Health Indicators

(ch.2, 3)

Dr. Afnan Younis, MPH, SBCM

Assistant Professor, Community Medicine

ayounis@ksu.edu.sa

Afnan.younis@gmail.com

Is it a health problem in Saudi Arabia?

- Diabetes
- Breast cancer
- Teenage pregnancy
- Thalassemia

At the end of the lecture students should be able to:

- Explain the need to use “indicators” to measure “health” status
- State the characteristics of health indicators
- List the uses of health indicators
- State with examples the types of health indicators

What is health indicator?

- Is an **indication** of a given situation.
- Variables that help to measure change.
- When change cannot be measured directly.

Uses of Health Indicators

1. Measure health status in a community.
2. Compare health status between countries or over time.
3. Assessment of health care needs.
4. Allocation of resources according to needs.
5. Monitoring and evaluation of health services.

Characteristics of a good indicator:

- Valid
- Reliable
- Sensitive
- Specific
- Relevant
- Feasible

Types of Health Indicators

1. Mortality indicators
2. Morbidity indicators
3. Disability indicators
4. Nutritional status indicators
5. Health care delivery indicators
6. Utilization rates

Types of Health Indicators

7. Social and mental health indicators
8. Environmental indicators
9. Socioeconomic indicators
10. Health policy indicators
11. Indicators of quality of life
12. Other indicators

Morbidity rates

1. Incidence
2. Prevalence

Incidence

- It measures the new cases.

- Incidence rate =

$$\frac{\text{No. of new cases in the population during a specific period of time}}{\text{Population at risk in the population during same period of time}} \times 10^n$$

Example

- In 1426 the number of colon cancer cases reported to the cancer registry in Riyadh region was 200. The midyear population of Riyadh region was four million.

  Calculate the incidence of colon cancer in Riyadh.

- Incidence rate =

$$\frac{\text{No. of new cases in the population during a specific period of time}}{\text{Population at risk in the population during same period of time}} \times 10^n$$

= 200/4,000,000 X 1000

= 0.05 /1000 population

Attack rate

- Acute **recurrent** diseases e.g. ARTI, food poisoning.

$$\text{AR} = \frac{\text{No. of episodes during specified period}}{\text{Population at risk during same}} \times 10^{n}$$

Secondary attack rate

Prevalence

- Point prevalence:

$$\frac{\text{Total cases (old + new) at fixed point of time in place}}{\text{total population at risk in the same place and time}} \times 10^{n}$$

example

- MOH conducted a survey for RVF among workers in slaughterhouses in Makkah. 224 seropositive workers were identified among 6000 workers.

- Calculate the prevalence of RVF.

- MOH conducted a survey for RVF among workers in slaughterhouses in Makkah. 224 seropositive workers were identified among 6000 workers.
- **Calculate the prevalence of RVF.**

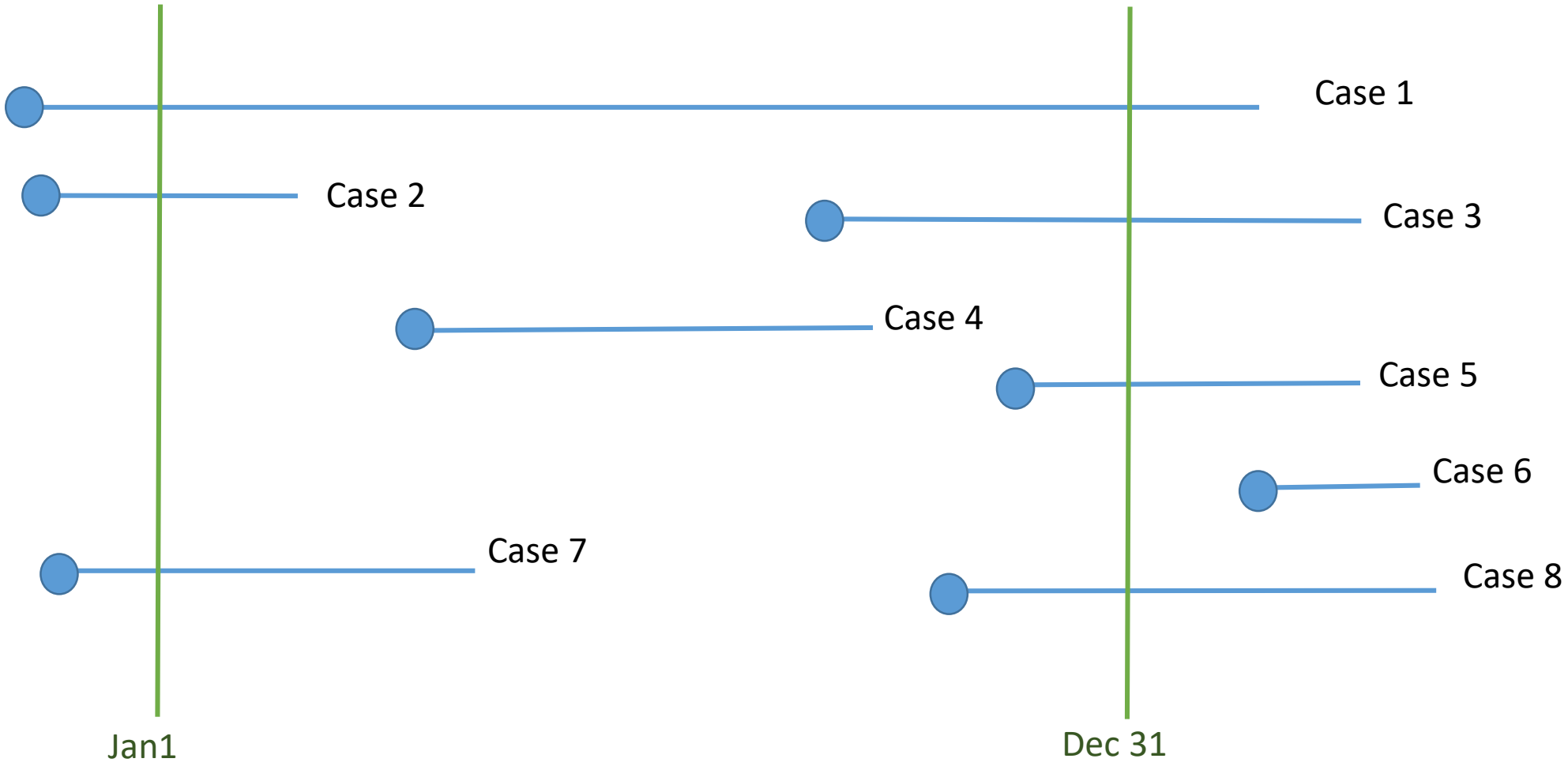
$$\text{Prevalence} = \frac{\text{Total cases (old + new) at fixed point of time in place}}{\text{total population at risk in the same place and time}} \times 10^{n}$$

