# HEALTH INDICATORS

# OBJECTIVES

Learning objectives

1. Explain the need to use “indicators” to measure “health” status
2. State the characteristics of health indicators
3. List the uses of health indicators
4. State with examples the types of health indicators

Performance objectives

1. Compute indicators of mortality
2. Interpret the result of the indicator

# DEFINITION OF HEALTH

"Health is a state of complete physical, mental and social well being not merely the absence of diseases or infirmity"

Health is measured using "Health Indicators"

# TYPES OF HEALTH INDICATORS

1. Morbidity indicators
2. Mortality indicators
3. Disability indicators
4. Nutrition indicators
5. Healthcare delivery indicators
6. Healthcare utilization indicators
7. Social and mental health indicators
8. Socioeconomic indicators
9. Environmental indicators
10. Quality of life indicators

# HEALTH INDICATORS

Health indicators are

- Variables that measure indirectly a status which can not be measured directly
- They are a reflection of a given situation
- They are used to compare between areas or population group at a certain time
- They are used to measure changes over a period of time

HEALTH INDICATORS QUANTIFY THE HEALTH OF THE POPULATION

# CHARACTERISTICS OF HEALTH INDICATORS

Health indicators should be

- **Valid** — Corresponds to the actual status
  Measures what it is supposed to measure
- **Reliable** — Precise, Reproducible
  Give the same results on repeated measurement by different individuals
- **Sensitive** — Reflects the smallest change in the health status of the population
- **Specific** — Reflects changes only in the situation concerned

# Uses of Health Indicators

- Reflect the health status of a given population
- Reflect changes in the health profile of the same population over time
- Provide international comparison
- Delimit areas of health priority
- Diagnosis of community needs
- Allow evaluation of health services and specific interventions
- Chart progress towards specific targets
- Allow future projection of the health status of the population

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# MORBIDITY INDICATORS

- Incidence rate
- Prevalence rate
- Attendance to out-patient clinics or health centers
- Admission – re-admission – discharge rate
- Length of hospital stay
- Spells of sickness or absence from school or work

# MORTALITY INDICATORS

- Crude death rate
- Age specific mortality rate
  - Infant mortality rate
  - Perinatal mortality rate
  - Neonatal mortality rate
  - Post-neonatal mortality rate
- Mortality rate of children below 5 years of age
- Maternal mortality rate and ratio
- Cause specific mortality rate
- Proportionate mortality rate
- Life expectancy

# DISABILITY INDICATORS

- **Event-type indicators**
  - Number of days of restricted activities
  - Number of days confined to bed
  - Number of days lost from work

- **Person-type indicators**
  - Limitation of mobility
  - Confined to bed
  - Confined to house
  - Getting around with aids

- **Limitation of activities**
  - Limitation of basic activities (toilet – bathing)
  - Limitation of major activities (house work or work)

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# HEALTHCARE DELIVERY INDICATORS

- Doctors – population ratio
- Nurses – population ratio
- Bed – Population ratio
- Center or sub-center – population ratio
- Midwives – female in the fertile age group ratio

# HEALTHCARE UTILIZATION INDICATORS

- Percentage of children attending for immunization
- Percentage of children attending for routine check-up
- Percentage of pregnant female attending for ante-natal care
- Percentage of pregnant female attended by a trained birth attendant
- Percentage of female attending family planning clinics
- Bed occupancy rate
- Bed turn over ratio

# NUTRITION INDICATORS

- Specific nutritional indicators
  - Percentage of the population who have low weight for age - height for age – weight for height
  - Percentage of infants born with a low birth weight
  - Percentage of the population who have low HB level
  - Percentage of children with clinical signs of malnutrition
  - Percentage of those whose protein and caloric intake below the required
  - Percentage of those who have 2 meals or fewer per day
  - Increases in prices as a percentage increase in minimal wages
  - Percentage of expenditure on food from total income

- Mortality indicators
  - MMR – IMR – children <5 years
  - Morbidity rates for certain diseases as measles and diarrhea
  - Cause specific mortality rate as from measles and tuberculosis

# SOCIOECONOMIC INDICATORS

- Rate of population growth
- Per-capita gross national production (GNP)
- Percentage of unemployed
- Percentage of literacy
- Average family size
- Crowding index
- Dependency ratio

# SOCIAL AND MENTAL INDICATORS

Rate of

- suicide
- homicide
- delinquency
- Alcohol and substance abuse
- rape
- child abuse
- wife abuse
- neglected or abandoned youth

# ENVIRONMENTAL INDICATORS

Percentage of the population with

- safe water supply inside dwellings
- sanitary refuse and sewage disposal
- living nearby a source of pollution

