

Global Infant and Child Health

Ahmet SALTIK, MD

Professor of Public Health

LLM: Health Law

BSc: Public Administration & Political Sciences



“Even if you are ambitious,
you will not be able to achieve
your ambitions because you are
psychologically totally defeated.”
– *An adolescent girl in Egypt*

***Phase 3 lecture, 2022 - 2023
academic year, spring semester
8th Febr. 2023, Ankara - TURKIYE***

Learning objectives....

At the end of this lecture, students are expected to;

- ❖ Define the concepts «Infant» and «Child» health at country and global scales.
- ❖ Explain the proportional share of infant & child health problems within entire country and global disease of burden : **QUALY** and **DALY** data if exist.
- ❖ Make orders of top 10 morbidity and mortality causes in the period of infancy and childhood depends on socio-economic level of the country and the general people.
- ❖ Learn basic health indicators of these 2 crucial consecutive periods of life and interpret the related Epidemiological indices.
- ❖ Construct motivation and responsibilities in order to fight against these problems of humanity considering root causes within the social – economic – cultural order.
- ❖ Introduce the efforts of UNICEF, WHO, UN, UNDP, UNEP and other international and national institutions on infant and child health issues and co-operate with them in the future.

Death Causes, Worldwide

- ❑ **Cardiovascular diseases** are the leading cause of death globally.
The second biggest cause are **cancers**.
- ❑ Causes of death vary significantly between countries: Non-communicable diseases dominate in rich countries, whereas **infectious diseases** remain high at lower income ones.
- ❑ *The world is making progress against infectious diseases.
As a consequence, more people are dying from non-communicable diseases.*
- ❑ Fewer people die at a young age. Almost half of all people who die are 70 years and older.
- ❑ **Leading risk factors for premature death** globally include high blood pressure, smoking, obesity, high blood sugar (DM) and **environmental risk factors** including **air pollution**.
- ❑ *There is a large difference between what people die from and which causes of death receive news coverage.*

Burden of disease

- ❑ A straightforward way to assess the health status of a population is focusing on mortality or concepts like **child mortality** or *life expectancy*, which are based on mortality estimates. A focus on mortality, however, does not take into account that the **burden of diseases** is not only that they kill people, but that they **cause suffering of people** who live with them.
- ❑ *Assessing health outcomes by both **mortality and morbidity** (the prevalent diseases) provides a more encompassing view on health outcomes.*
- ❑ The sum of mortality and morbidity is referred to as the '**burden of disease**' and can be measured by a metric called '**Disability Adjusted Life Years**' (**DALYs**). **DALYs** are measuring lost health and are a standardized metric that allow for direct comparisons of disease burdens of different diseases across countries, between different populations, and over time.
- ❑ Conceptually, one **DALY** is the equivalent of losing one year in good health because of either premature death or disease or disability. **One DALY represents one lost year of healthy life.**

For Improving Public Health

Improving Public Health is a key component of the MDGs—both directly, in the aspirations to improve

Maternal & Child Health - MCH

and to combat HIV/AIDS, and also indirectly through strategies for raising educational standards, promoting gender equality, and seeking environmental sustainability —all of which will improve the health of populations.

Because health system is sensitive almost everything!

Ref. Oxford Textbook of Public Health 6th ed. p. 1573

Major remarks on child mortality....

- ❖ *15,000 children die every day – **Child mortality** is an everyday **tragedy** of enormous scale that rarely makes the headlines.*
- ❖ ***Child mortality** rates have declined in all world regions, but the world is not on track to reach the Target 4 of **Sustainable Development Goal-SDG by 2030 for child mortality***
- ❖ *Before the Modern Revolution, child mortality was very high in all societies that we have knowledge of – a quarter of all children died in the 1st year of life, and almost half died before reaching the end of puberty.*

MDG : Millenium Developmental Goals

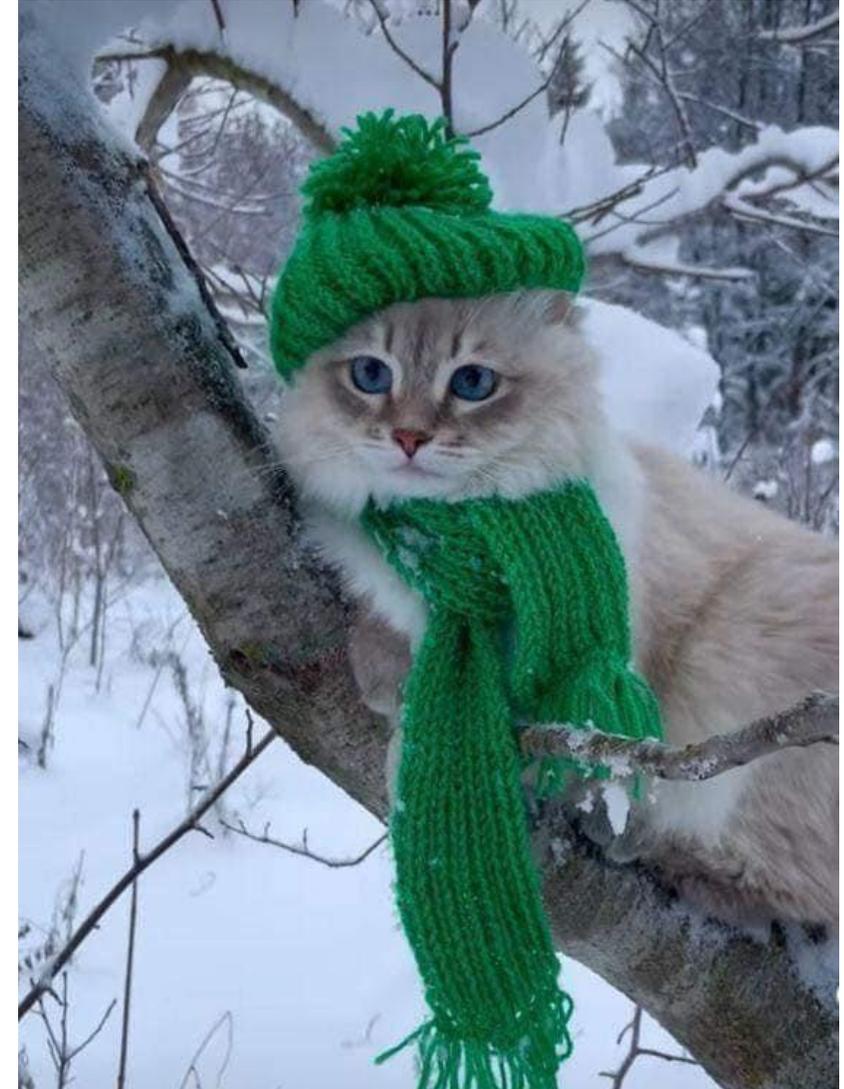


Major remarks child mortality...