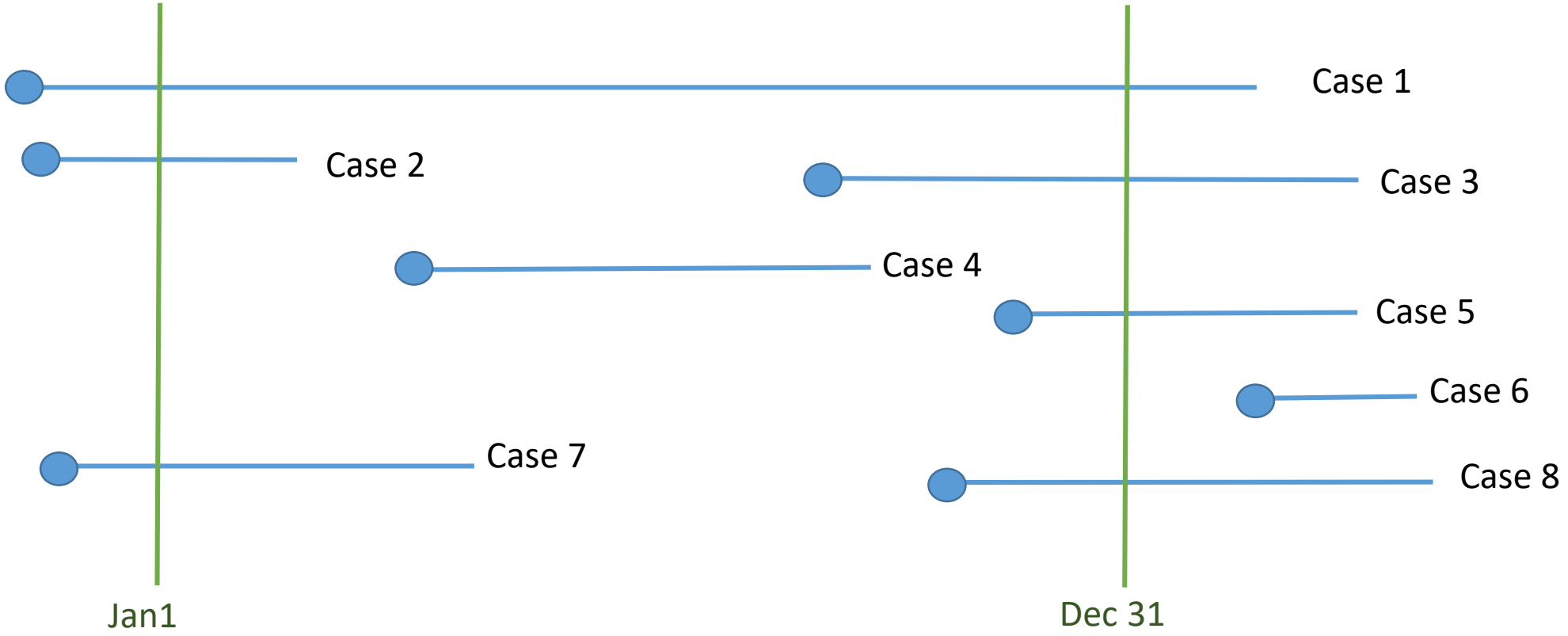
=224 / 6,000 X 1,000 = 37 per 1,000

- Period prevalence

$$\frac{\text{No. of existing cases (old+new) of a specified disease during a given period of time interval}}{\text{Estimated mid-interval population at risk}} \times 100$$

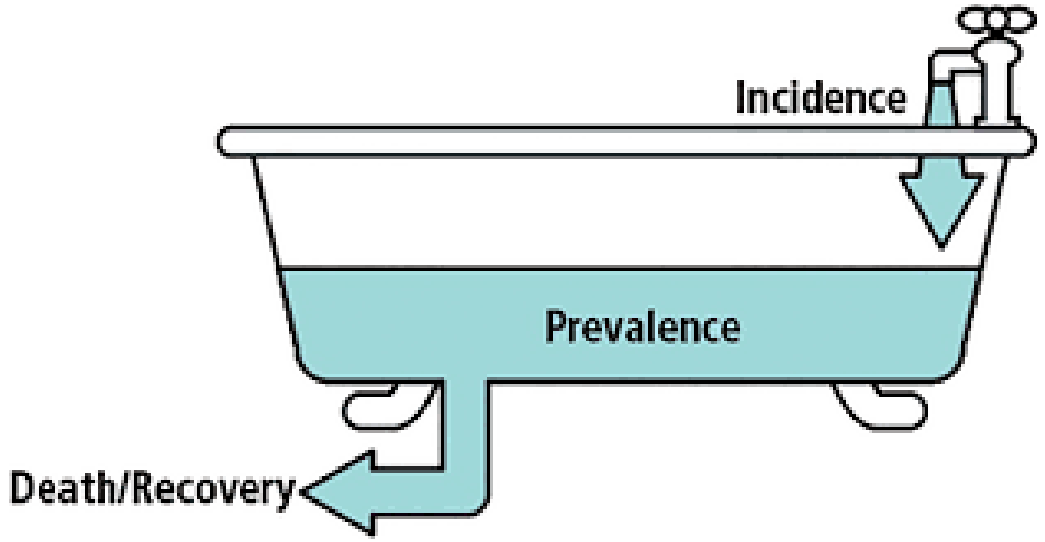
Incidence, point prevalence and period prevalence





