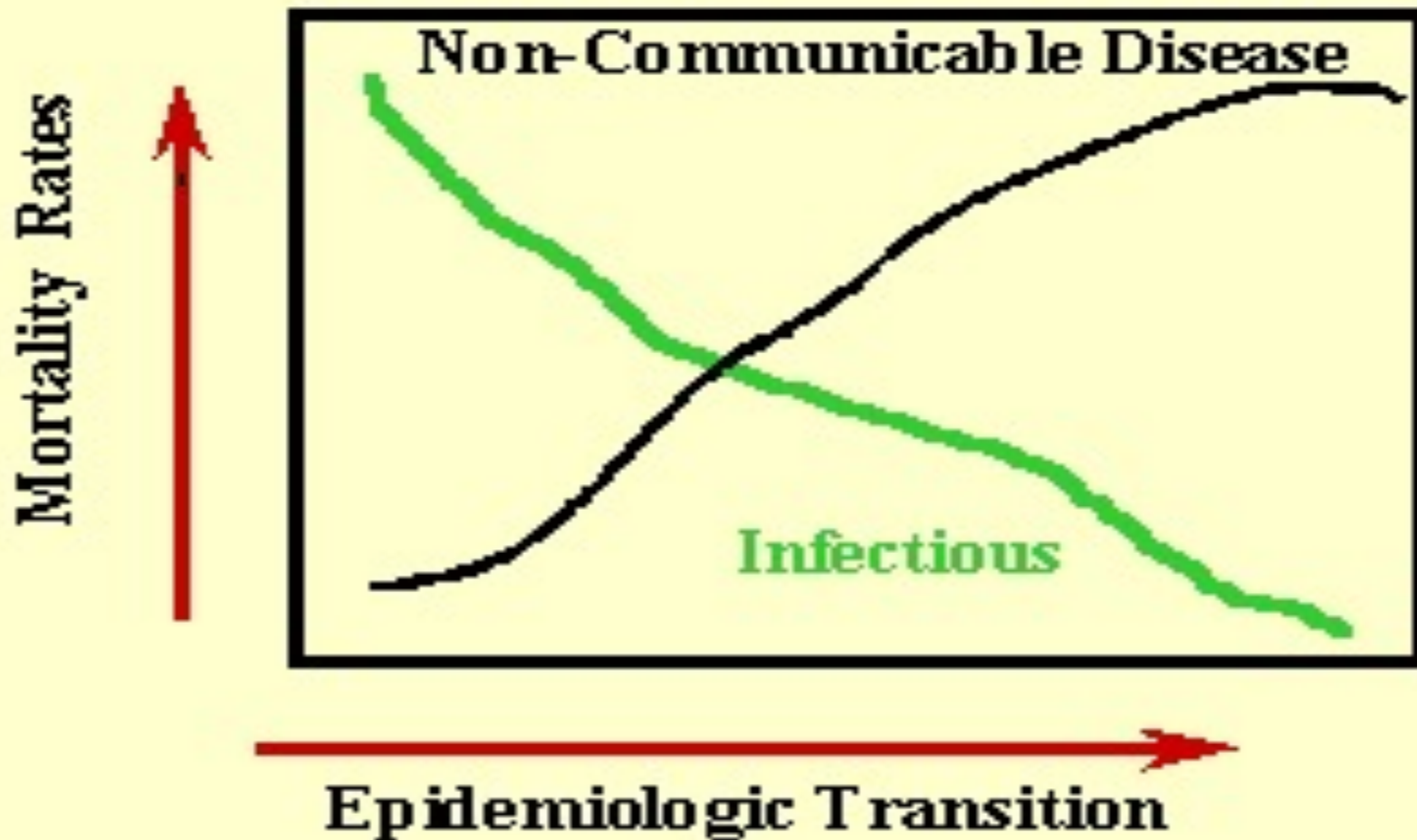
Source: United Nations Department of Economic and Social Affairs, Population Division, "World Population Prospects 2019."