- ❖ *Over the last 2 centuries all countries in the world have made very rapid progress against child mortality. From 1800 to 1950 global mortality has halved from around 43% to 22.5%.*
- ❖ *Since 1950 the mortality rate has declined five-fold to 4.5% in 2015. All countries in the World have benefitted from this progress.*
- ❖ *In the past it was very common for parents to see children die, because both, **child mortality** rates and **fertility rates** were very high. In Europe in the mid 18th century parents lost on average between 3 and 4 of their children.*

Major remarks for child mortality...

- ❖ *Based on this overview we are asking where the World is today – where are **children dying** and **what are they dying from**?*
- ❖ **5.2 million** children younger than 5 die every year – Where did these children die?
- ❖ **Pneumonia** is the most common cause of death, **preterm births and neonatal disorders** is 2nd, and **diarrheal diseases** are 3rd – What are children today dying from?



Major remarks for child mortality...

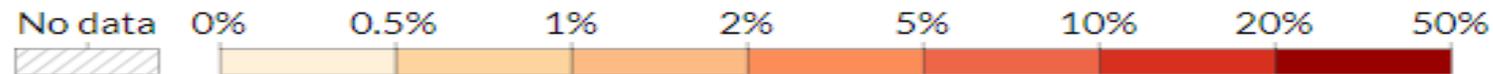
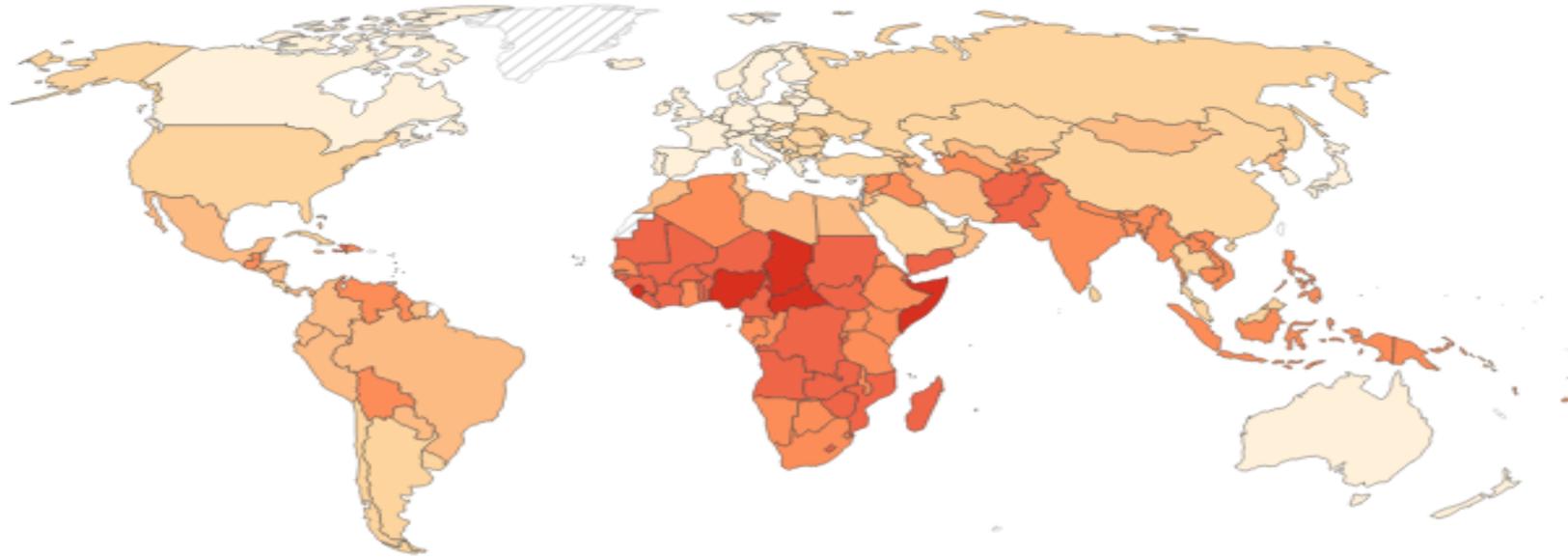
- ❖ This is the basis for answering the question what can we do to make further progress against **child mortality**?
We will extend this entry over the course of 2020s.
- ❖ Of course, the death of every child is an **enormous tragedy**, and in many countries far too many children die because of causes we know how to prevent and treat.
- ❖ As the map in the following slide shows, today the highest child mortality rates are in Sub-Saharan Africa, where we still have countries with **child mortality rates** greater than 10% (Global average 3.8%), this means that 1 out of 10 children born never reach their 5th birthday!

Child mortality rate, 2020

Our World
in Data

The share of newborns who die before reaching the age of five.

World



Source: UN Inter-agency Group for Child Mortality Estimation (via World Bank)

Note: The child mortality rate expresses the probability of a child born in a specific year or period dying before reaching the age of 5 years, if subject to age-specific mortality rates of that period. This is given as the share of live births.