- Incidence: 3, 4, 5, 8
- Point prevalence dec 31: 1, 3, 5, 8
- Point prevalence jan1: 1, 2, 7
- Period prevalence: 1, 2, 3, 4, 5, 7, 8

Incidence vs. prevalence



Incidence: causality

Prevalence: magnitude of health problem

Mortality rates

Mortality Rates

$$\text{Death rate} = \frac{\text{No. of deaths in one year}}{\text{Mid-year population}} \times 1000$$

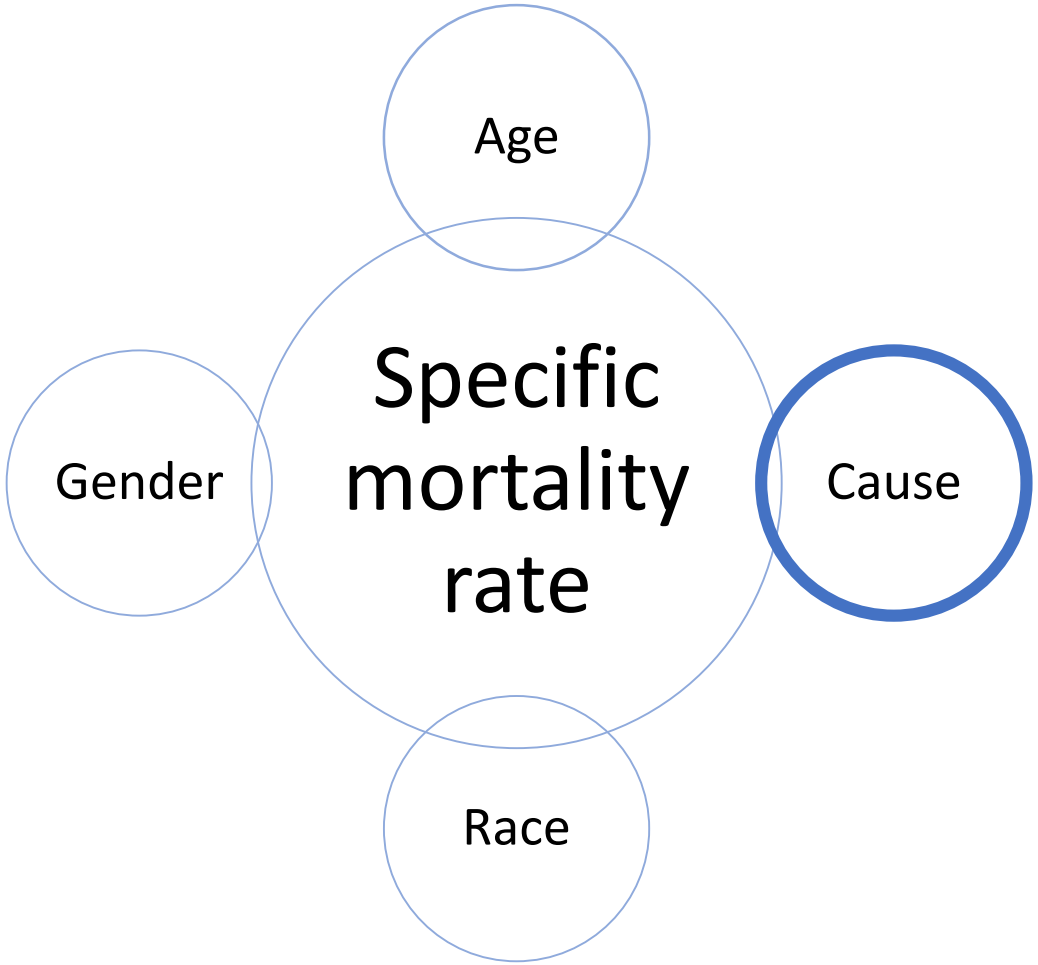
Mortality rates

- Crude death rates
- Specific death rates
- Standardized death rates

Crude Death Rate (CDR)

$$Crude\ Death\ Rate = \frac{Total\ number\ of\ deaths\ in\ a\ certain\ year\ and\ locality}{Estimated\ mid-year\ population\ (Same\ year\ and\ locality)} X\ 1000$$