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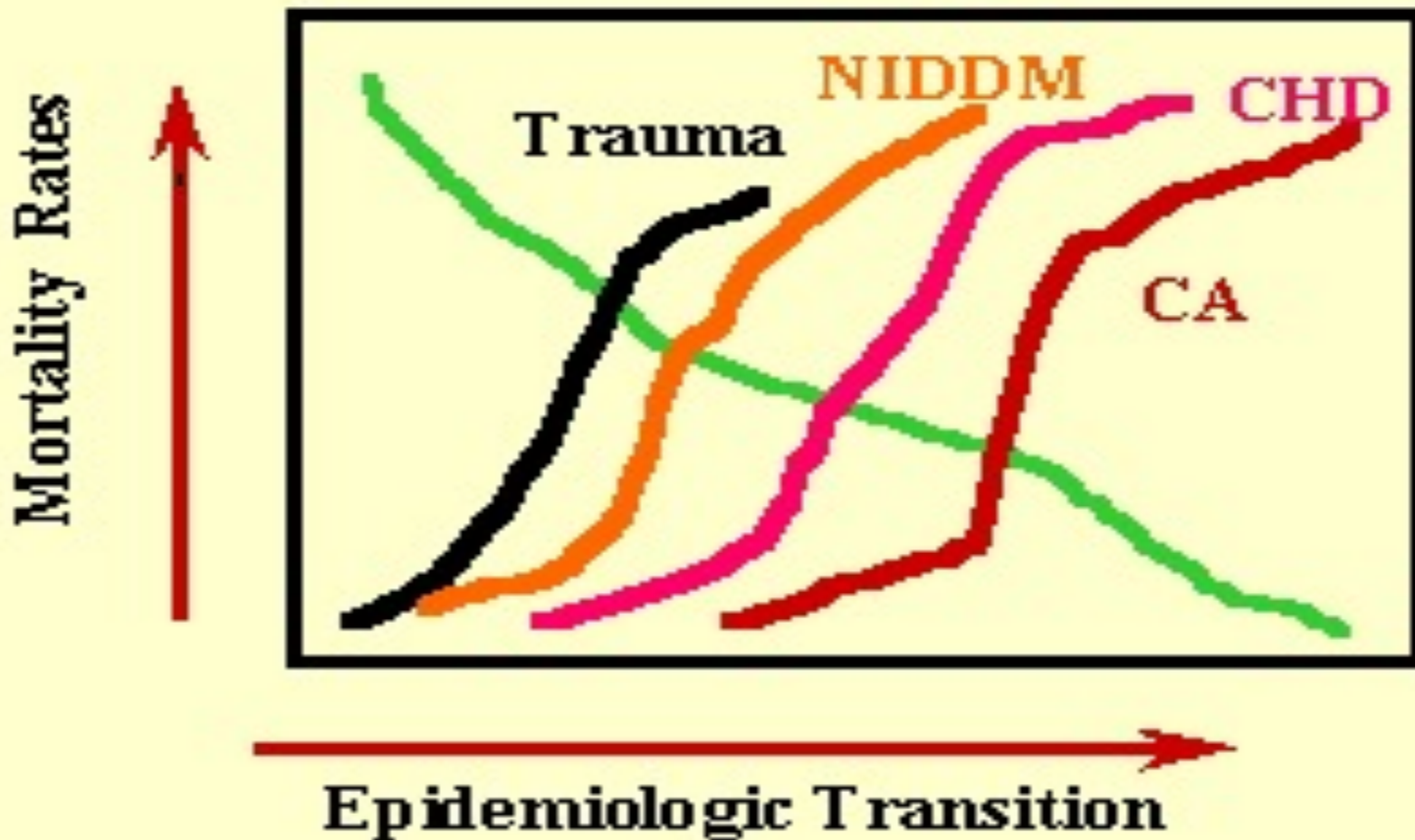
# The epidemiological/health transition

**During the epidemiologic transition, a long-term shift occurs in mortality and disease patterns whereby pandemics of infection are replaced by degenerative and man-made diseases...**

# CDs and NCDs



# CD and NCD (cont'd)



# Stages of the demographic and epidemiological transitions

A shift in disease patterns over time – how fast do countries do it?