OurWorldInData.org/child-mortality • CC BY



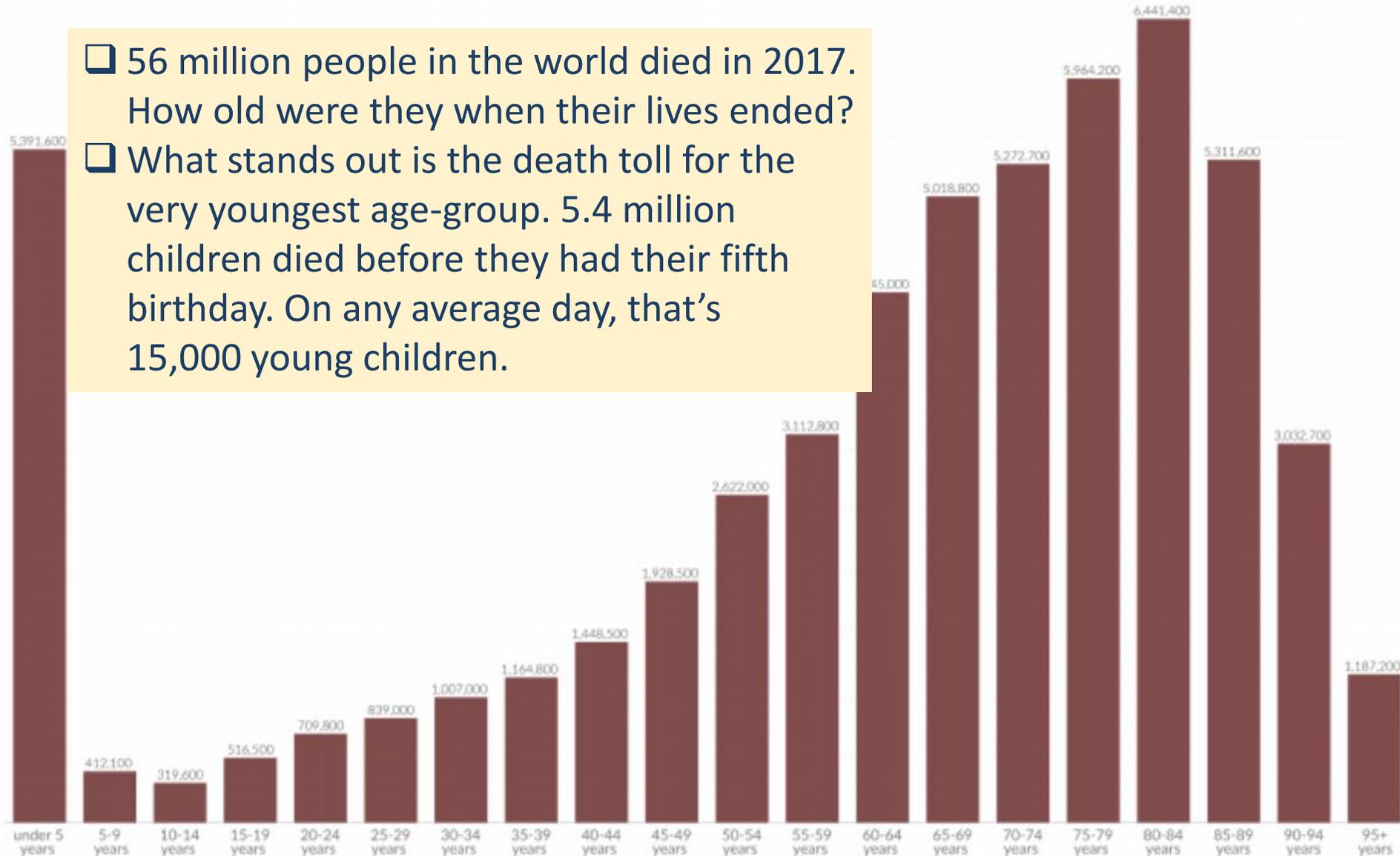
Child mortality is an everyday tragedy

- ❖ *Child mortality is an everyday tragedy of enormous scale that rarely makes the headlines.*
- ❖ 56 million people in the world died in 2017. How old were they when their lives ended?
- ❖ *The answer can be seen in the bar chart. It shows all deaths in the world by age in five-year age groups, starting with the youngest on the left towards the oldest age group (95+ years) on the right.*
- ❖ What stands out is the death toll for the very youngest age-group. 5.4 million children died before they had their 5. birthday. On any average day, that's 15,000 young children.
- ❖ *The suffering and dying of children remains immense, yet these daily tragedies continue without receiving the attention this injustice deserves. A comparison of the tragedy of child deaths with those tragedies that do receive public attention puts it in perspective.*
- ❖ **A large jumbo jet can carry up to 620 passengers.**

Deaths globally by age

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

- ❑ 56 million people in the world died in 2017. How old were they when their lives ended?
- ❑ What stands out is the death toll for the very youngest age-group. 5.4 million children died before they had their fifth birthday. On any average day, that's 15,000 young children.



Child mortality is an everyday tragedy

- ❖ Previous slide shows all deaths in the world by age in 5-year age groups, starting with the youngest on the left towards the oldest age group (95+ years) on the right.
- ❖ *The suffering and dying of children remains immense, yet these daily tragedies continue without receiving the attention this injustice deserves.*
- ❖ A comparison of the tragedy of child deaths with those tragedies that do receive public attention puts it in perspective.
- ❖ *A large jumbo jet can carry up to 620 passengers.*
- ❖ The number of child deaths is that of 24 jumbo jet crashes, with only children on board, every single day.
- ❖ *Single events -such as plane crashes- always make the headlines.*
- ❖ Daily tragedies -even the worst ones like the **deaths of thousands of children-** never make the headlines. (Ref. [Child and Infant Mortality - Our World in Data](#) 7.2.23)

Child mortality is an everyday tragedy

- ❖ Every case of a family **losing a child is a tragedy**, regardless of how common or uncommon the cause. Spectacular events that grab global attention in the media are not more important than everyday human suffering. But unfortunately this is not how our minds and our media work. What we focus our attention on are either the spectacular tragedies (*natural disasters, terrorist attacks, crime*) or new problems (*fake news, risks from automation*).
- ❖ The first category keeps the breaking news cycle running, the 2nd category keeps the op-ed writers (Columnists) employed. But in many aspects the biggest threats to our lives are the same threats that all the generations that came before us have faced. And this seems unfortunately to be true for **what kills children around the world**; it's neither new nor spectacular. *(Ref. [Child and Infant Mortality - Our World in Data](#) 7.2.23)*
- ❖ *A newspaper that would cover the most important facts about the last 24 hours would cover the **15,000 child deaths every day** on its cover page?*

Child mortality: Achieving the global goal for 2030 would be a huge achievement but we are currently far away

- ❑ [Goal 3.2](#) is to reduce the to at least as low as 2.5% in all countries by 2030.
- ❑ *This would mean that more than 97.5% of all newborns would survive the 1st 5 years of their life no matter where they are born.*
- ❑ We are currently far away from the goal for 2030.
- ❑ *Globally 3.8% (38‰) of all children die before reaching the age of five, which means that on average 15,000 children die every day.*
- ❑ And the visualization shows that while the child mortality rate declined around the world there are still many countries in which the mortality rate is higher than 2.5% (25 per thousand).