Specific mortality rate

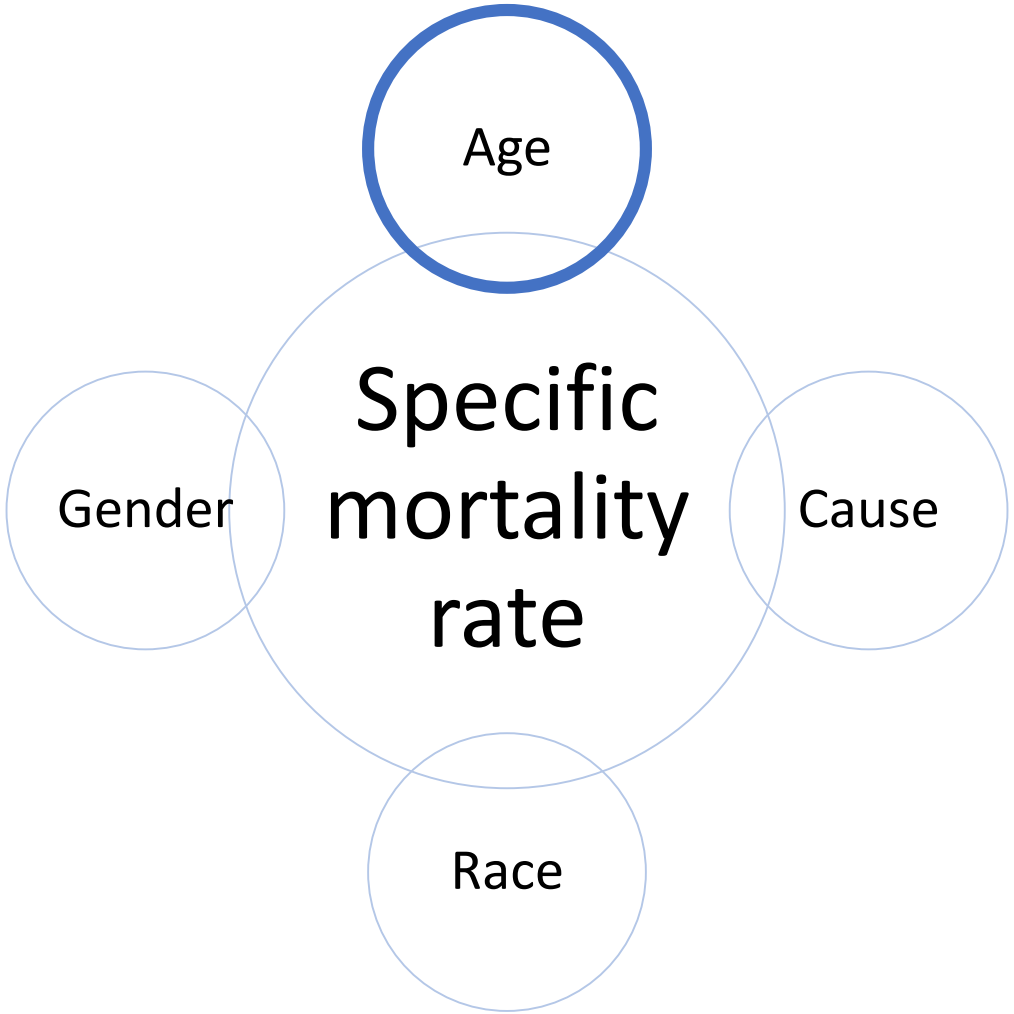


Cause-specific mortality rate

$$= \frac{\textit{Deaths of a specific cause in a given year and locality}}{\textit{Estimated mid-year population in same year and locality}} \textit{ X } 100{,}000$$

Example

$$\text{Specific death rate due to tuberculosis} = \frac{\text{No. of deaths of TB in a certain year and locality}}{\text{Estimated mid-year population in same year and locality}} \times 100{,}000$$


Age
Specific mortality rate
Gender
Cause
Race

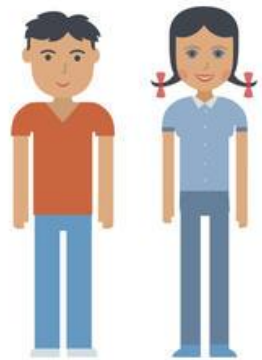
Age-specific mortality rates

$$\text{Age specific death rate} = \frac{\text{Number of persons dying in a certain age and a certain year and area}}{\text{Total number in the same age group in the same year and same area}} x1000$$

- Examples: neonatal, post-neonatal, infant and under 5-years mortality rates.

AGE INFOGRAPHIC

5 -10



15 - 20

25 - 30

35 - 40

45 - 50

60 - 70

Adult mortality rate (per 1000 population)

- Adulthood: between 15- 60 years of age

$$\text{Adult mortality rate} = \frac{\text{Number of persons dying between 15 - 60 in a certain year and area}}{\text{Total number of population between 15 - 60 in the same year and same area}} x1000$$