- ~ 150 - 100 years... - "classical" transition (Eur, OECD)
- ~ 75 - 50 years .. - accelerated trans.(Japan, S Korea)
- > 150 years .... - delayed transition (SS Africa, SAsia )
- ~ 100-75 years - reversed transition (LA; SSA)

➤ What are the driving forces in this development?

➤ Why such a difference in time?

# From an agrarian to an industrial society ...

- **Technology Development**

- Industrialisation, natural resources;

➔ *Economic growth,*

- **Socio-economic development**

- Universal access to education (boys and girls)

- Women's status; breadwinners....decision-making capacity to increase

- Employment available and small-scale companies formed

- **Environmental matters** ... sustainable development???

- **Public Health initiatives**, PHC, immunisations, antibiotics, health care services more accessible .....

# Conclusion

- The driving force behind the epidemiological/health transition is:

*Economic development = moving away from poverty + social development towards equity and equality between groups, but political action is needed... such as redistribution of resources...systems accountability...*

➔ ...the shift in disease panorama has not much to do with climate ("tropical diseases") or genes!

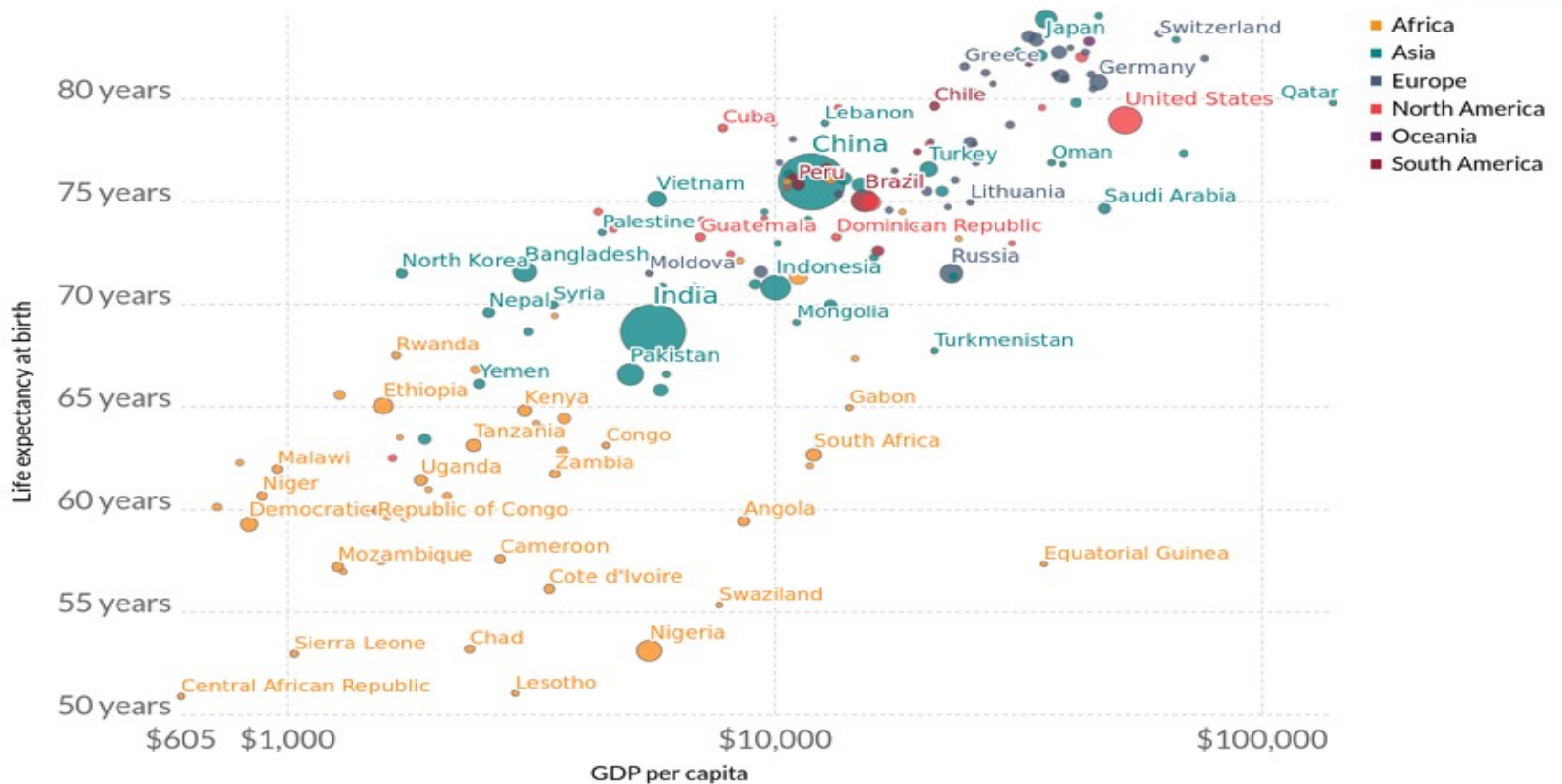
# However....

- Even though there is economic growth – there is a limit to what can be achieved in terms of health! Income per capita,
- GDP = gross domestic product, an indicator of a country's standard of living, divided on all citizens
- Some countries do worse and other do better!

# Average life expectancy and GDP/capita

Our World  
in Data

Life expectancy vs. GDP per capita, 2015



Source: Clio-Infra & UN Population Division ; Maddison Project Database (2018)

## The paradox:

Not only economic development...

- Low-middle income countries, such as Vietnam, and Cuba, face a higher average life expectancy and lower infant mortality (IMR) than the high income country Saudi Arabia...why?
- South Africa, why is it not doing better in terms of life expectancy than the much poorer central African state Rwanda?

*How can this  
be explained?*

# Summary: Political actions for better health, towards a more equal society, some key issues

- ➔ *Fairer distribution of income/resources among population groups (political commitment, equality, equity, welfare system, universal access to education, income earning possibilities ...)*
- ➔ *Industrialisation, Jobs available: Tax system*
- ➔ *Environmental issues: sustainable use of land and other resources*
- ➔ *Education also for girls: Women in paid work*
- ➔ *Preventive medicine: maternal and child health care, immunisations: healthy workforce/population*
- ➔ *Basic health care services for all: treatment of common diseases accessible*

# Section C. Public Health 1800's-1920's....

- Public Health: 1850's; England, France, Germany, USA

William Farr - founder of epidemiology/biostatistics, he recorded births and deaths and found that ill-health was unevenly distributed in cities, and less in rural areas in Great Britain

Edwin Chadwick – water, sanitation, engaged in improving living conditions for the poor, esp in London in the 1850s, “The Great Stink 1858” ...

Louis Pasteur – microbiologist in France; rabies/anthrax vaccination; pasteurization

Robert Koch – microbiologist In Germany, found TB bacillus and the cholera vibrione, Nobel Prize winner 1905 (TB)

- later established the discipline Public Health, with other scientists!

ILLUSTRATING PUBLIC HEALTH LANDMARKS....