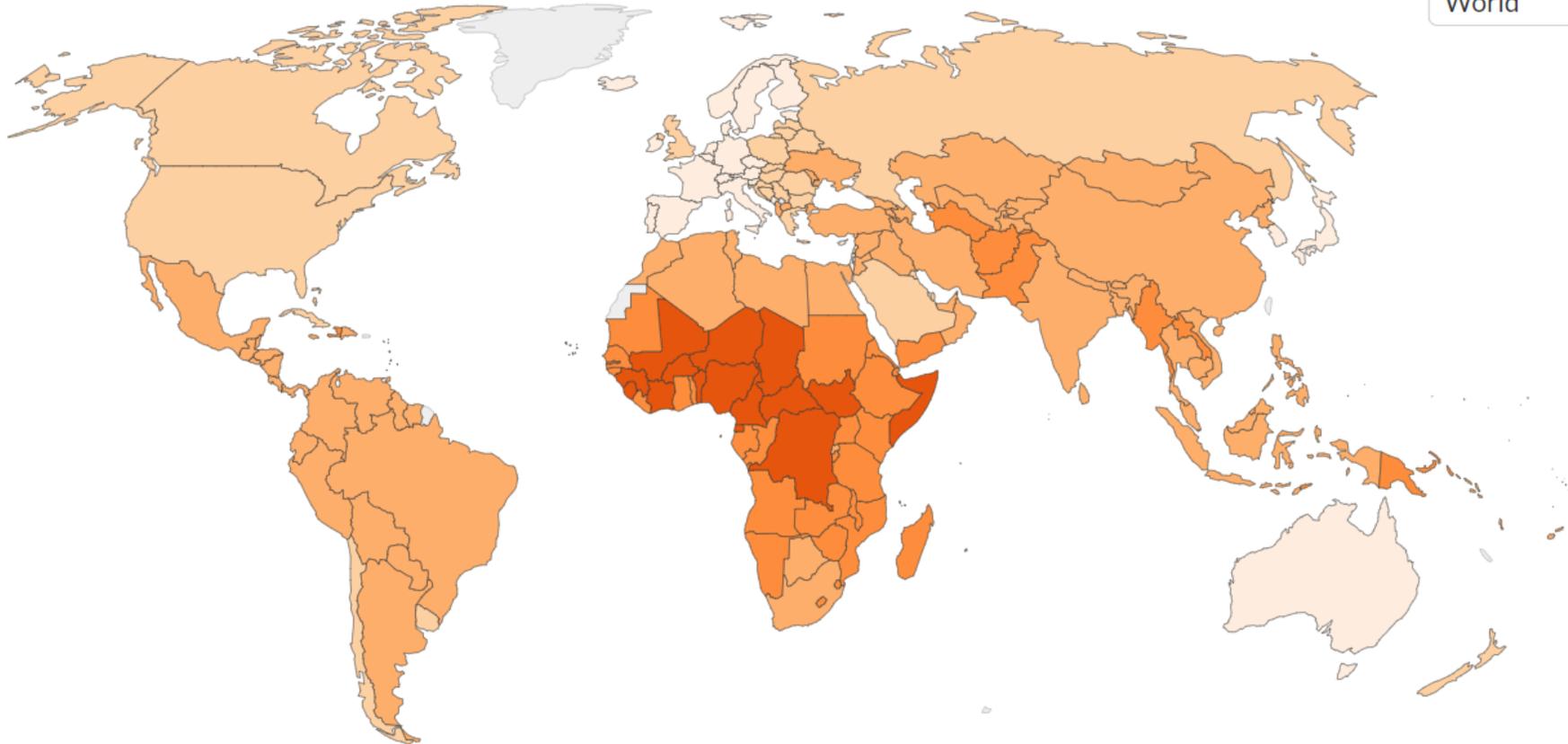
How likely is it that the world reaches SDG 3.2?

- ❑ The visualization shows five scenarios for the 15-year period of the SDG era to answer this question.
- ❑ **Stagnation in child health** would mean 100 million child deaths in the SDG era. The number of births in the world is expected to stagnate between 2015-30 at around 140 million births per year. If we assume the global **child mortality rate** to remain at the level it was at the beginning of the SDG era (4.5%) then we would live in a world with 6.3 million child deaths every year **100 million child deaths** until 2030.
- ❑ **Stagnation**, however, is not what global health researchers expect. Based on past trends and levels in 2015 the UN Population Division made projections for the number of births and the mortality rate of children in all countries of the world.
- ❑ According to these projections the number of child deaths will be almost 2 million lower in 2030 than in a stagnating world: 4.5 million child deaths. This improvement of child health would still mean terrible suffering: **86 million child deaths in the SDG era**.

Youth mortality rate, 2017

Youth mortality is the share of newborns who die before reaching the age of 15.