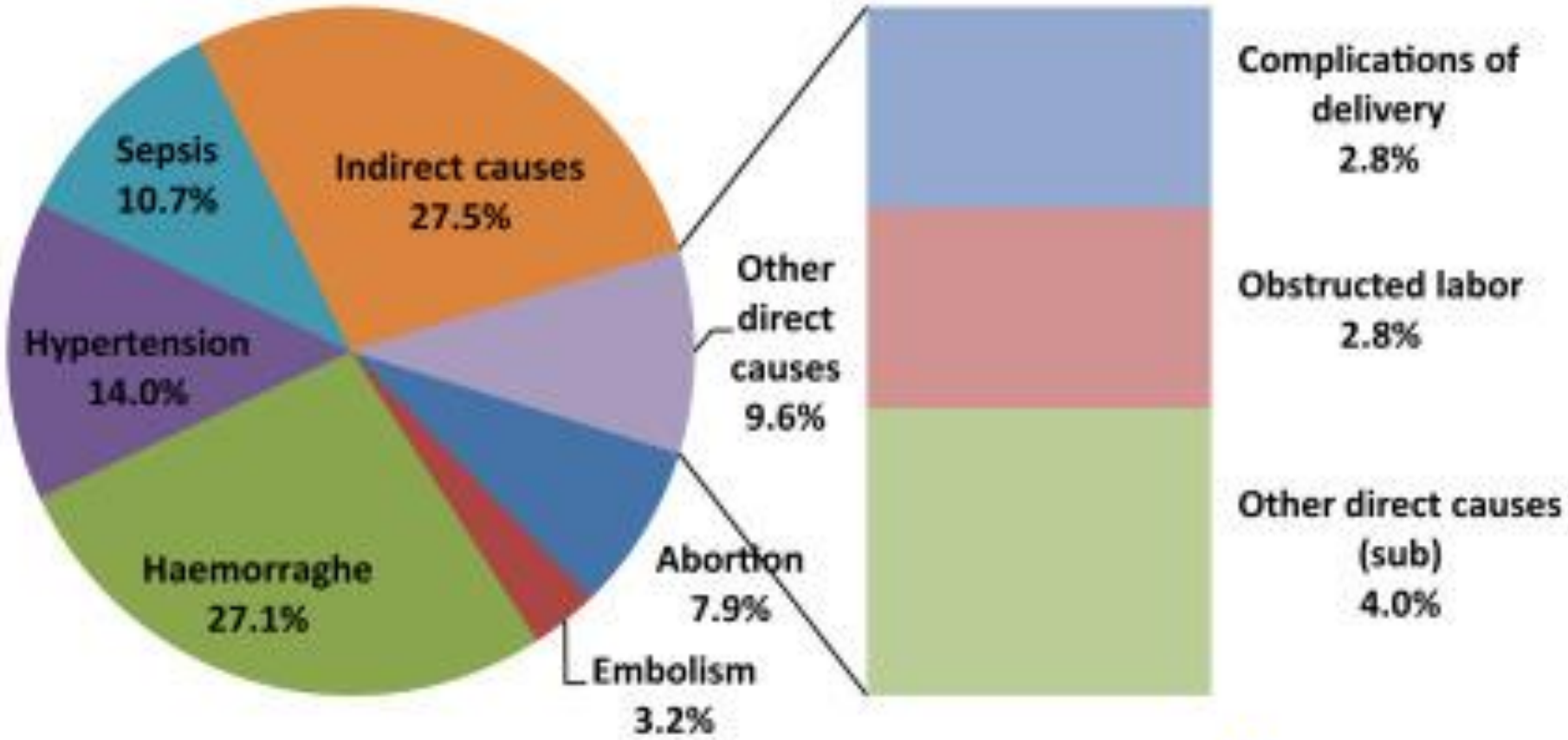
Mortality rates related to maternal and child health:

Maternal mortality ratio (MMR) (per 100 000 live births)

The number of maternal deaths per 100 000 live births during a specified time period, usually 1 year.

Maternal death is the death of a woman while pregnant or within 42 days after termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

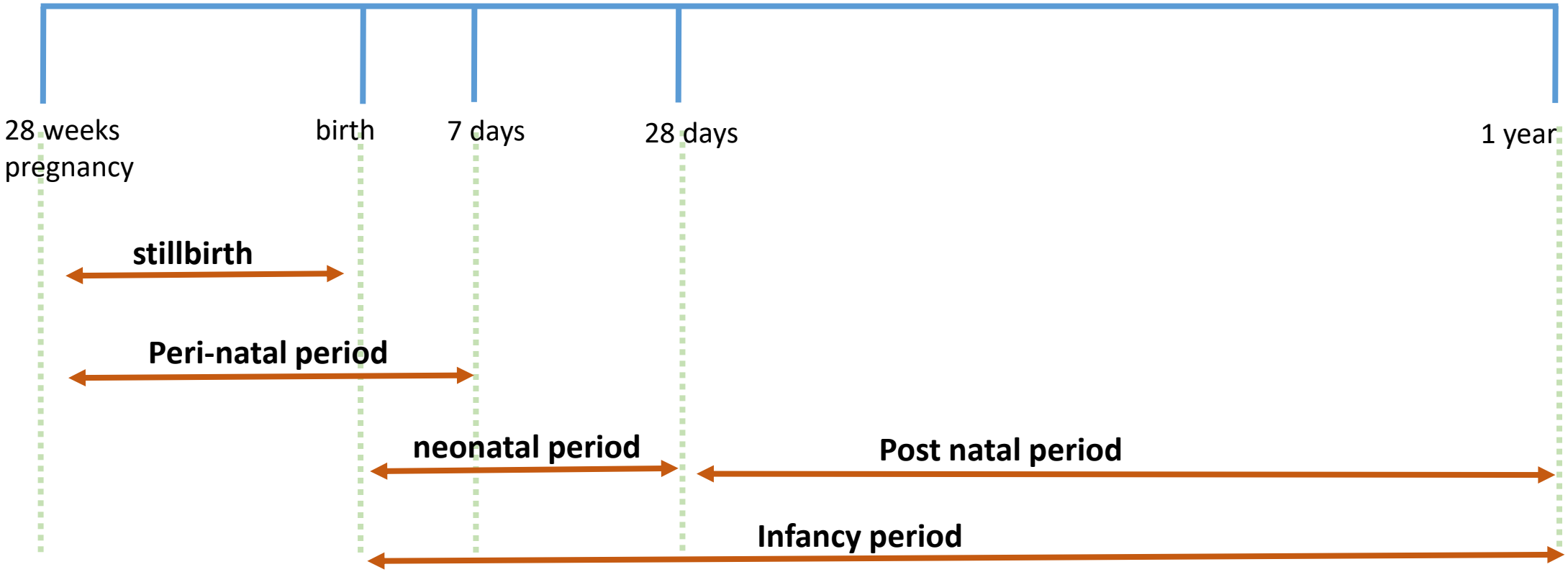
Causes of maternal deaths (%) including direct causes



Reference: Global causes of maternal death: a WHO systematic analysis, Say et al. Lancet 2014 (13)

$$\text{Maternal mortality ratio} = \frac{\text{Number of Maternal deaths asigned to causes related to pregnancy in a given year and locality}}{\text{Number of live births in the same year and locality}} \times 100{,}000$$