# QUALITY OF LIFE INDICATORS

- Physical quality of life

  Averaging three indicators :Infant mortality - Life expectancy at 1 year of age - Literacy rate yielding a score on a scale ranging from 0 (worst) to 100 (best)

- Subjective quality of life
  - Physical — Pain, fatigue, lack of energy
  - Psychological — Memory, concentration, self esteem
  - Level of independence — Mobility, daily activity, working capacity,
  - Social relation — Personal relations, social support

# MORTALITY INDICATORS

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# MORTALITY INDICATORS

Mortality rate is the number of deaths expressed as per 1000 or per 100 of the population among which the deaths occurred.

$$Mortality\ rate = \frac{Deaths\ in\ a\ given\ period\ of\ time}{Size\ of\ the\ population\ among\ which\ deaths\ occurred\ in\ the\ same\ period\ of\ time} \text{ x Constant}$$

# Crude Death Rate (CDR)

Mortality from all causes of death in a given period usually expressed as per 1000 of the estimated mid year population

$$CDR = \frac{Total\ deaths\ in\ a\ given\ period\ of\ time\ and\ locality}{Estimated\ mid\ year\ population\ in\ the\ same\ year\ and\ locality} \times 1000$$

Mid year population is an adjustment of the size of the population as of 1st of July of the same year

# Age specific mortality rate

Mortality from all causes of death among a certain age group in a given period and locality usually expressed as per 1000 of the estimated mid year population of the same age group in the same period and locality

$$Age\ Specific\ Mortality = \frac{Total\ deaths\ among\ a\ certain\ age\ group\ in\ a\ given\ period\ of\ time\ and\ locality}{Estimated\ mid\ year\ population\ of\ the\ same\ age\ group\ in\ the\ same\ year\ and\ locality} \times 1000$$

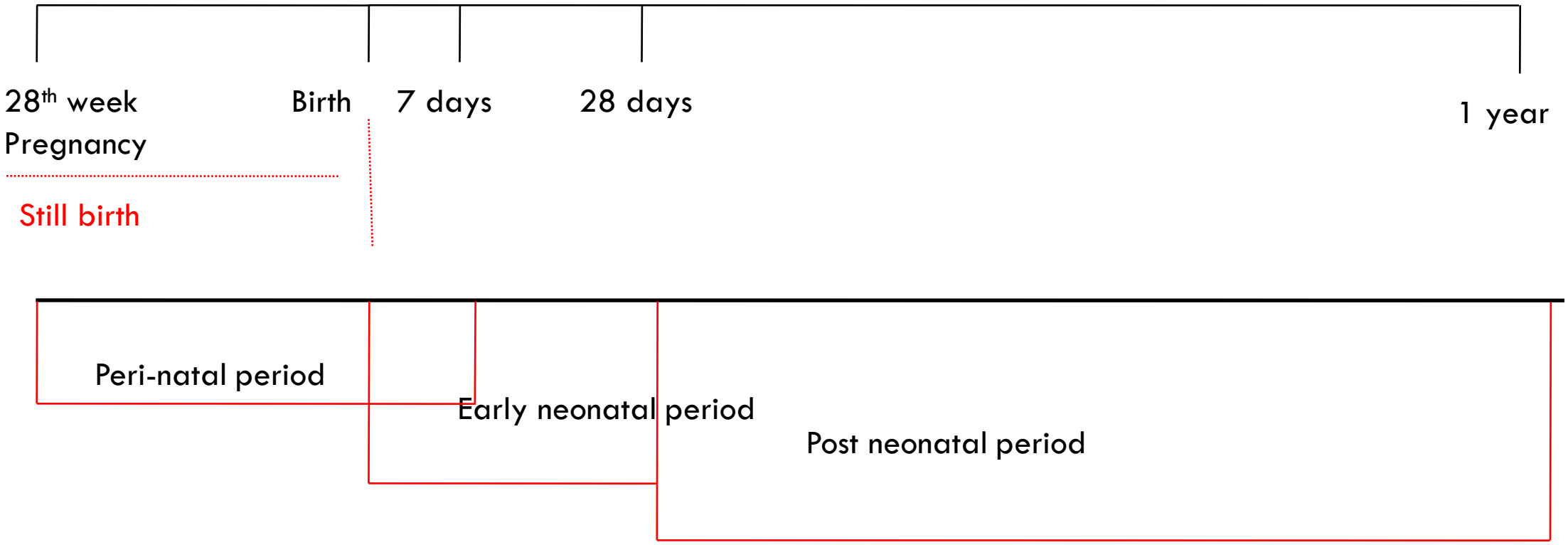
# Infant mortality rate (IMR)