Broad Street Pump  
London, 1854

## The four pillars of classical public health work.

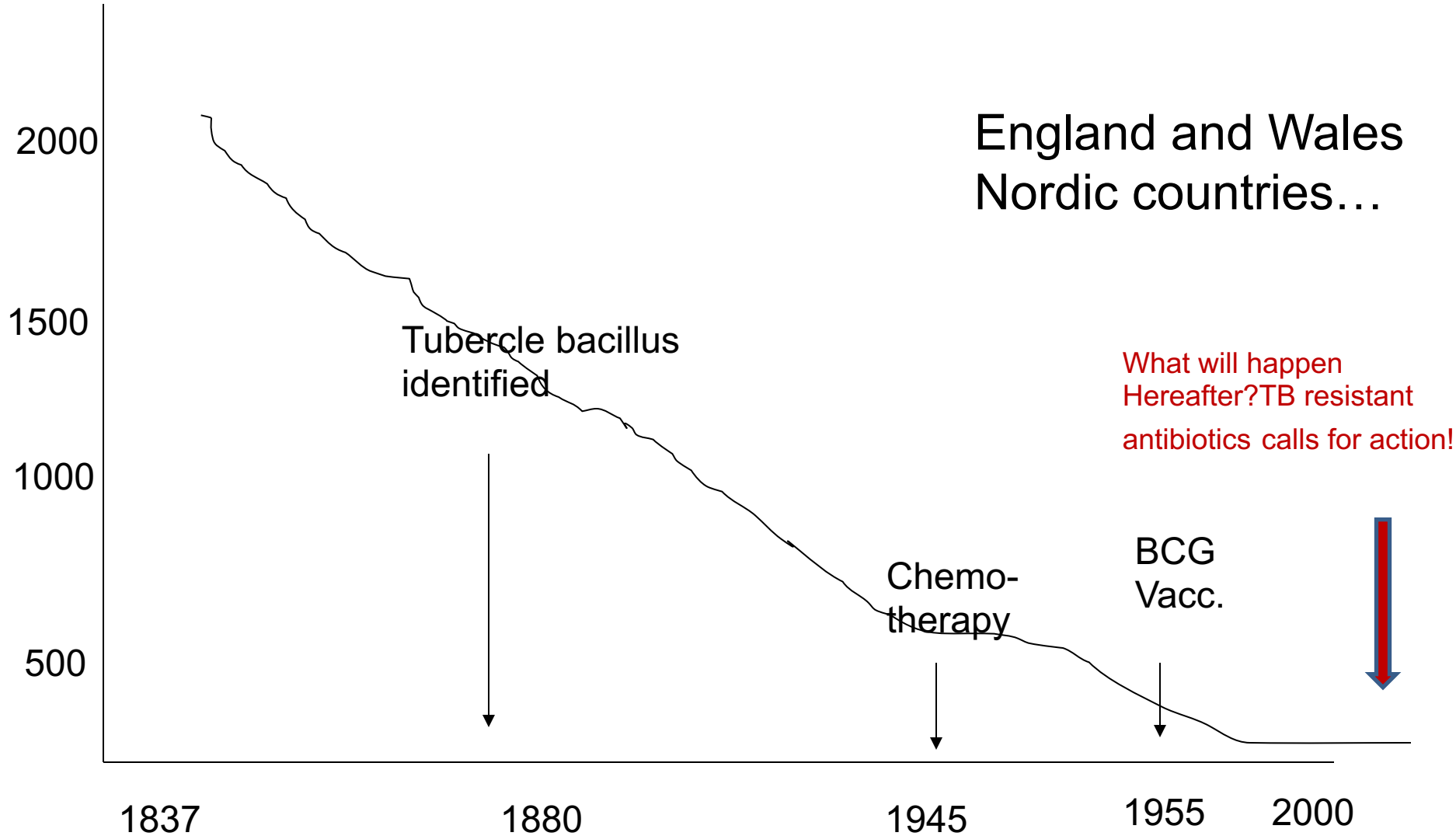
Clean water  
Sanitation  
Nutritious food  
Good housing standard

Dr. John Snow



# Tuberculosis mortality

Death rates/million inhab





**Where are we today?**

# Principles of Public Health /Global Public Health

- Focus on **population groups** rather than on individuals;
- **Prevention and promotion**– immunisation, antenatal care services, child health services; prerequisites for people to live a healthy life **with a focus on social determinants**;
- **Treatment**; i.e. how to treat common diseases in the population;
- **Multisectoral and multiprofessional** – medicine, epidemiology, biostatistics, behavioural sciences, economics, psychology, anthropology, sociology...;
- **Social justice emphasised** – social inequalities...;
- **Close collaboration with state authorities and communities** (“organised efforts of society”)

# Sustainable Development Goals, (SDGs), all have measurable targets, and almost all influence health!

1. End poverty in all its forms everywhere
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. Ensure healthy lives and promote well being for all at all ages
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5. Achieve gender equality and empower all women and girls
6. Ensure availability and sustainable management of water and sanitation for all
7. Ensure access to affordable, reliable, sustainable and modern energy for all
8. Promote sustained, inclusive and sustainable economic growth , full and productive employment and decent work for all
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10. Reduce inequality within and among countries

# SDGs cont'd

11. Make cities and human settlements inclusive, safe, resilient and sustainable
12. Ensure sustainable consumption and production patterns
13. Take urgent action to combat climate change and its impact
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice and build effective, accountable and inclusive institutions at all levels
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

# Bra bok