Period of Infancy

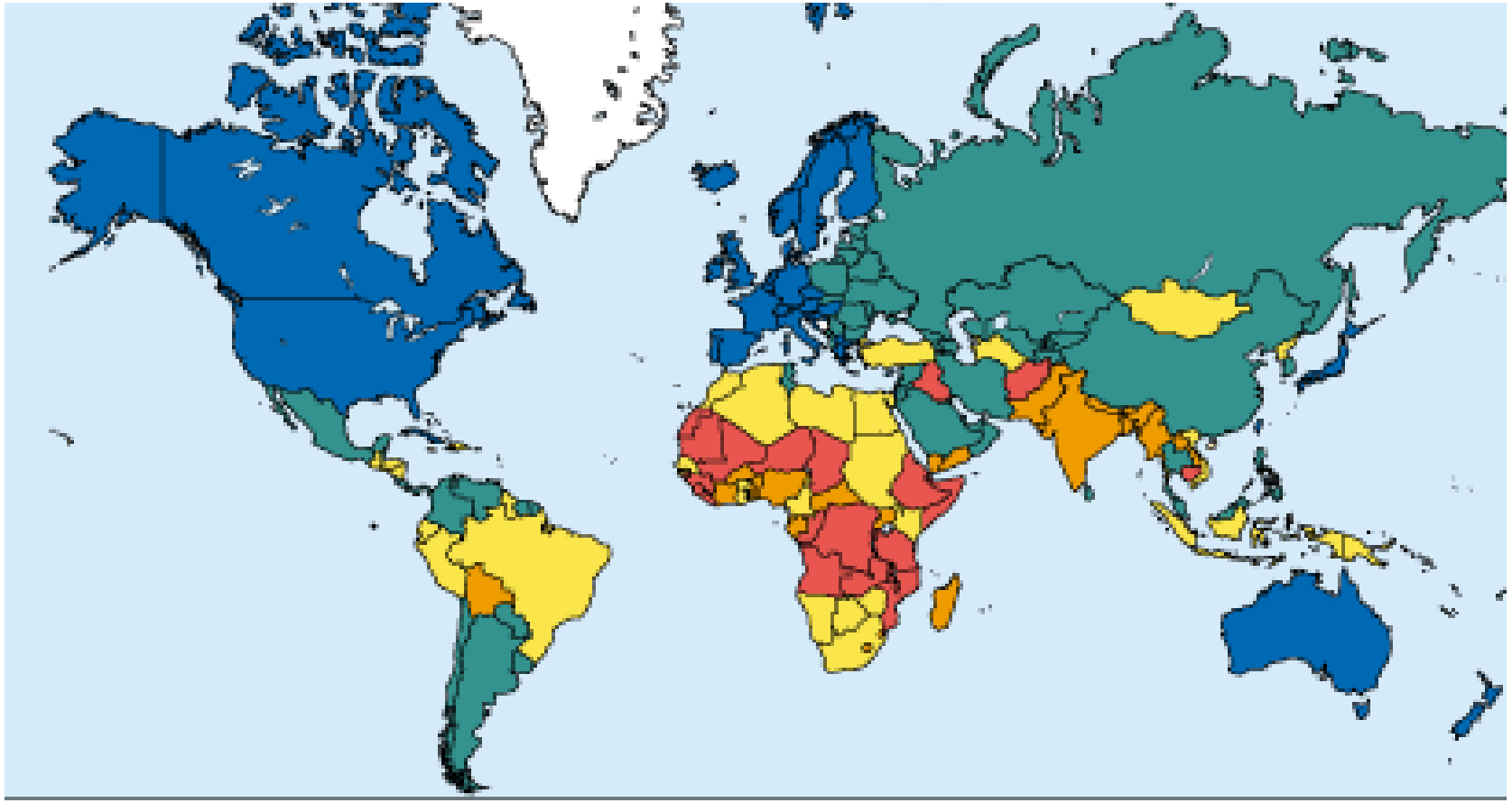


Infant mortality rate (per 1 000 live births)

Infant mortality rate is the probability of a child born in a specific year or period dying before reaching the age of one.

$$\text{Infant mortality rate} = \frac{\text{Total number of deaths from zero up to less than one year during a year and in a given locality}}{\text{Total number of live births in the same year and locality}} x1000$$

Infant Mortality Rate



Neonatal mortality rate (per 1 000Neonatal live births)

$$\text{Neonatal mortality rate} = \frac{\text{Total number of deaths from zero up to less than 28 days during a year and in a given locality}}{\text{Total number of live births in the same year and locality}} x1000$$

Post-Neonatal mortality rate (per 1 000 live births)

$$\text{Post-Neonatal mortality rate} = \frac{\text{Total number of deaths from 28 days up to less than one year during a year and in a given locality}}{\text{Total number of live births in the same year and locality}} x1000$$

Stillbirth rate (per 1000 total births)

$$\text{Still birth rate} = \frac{\text{Number of still births during a year and in a given locality}}{\bullet\ \text{Total births (live births + still births) in the same year and locality}} x1000$$

- **Stillbirths:** are defined as third trimester fetal deaths (> or = 1000 grams or > or = 28 weeks of gestation).
- **Total births** : Total births is defined as the sum of live births and still births.