World 



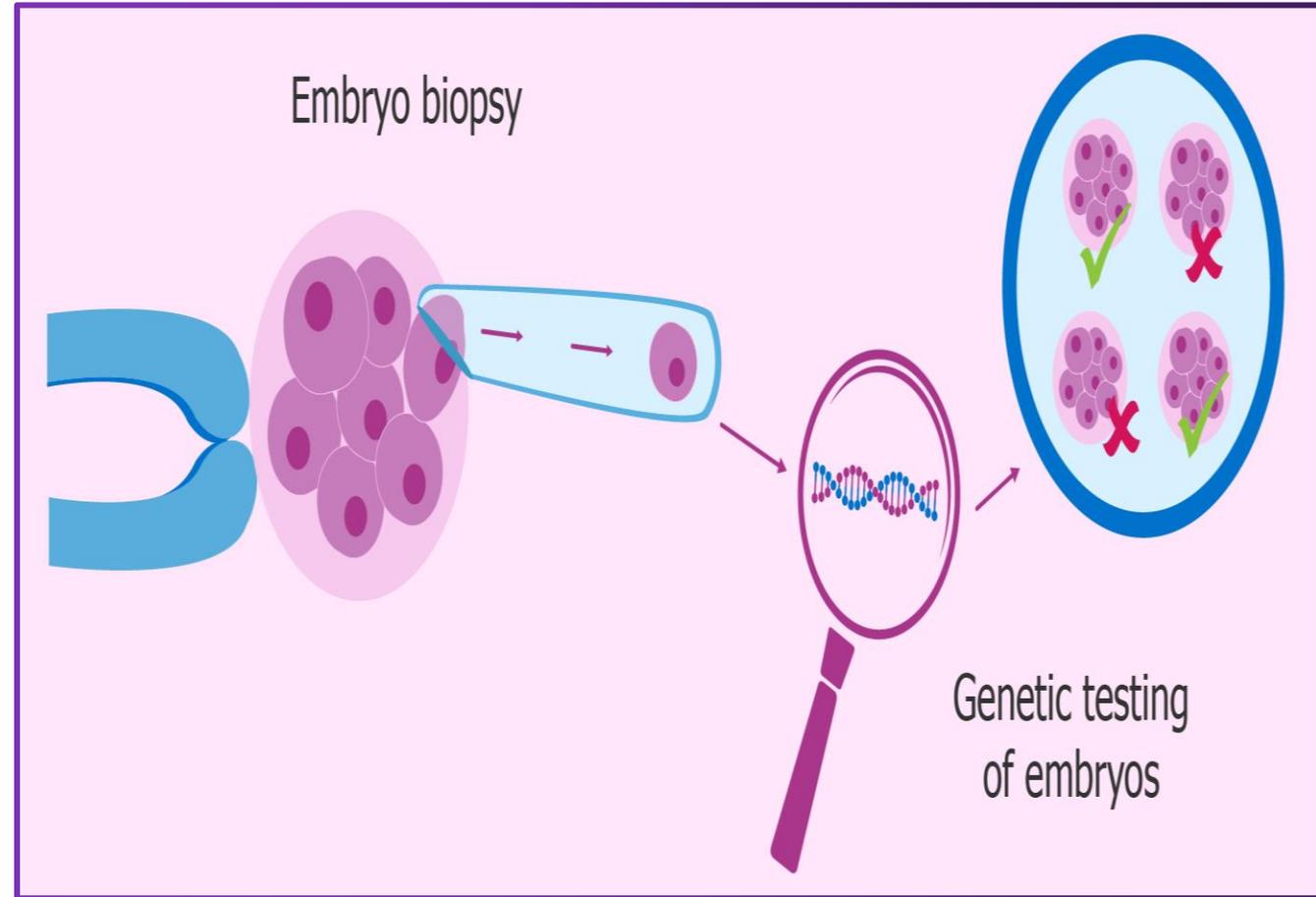
Source: United Nations Inter-agency Group for Child Mortality Estimation (2018)

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Pre-implantation Genetic Testing

Preimplantation genetic testing (PGT) is now well established as a valuable treatment option for patients wishing to start or continue a family, for a range of indications from advanced maternal age to high risk of transmitting inherited disease. *This text brings together contemporary thinking from international opinion leaders and will be an invaluable guide for practitioners in Reproductive Medicine wishing to keep pace with the latest developments and clinical data.*



<https://www.taylorfrancis.com/books/edit/10.1201/9780429445972/preimplantation-genetic-testing-darren-griffin-gary-harton>

Screening methods are available during pregnancy

The following screening methods are available during pregnancy:

- Alpha-fetoprotein (AFP) test or multiple marker test**
- Amniocentesis***
- Chorionic villus sampling (CVS)**
- Cell-free fetal DNA testing***
- Percutaneous umbilical blood sampling**
(withdrawing a small sample of the fetal blood from the umbilical cord)
- Ultrasound scan (USG)***



ref. <https://www.hopkinsmedicine.org/health/wellness-and-prevention/common-tests-during-pregnancy>

Screening methods are available during pregnancy

Genetic Screening : Cystic fibrosis, Duchenne muscular dystrophy, Hemophilia A, Polycystic kidney disease, Sickle cell disease, Tay-Sachs disease, Thalassaemia