Deaths in the first year of life expressed as per 1000 of total live births

$$IMR = \frac{Deaths\ below\ 1\ year\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ live\ births\ in\ the\ same\ year\ and\ locality} \times 1000$$

Reflects socioeconomic development and heath services

# INFANT MORTALITY RATE



# Neonatal mortality rate

Deaths in the first 28 days of life expressed as per 1000 of total live births

$$Neonatal\ mortality = \frac{Deaths\ below\ 28\ days\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ live\ births\ in\ the\ same\ year\ and\ locality} \times 1000$$

*Reflects primarily quality of obstetric care and neonatal care as well as maternal nutrition and health status*

# Post neonatal mortality rate

Deaths between 28 days of life to less than 1 year expressed as per 1000 of total live births

$$Post\ neonatal\ mortality = \frac{Deaths\ from\ 28\ days\ to\ less\ than\ 1\ year\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ live\ births\ in\ the\ same\ year\ and\ locality} \times 1000$$

*Reflects infants' health care, nutrition and sanitation of the environment*

# Peri-natal mortality rate

Deaths between 28th week of gestation to less than 7 days of life expressed as per 1000 of total births (live and still)

$$Peri\ natal\ mortality = \frac{Deaths\ from\ 28th\ week\ of\ gestation\ to\ less\ than\ 7\ days\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ births\ (live\ and\ still) in\ the\ same\ year\ and\ locality} \times 1000$$

*Reflects maternal health status, quality of maternal care and obstetric services*

# Under-5 mortality rate

Deaths below 5 years expressed as per 1000 of the number of children below the age of 5 years

$$Under-5\ mortality = \frac{Deaths\ below\ 5\ years\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ children\ below\ 5\ years\ of\ age\ in\ the\ same\ year\ and\ locality} \times 1000$$

# Maternal Mortality Ratio (MMR)

Deaths due to maternal causes (pregnancy, delivery and puerperium) in a given year and locality expressed as per 100 000 live births in the same year and locality

$$MMR = \frac{Deaths\ due\ to\ maternal\ causes\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ live\ births\ in\ the\ same\ year\ and\ locality} \times 100\ 000$$

*Reflects the status of maternal health and nutritional status, the quality of antenatal, natal and postnatal care as well as family planning services*

# Cause Specific death rate

Deaths from a certain cause (as accidents, cardiovascular diseases) expressed as per 100 000 of the population among which the deaths occurred

$$Cause\ specific\ death\ rate = \frac{Deaths\ from\ a\ certain\ cause\ in\ a\ given\ year\ and\ locality}{Estimated\ mid\ year\ population\ in\ the\ same\ year\ and\ locality} \times 100\ 000$$

*Reflects the leading causes of mortality*

# Proportionate mortality rate

Deaths from a certain cause (as accidents, cardiovascular diseases) expressed as percentage of the total deaths in the same year and locality

$$Proportionate\ mortality\ rate = \frac{Deaths\ from\ a\ certain\ cause\ in\ a\ given\ year\ and\ locality}{Total\ deaths\ from\ all\ causes\ in\ the\ same\ year\ and\ locality} \times 100$$

*Reflects the burden of diseases in the community*

# Case fatality rate

Deaths from a certain disease expressed as percentage of the total number of cases of the same disease in the same year and locality