Perinatal Mortality Rate

It is expressed as the sum number of still births and early neonatal deaths (less than 7 days of life) per 1000 total births (still births plus live births).

$$Perinatal\ M.R. = \frac{No.of\ stillbirths + No.of\ early\ neonatal\ deaths\ in\ certain\ year\ and\ locality}{Total\ births\ (Still\ and\ livebirths)\ in\ the\ same\ year\ and\ locality} X1000$$

It the best indicator of Maternal and Child Health services

Under-5 mortality rate(per 1 000 live births)

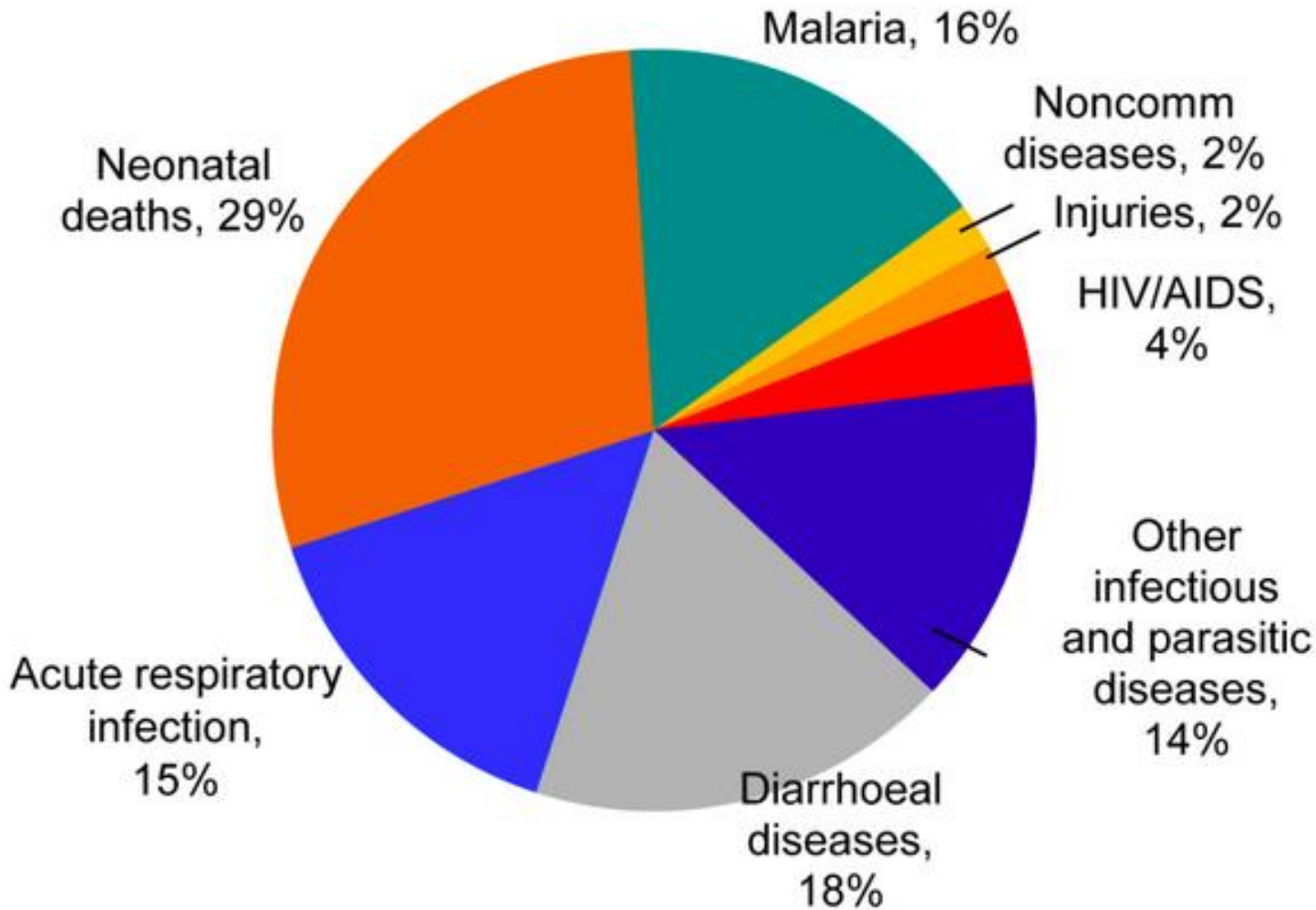
Under-five mortality rate is the probability of a child born in a specific year or period dying before reaching the age of five.

$$\text{The under 5 - years mortality rate} = \frac{\text{Total number of deaths among children under 5 - years of age during a year and in a given locality}}{\text{Total number of live births in the same year and locality}} x1000$$

Proportionate mortality ratio

Proportionate mortality ratio

$$Proportionate\ mortality = \frac{Deaths\ due\ to\ a\ particular\ cause}{Deaths\ from\ all\ causes} \times 100$$



Causes of child deaths in sub-Saharan Africa, 2010
https://doi.org/10.1371/journal.pmed.1000294.g004

Proportionate mortality ratio, KSA 2010

Cause	%
Injury, Poisoning and External Causes	18.5
Dis. Circulatory System	16.74
Cond. Orig..Perinatal Period	9.05
Dis. Respiratory System	4.09
Neoplasms	4.75
Infect & Parasitic Diseases	3.31
Dis. Genitourinary System	3.09
Congenital Anomalies	٢.٦٦
Endocrine. Nutr. Metab Diseases	2.46
Dis.Digestive System	1.93

Case fatality rate (Death to case ratio)

$$\text{Case fatality rate} = \frac{\text{Total number of deaths from a certain disease in a year and in a given locality}}{\text{Total number of cases having the same disease in the same year and locality}} \times 100$$

It reflects severity and virulence of diseases

Standardized (adjusted) death rates

Removes confounding effect

Direct comparison

Age group	Mid-year pop.	Deaths in the year	Age-specific death rate	
0	4,000	60	15	
1-4	4,500	20	4.4	
5-14	4,000	12	3	
15-19	5,000	15	3	
20-24	4,000	16	4	
25-34	8,000	25	3.1	
35-44	9,000	48	5.3	
45-54	8,000	100	12.5	
55-64	7,000	150	21.4	
Crude death rate		**8.30** per 1000 population		
Standardized death rate		**6.56** per 1000 population		

The Millennium Development Goals

Eight Goals for 2015

Eradicate extreme hunger and poverty

Achieve universal primary education

Promote gender equality and empower women

Reduce child mortality

Improve maternal health

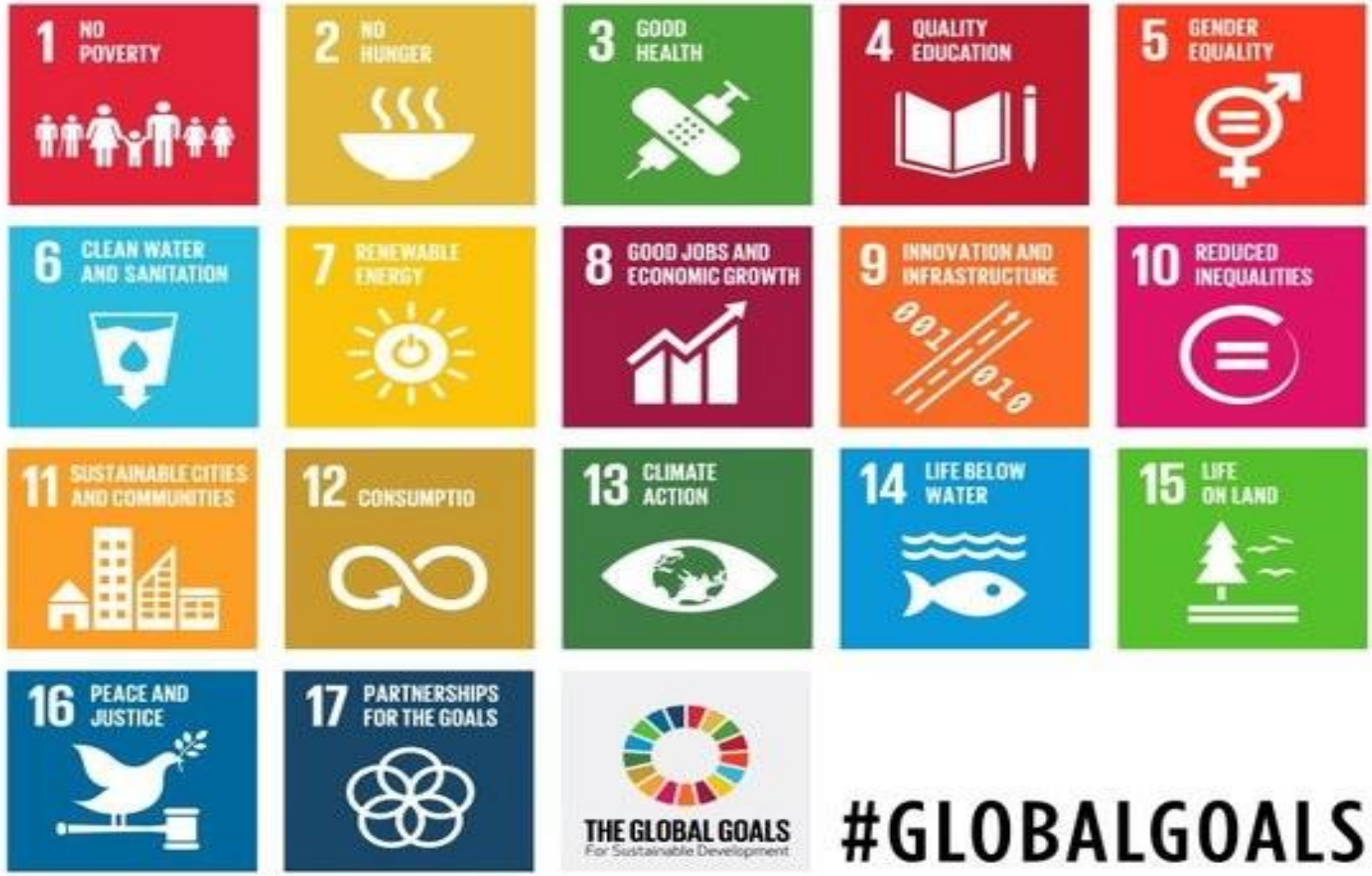
Combat HIV/AIDS, malaria and other diseases

Ensure environmental sustainability

Develop a global partnership for development

THE GLOBAL GOALS

For Sustainable Development



#GLOBALGOALS

SUSTAINABLE DEVELOPMENT KNOWLEDGE PLATFORM

HOME | HIGH-LEVEL POLITICAL FORUM | STATES | SIDS | SDGS | TOPICS | UN SYSTEM | STAKEHOLDER ENGAGEMENT | PARTNERSHIPS | RESOURCES | ABOUT

PROGRESS & INFO (2017) | PROGRESS & INFO (2016) | TARGETS & INDICATORS

The global indicator framework was developed by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs) and agreed to, as a practical starting point at the 47th session of the UN Statistical Commission held in March 2016. The report of the Commission, which included the global indicator framework, was then taken note of by ECOSOC at its 70th session in June 2016. More information.

TARGETS		INDICATORS	
3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	3.1.1	Maternal mortality ratio
		3.1.2	Proportion of births attended by skilled health personnel
3.2	By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births	3.2.1	Under-five mortality rate
		3.2.2	Neonatal mortality rate
3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	3.3.1	Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations
			Tuberculosis incidence per 1,000 population

https://sustainabledevelopment.un.org/sdg3

Reference book

Park,s Textbook of Preventive and Social Medicine