First Trimester

Second Trimester

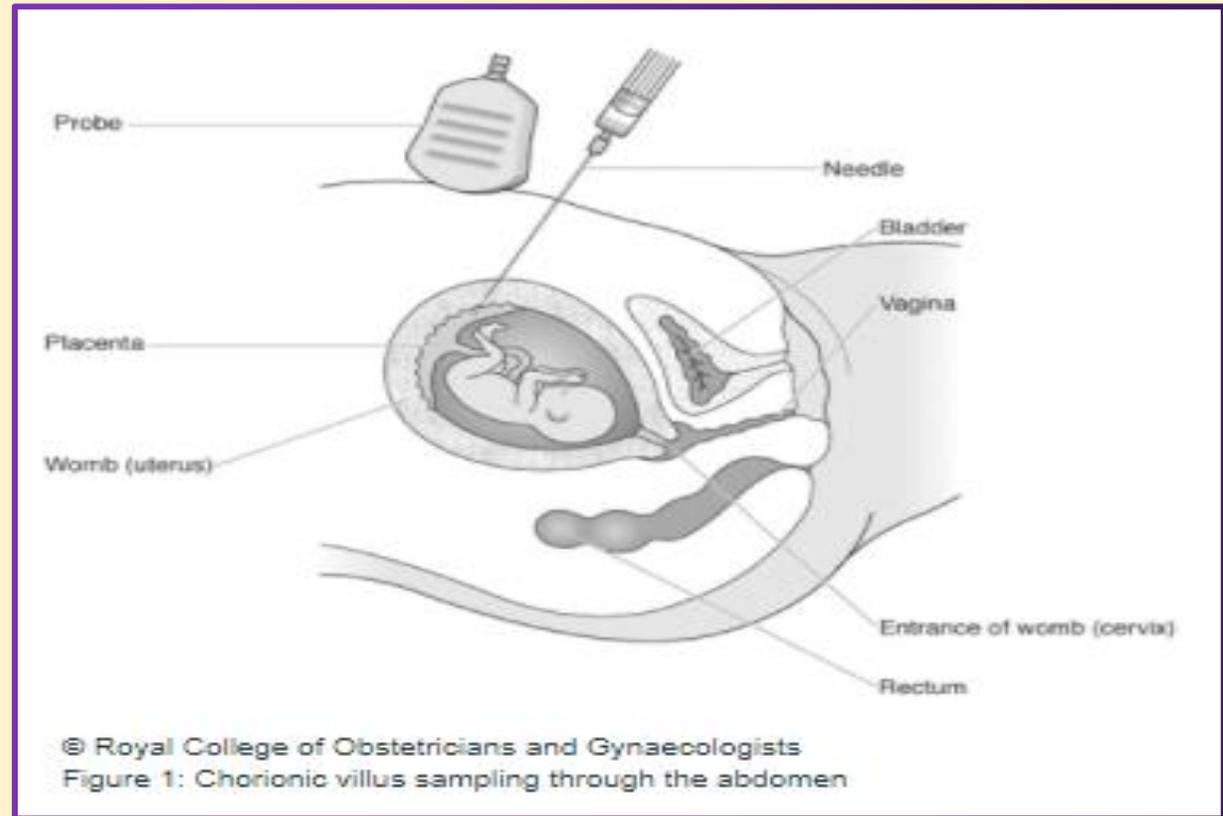
Ultrasound (USG)

Amniocentesis

Chorionic Villus Sampling (CVS)

Fetal Monitoring

Glucose (fetal blood)



ref. <https://www.hopkinsmedicine.org/health/wellness-and-prevention/common-tests-during-pregnancy>

1st trimester screening includes:

Ultrasound for fetal nuchal translucency. Nuchal translucency screening uses an ultrasound to examine the area at the back of the fetal neck for increased fluid or thickening.

Ultrasound for fetal nasal bone determination. The nasal bone may not be visualized in some babies with certain chromosome abnormalities, such as Down syndrome. This screen is performed using an ultrasound between 11 and 13 weeks gestation.

Maternal serum (blood) tests. These blood tests measure two substances found in the blood of all pregnant women:

Pregnancy-associated plasma protein A. A protein produced by the placenta in early pregnancy. Abnormal levels are associated with an increased risk of chromosomal abnormality.

Human chorionic gonadotropin. A hormone produced by the placenta in early pregnancy. Abnormal levels are associated with an increased risk of chromosomal abnormality.

ref. <https://www.hopkinsmedicine.org/health/wellness-and-prevention/common-tests-during-pregnancy>

2nd trimester screening includes :

.. several blood tests called **multiple markers**. These markers provide information about your potential risk of having a baby with certain genetic conditions or birth defects. Screening is usually done by taking a sample of your blood between 15 and 20 weeks of pregnancy (16 to 18 weeks is ideal). The **multiple markers** include:

AFP screening. Also called maternal serum AFP, this blood test measures the level of AFP in blood during pregnancy. AFP is a protein normally produced by the fetal liver that is present in the fluid surrounding the fetus (amniotic fluid).

It crosses the placenta and enters your blood. **Abnormal levels of AFP may indicate:**

A miscalculated due date, as the levels vary throughout pregnancy

Defects in the abdominal wall of the fetus / Down syndrome or other chromosomal abnormalities

Open neural tube defects, such as spina bifida / Twins (more than one fetus is producing the protein)

Estriol. This is a hormone produced by the placenta.

It can be measured in maternal blood or urine to be used to determine fetal health.

Inhibin. This is a hormone produced by the placenta.

Human chorionic gonadotropin. This is also a hormone produced by the placenta.

ref. <https://www.hopkinsmedicine.org/health/wellness-and-prevention/common-tests-during-pregnancy>

Health policy indicators

- Proportion of the budget (NGP) spent on...

Health services—

RCH, RNTCP, ICDS, Pulse polio

Health related services—



The infant mortality rate is the number of deaths under one year of age occurring among the live births in a given geographical area during a given year, per 1,000 live births occurring among the population of the given geographical area during the same year.

Specific Death Rates

- For example: infant mortality

$$\text{Infant mortality rate} = \frac{\text{Number of child deaths less than 1 year old in one year}}{\text{Number of live births in the same year}} \times 1,000$$

$$\text{Infant death rates under one year} = \frac{\text{Number of child deaths less than 1 year old in one year}}{\text{Total population}} \times 100,000$$

Under-five mortality rates

The **under-five mortality rate** is the probability (expressed as a **rate** per 1,000 live births) of a child born in a specified year dying before reaching the age of five if subject to current age-specific **mortality rates**.

Under 5 proportional mortality rate is the proportion of under 5 mortality to total deaths. And **this rate is most precious indicator.**

4. Proportional Mortality Ratio

(a) *Proportional mortality from a specific disease*

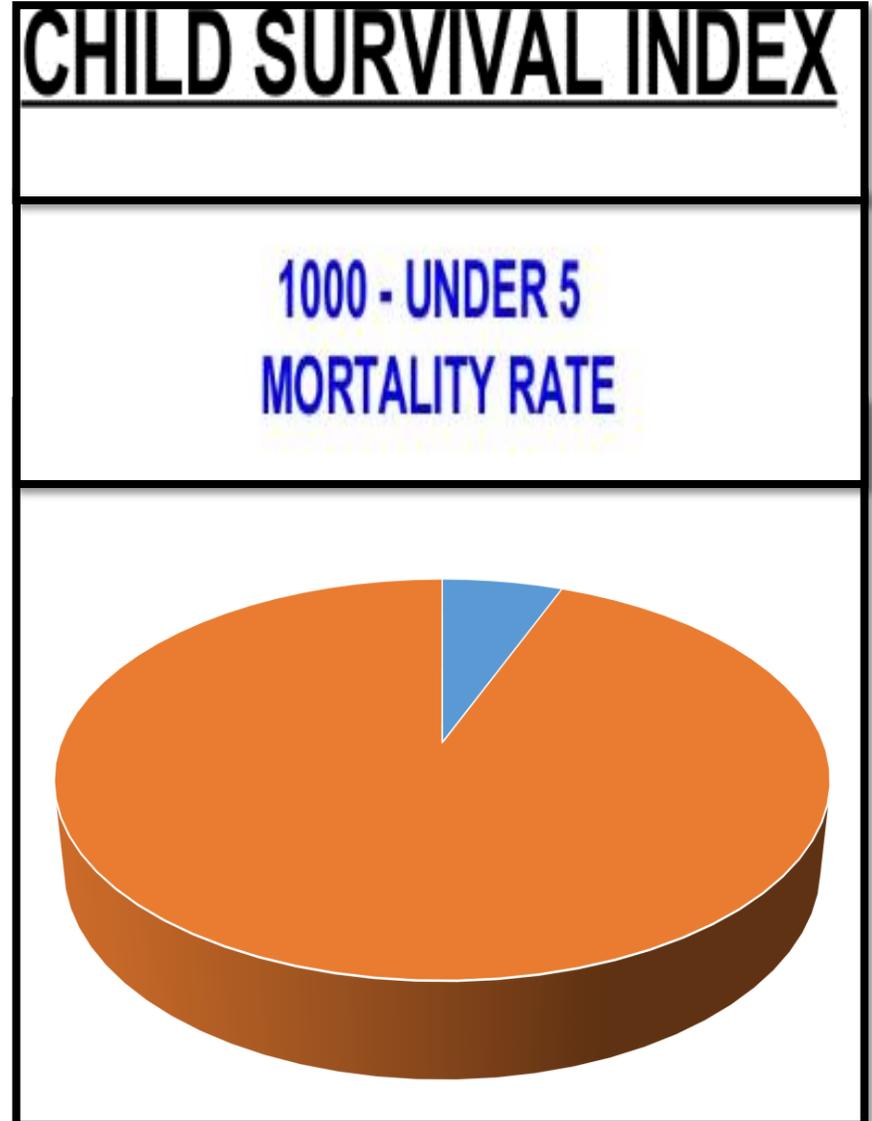
$$= \frac{\text{Number of deaths from the specific disease in a year}}{\text{Total deaths from all causes in that year}} \times 100$$

- E.g. PMR at age 50 & above
No. of deaths of persons aged 50 years and above
PMR = $\frac{\text{No. of deaths of persons aged 50 years and above}}{\text{Total deaths of all age groups in that year}} \times 100$
- E.g. Under- 5 proportionate mortality rate
No. of deaths of under 5 years of age in the given year
PMR = $\frac{\text{No. of deaths of under 5 years of age in the given year}}{\text{Total no deaths of during the same period}} \times 100$

Under-five mortality rates

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**Only 1 child
for 1 family :
Urgent
obligation of
our Planet!**

The State of the World's Children 2021

On My Mind: Promoting, protecting and caring for children's mental health.



unicef 
for every child

Prospects for Children in 2022: A Global Outlook

As we enter a 3rd year of the pandemic, what can be done to improve children's fortunes?



Children and young people express greater optimism for the future and 2022 will present opportunities to prove them right.

For instance, technology and infrastructure developed for the pandemic can drive the next **revolution in child survival**.

Universal health coverage (UHC)

WHO uses 16 essential health services in 4 categories as indicators of the level and equity of coverage in countries:

Reproductive, maternal, newborn and child health:

- **family planning**
- antenatal and delivery care
- full child immunization
- health-seeking behaviour for pneumonia.

[http://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](http://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)),
01.09.2018

<https://www.youtube.com/watch?v=RFu1aFtuboA>

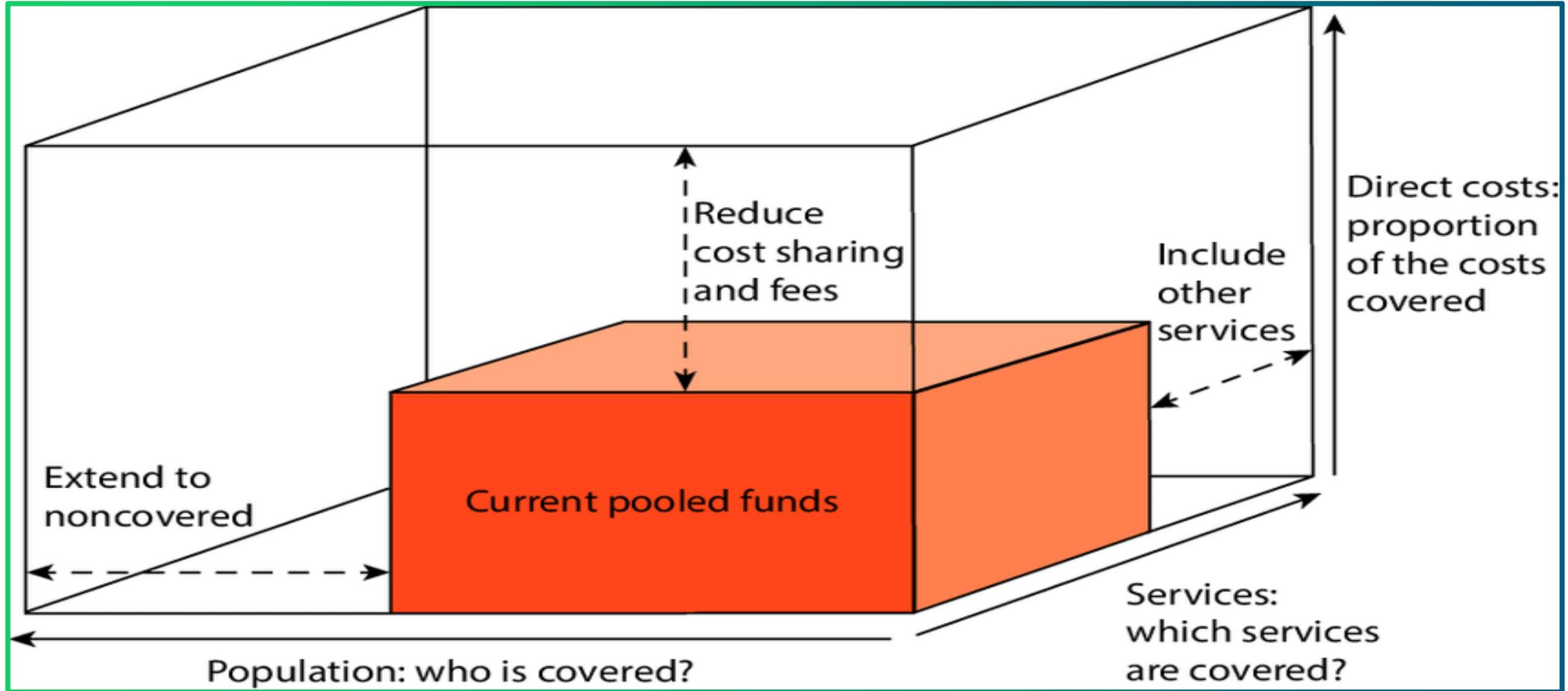


The State of the World's Children 2021

On My Mind: Promoting, protecting and caring for children's mental health

- The **COVID-19 pandemic** has raised concerns about the mental health of a generation of children. But the pandemic may represent the tip of a **mental health iceberg**, an iceberg we have *ignored for far too long*.
- ***The State of the World's Children 2021*** examines child, adolescent and caregiver mental health. It focuses on risks and protective factors at critical moments in the life course and delves into the **social determinants** that shape mental health and well-being.
- It calls for **commitment, communication** and **action** as part of a comprehensive approach to promote good mental health for every child, protect vulnerable children and care for children facing the greatest challenges.

Universal health coverage (UHC)



Keep in mind : *The reduction in child mortality, the improvement in maternal health*

Reduction in the burden of environmental diseases may help the eradication of **extreme poverty** and **hunger**, the achievement of *universal primary education, the promotion of gender equality and women's empowerment, the reduction in **child mortality**, the improvement in **maternal health***, the maintenance of environmental sustainability, and the control of epidemics including AIDS/HIV, malaria, tuberculosis, and other infectious diseases.

Global partnerships need to be strengthened to achieve interrelated goals of health, environmental sustainability, and development.

Ref. Oxford Textbook of Public Health 6th ed. p. 156

Keep in mind : *Quick Reminders...*

In this lecture we reviewed an overview of the mortality of infants and children. In demography, **U5M & U5PM** refers to the death of children under age of five while **IMR** refers to the death of those under the age of 1 (infant mortality).

This is the basis for answering the question:

What can we do to make further progress against child mortality?

Malaria – most malaria victims are children and it is one of the main causes of death of children.

Maternal mortality – How many mothers die when giving birth to children?

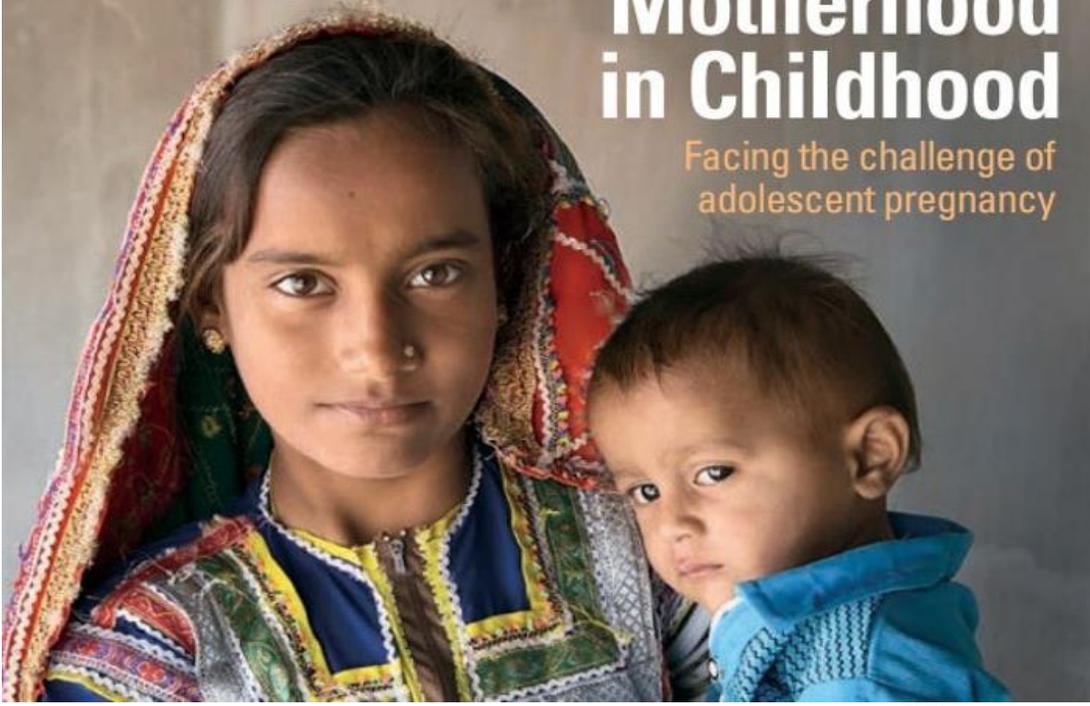
Life expectancy – What is the impact of child mortality for life expectancy?

And how is mortality at later stages of life changing?

Fertility rate – How many children are born?

Motherhood in Childhood

Facing the challenge of
adolescent pregnancy



*Thanks for
cooperation..*



**Any QUESTIONS?
or COMMENTS??**

f o r

*Thank you
for joining..*



Ahmet SALTIK
*Professor of Public Health
MD, LLM, BSc*

Slides available at :
www.ahmetsaltik.net

profsaltik@gmail.com