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

*Reflects the virulence and pathogenicity of the organism*

# LIFE EXPECTANCY

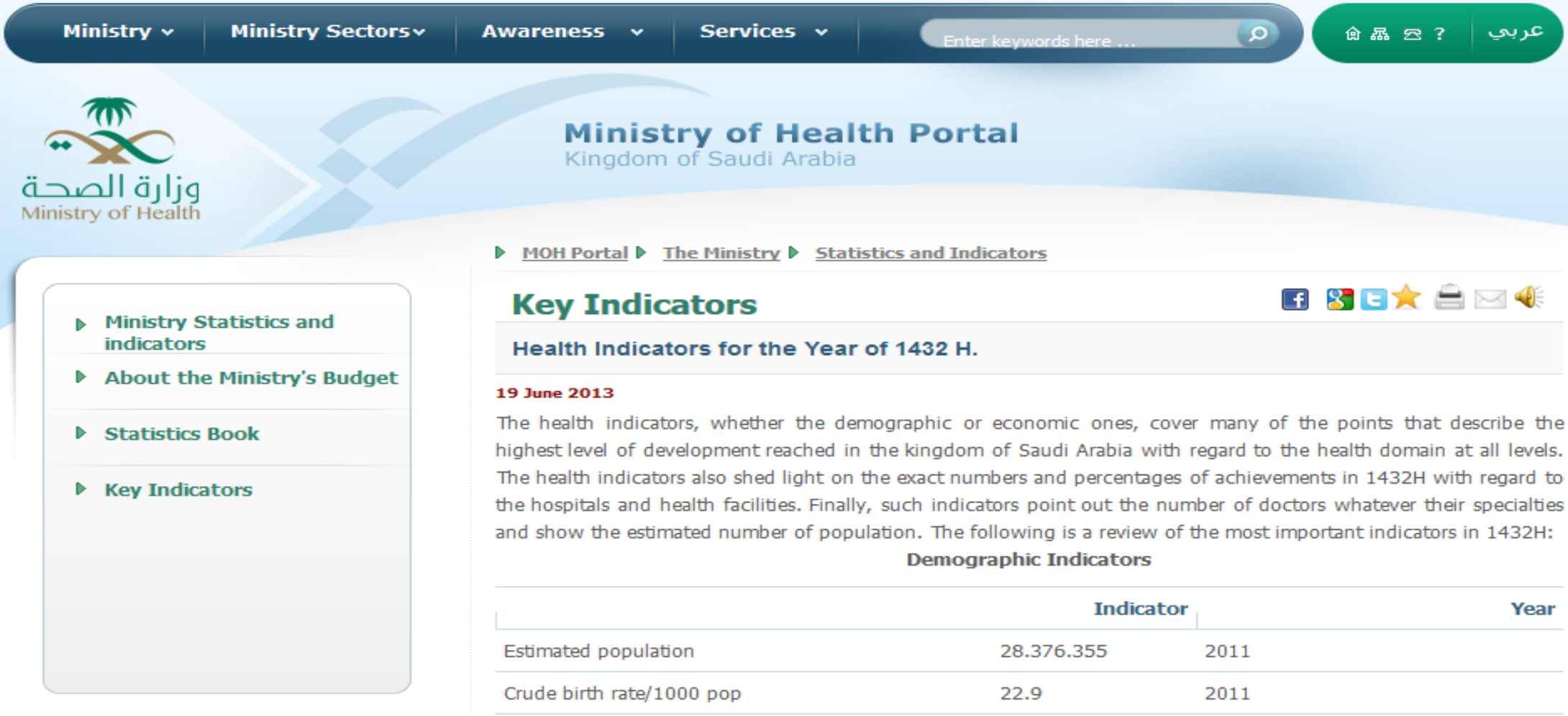
"Number of years expected to be lived by those borne into the population if the current age specific mortality rate persists"

Life expectancy at birth

- Best global indicator of health status
- Affected by infant mortality

Life expectancy at 5 years

- Not affected by infant mortality




http://www.moh.gov.sa/en/Ministry/Statistics/Indicator/Pages/Indicator-2013-06-19-001.aspx

# Application – mortality indicators

In the year 2015 the following data were provided for a certain village

- Midyear population 200,000
- Live births 7500
- Deaths 3000
- Infant deaths(< one year ) 750
- Neonatal deaths (0- 28 days ) 150
- Post neonatal deaths ( 28 days- < one year) 600
- Maternal deaths 100

*Calculate and interpret the following rates*

Crude death rate

Infant mortality rate

Neonatal mortality rate

Post neonatal mortality rate

Maternal mortality ratio

# Application – mortality indicators

In village x, the estimated midyear population for the year 2015 was 200 000. In the same year 7500 births and 3000 deaths were recorded. 100 died from maternal causes. Number of deaths below the age of 1year was 750 of whom 150 died in the first 28 days.

Calculate all possible indicators of mortality and indicate what these indicators reflect.

# Application – mortality indicators

Data of city (A) during the year 2014 shows that the midyear population was 100,000 individuals (45,000 males and 55,000 females). Number of deaths from all causes was 1000 (600 males and 400 females). There were 50 cases (40 males and 10 females) of lung cancer of which 45 died (36 males and 9 females). Calculate all possible indicators of mortality and indicate what these indicators reflect.

# References


- Last JM, editor. Dictionary of epidemiology. 4th ed. New York: Oxford University Press; 2001
- Principles of EPIDEMIOLOGY in Public Health Practice *Third Edition* An Introduction to Applied Epidemiology and Biostatistics. Centers for Disease Control and Prevention (CDC)
- Quality of Life indicators by European Commission http://epp.eurostat.ec.europa.eu/portal/page/portal/quality_life/introduction
- WHO http://www.who.int/ceh/publications/cehframework/en/
- World Bank World Development Indicators http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators