Health Indicators

Objectives

- 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

Resources: Slides and Doctor Notes

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Important | Doctors notes | Extra

Feedback - Editing File

What is health indicator?

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

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 – measures what it is supposed to measure. (accurate, measures what claims to be measured for example: to measure tall we use meter.)

Reliable(مهم) – provides same information under different observations, conditions (repeated)

Sensitive – sensitive to changes in the situation (measure changes, if there is something changed it will detect positive findings)

Specific – reflects changes only in that situation (it will remove negative findings of sensitive changes)

Relevant: relevant to the community needs & problems. (use of something which is in need)

Feasible: the ability to obtain data when needed (simple not complicated)

Types of Health Indicators (we will concentrate in two indicators: mortality and morbidity)

- **Mortality indicators** (crude mortality rate, cause-specific mortality rate, age specific mortality rate) (mortem death, death indicators)
- **Morbidity indicators** (incidence, prevalence) (sick)
- **Disability indicators** (DALY, QALY,)
- **Nutritional status indicators** (anthropometric measurements,)
- **Health care delivery indicators** (doctor-population ratio, population-bed ratio,)
- **Utilization rates** (bed turnover ratio, vaccine coverage ratio,)
- **Social and mental health indicators** (tobacco use, substance Abuse, responsible sexual behavior, mental health)
- **Environmental indicators** (Environmental Quality)
- **Socioeconomic indicators** (rate of population increase, dependency ratio, literacy rate.)
- **Health policy indicators** (GNP spent on healthcare,)
- **Indicators of quality of life**
- **Other indicators** (health for all, MDG, SDG)

MORBIDITY INDICATORS

(1-Incidence rate 2- Prevalence 3- Attendance to out-patient clinics or health centers 4- Admission – re-admission – discharge rate 5- Length of hospital stay 6- Spells of sickness or absence from school or work)

MORTALITY INDICATORS

(1- Crude death rate 2- Age specific mortality rate 3- Infant mortality rate 4- Perinatal mortality rate 5- Neonatal mortality rate 6-Post-neonatal mortality rate 7- Mortality rate of children below 5 years of age 8- Maternal mortality rate and ratio 9- Cause specific mortality rate 10- Proportionate mortality rate 11- Life expectancy 12-sillbirths 13- adult mortility rate)

DISABILITY INDICATORS

(1- Event-type indicators 2- Number of days of restricted activities 3- Number of days confined to bed 4- Number of days lost from work 5- Person-type indicators 6- Limitation of mobility 7- Confined to bed 8- Confined to house 9- Getting around with aids Limitation of activities 10- Limitation of basic activities (toilet – bathing) 11- Limitation of major activities (house work or work))

HEALTHCARE DELIVERY INDICATORS

(1- Doctors – population ratio 2- Nurses – population ratio 3- Bed – Population ratio 4- Center or sub-center – population ratio 5- Midwives – female in the fertile age group ratio)

HEALTHCARE UTILIZATION INDICATORS

(1-Percentage of children attending for immunization 2- Percentage of children attending for routine check-up 3- Percentage of pregnant female attending for ante-natal care 4- Percentage of pregnant female attended by a trained birth attendant 5- Percentage of female attending family planning clinics 6- Bed occupancy rate • Bed turn over ratio)

NUTRITION INDICATORS

(1- Specific nutritional indicators 2- Percentage of the population who have low weight for age - height for age – weight for height 3- Percentage of infants born with a low birth weight 4- Percentage of the population who have low HB level 5- Percentage of children with clinical signs of malnutrition 6-Percentage of those whose protein and caloric intake below the required 7- Percentage of those who have 2 meals or fewer per day 8-Increases in prices as a percentage increase in minimal wages 9-Percentage of expenditure on food from total income 10- Mortality indicators 11- MMR – IMR – children)

SOCIOECONOMIC INDICATORS

(1-Rate of population growth 2- Per-capita gross national production (GNP) 3- Percentage of unemployed 4- Percentage of literacy 5- Average family size 6- Crowding index 7- Dependency ratio)

SOCIAL AND MENTAL INDICATORS

(1-suicide 2-homicide 3-delinquency 4- Alcohol and substance abuse 5- rape 6- child abuse 7- wife abuse 8- neglected or abandoned youth

ENVIRONMENTAL INDICATORS

(1-Percentage of the population with 2- safe water supply inside dwellings 3- sanitary refuse and sewage disposal 4- living nearby a source of pollution

Morbidity rates

1. Incidence
2. Prevalence

EX. trial and treatment (incidence and complications): Supplement cause complication, in prevalence we can't know when constipation started but in incidence I give supplements then I take the incidence of new cases of constipation here we make assure that there is a causative relation between exposure and outcome.

Incidence

- It measures the new cases.
- Incidence rate =

In incidence we always have to name the place and to specify the date. in numerator, and denominator. We can't measure new cases of Riyadh and divide it by population of Jeddah, nor can I divide new cases of 2019 by population in 2018

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

Example

Incidence of cancer: population at risk we remove the number of patient who have cancer already.

- 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 (If the fraction is too small we multiply by 100000 instead of 1000)

= 0.05 /1000 population (But don't foget to write /10 to the power of n ex. 1000 or 100000.

Attack rate

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

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

Prevalence

- Point prevalence: (Ex. I survey now and calculate all who have diabetes

Total cases (old + new) at fixed point of time in place

_____ x 10n

total population at risk in the same place and time

Period prevalence: to observe a period,we sum recurrence with cured divided by population then, we multiply it by 1000. not included in the exam.

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?

Prevalence=

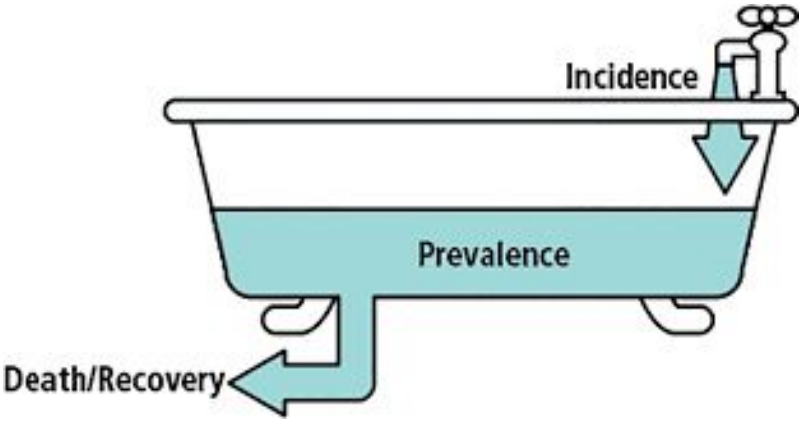
Total cases (old + new) at fixed point of time in place x 10n Total

_____

population at risk in the same place and time

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

Incidence vs. prevalence



Prevalence of diabetes: measures all cases, to have the problem magnitude, but when we take prevalence of diabetes in one month it is not effective because the patients may be diagnosed long time ago.

Incidence: causality

Prevalence: magnitude of health problem

The relation between incidence and prevalence: Is that incidence is the new cases. Imagine it like I have a pool and I'm inserting cases. Prevalence is the pool of cases which include new and old.

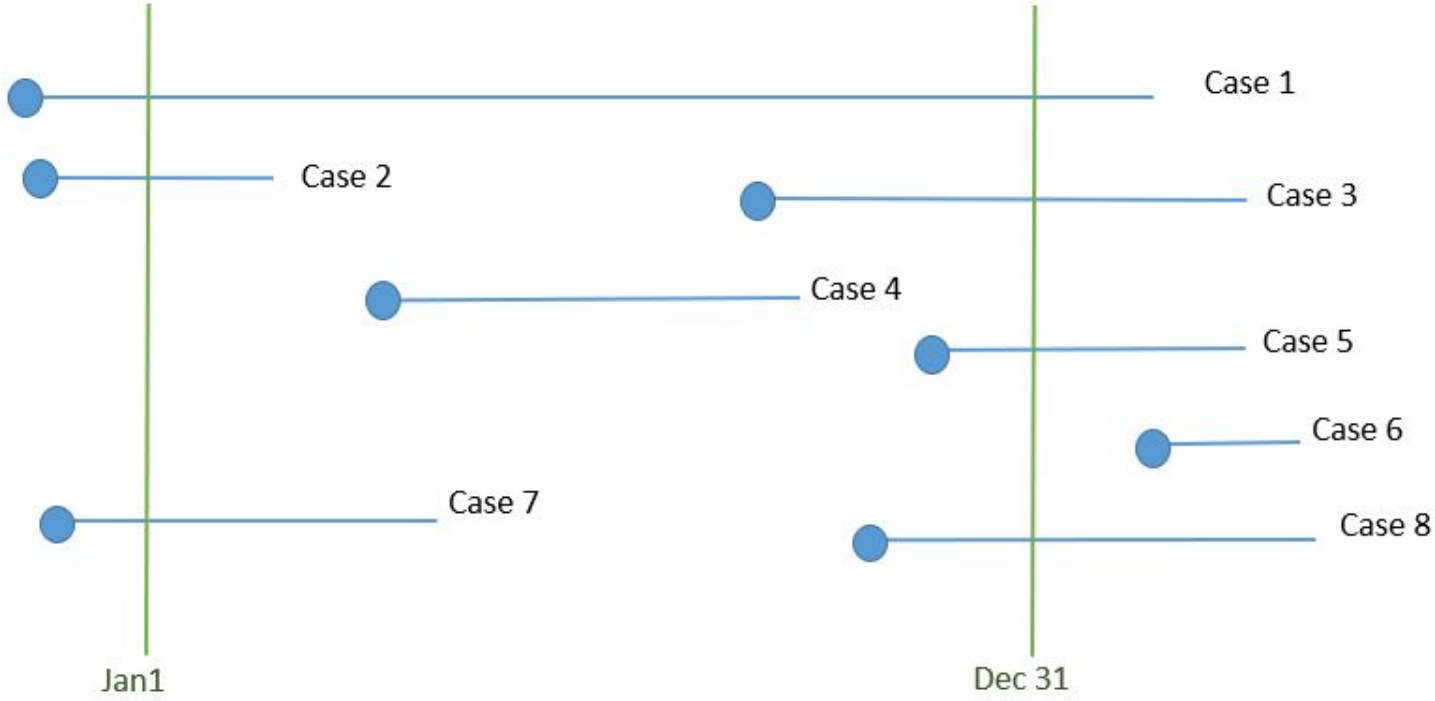
What might decrease the prevalence? Death or recovery, imagine something which exert death and recovery, these will escape from the pool.

If the incidence increases, prevalence increases (direct correlation).

Prevalence may decrease if I have high death rate or there is high cure rate.

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

The study cases have disease at 1Jan: 1,2,7
31 dec 1,3,5,8
2 may be cured or death occur
4: death or cured not found in dec31, or jan1

Period prevalence: 1,2,3,4,5,7,8
6 is not diagnosed same timing of the studyhe may be diagnosed after the study

This is the difference between period prevalence and point prevalence. But don't worry period prevalence is not required in the exam.

Incidence: 2018 jan1- dec31: 3,4,5,8
case 7 no because it is old case.
6 he didn't been diagnosed yet

Mortality Rates

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

A mortality rate

Is a measure of the frequency of occurrence of death in a defined population during a specified period of time.

Mid-year population

It is important to use the population size at the midpoint of the time interval as an estimate of the average population at risk especially if: a denominator population is growing or shrinking during the period of time for which a rate is to be computed.

There is difference between rate, ratio, and proportion.
Rate: it divides two different things Ex. speed = distance over time.
Ratio is similar to rate, but rate have time factor but ratio don't have it. (ratio: important)
Proportion: ex. Deaths over deaths. (numerator is same us the denominator)

Mortality rates

- Crude death rates crude=خام, broad (calculate all of the death regardless of age, cause)
- Specific death rates
- Standardized death rates

Crude Death Rate (CDR)

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

crude death rate: It is the total number of death over mid-year population

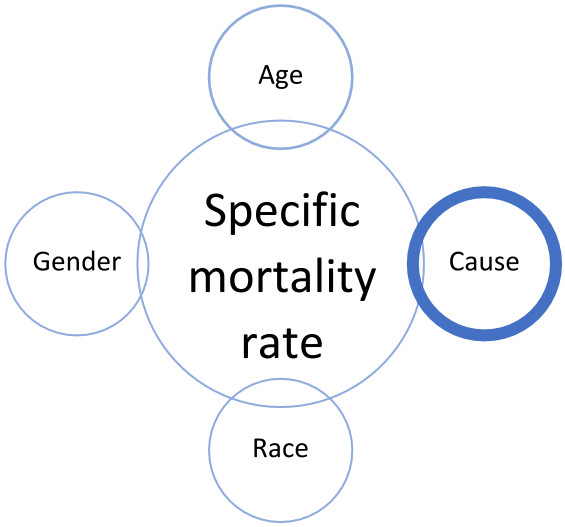
Ex. Death rate in Saudi arabia in 2018-2019 we calculate all of deaths whatever the cause over mid-year population.

شرح للتوضيح

In 2018 there is increase,decrease there is also, newborns, death, immigration and outmigration, so how to identify the number that I will divide on it, I'll take mid-year population. Saudi mid year population is 30 million average. Don't forget to specify the time and place in crude death rate.

If I want to calculate crude rate of saudi I have to divide with mid year of Saudi, if I want to calculate the death crude of Riyadh I have to divide on the mid year population of Riyadh. Then we multiply it by 1000

Specific mortality rate



Crude death rate don't give the causes, so they create specific death rate
Specific death rate: it is specific for age group, or for certain causes.
Cause specific mortality rate: mortality of specific cause

Ex. cancer malignancy mortality in given place and time.

Cause specific mortality rate: in numerator we will take mortality caused by specific cause divided by mid-year population multiplied by 100 thousand.

Cause-specific mortality rate

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

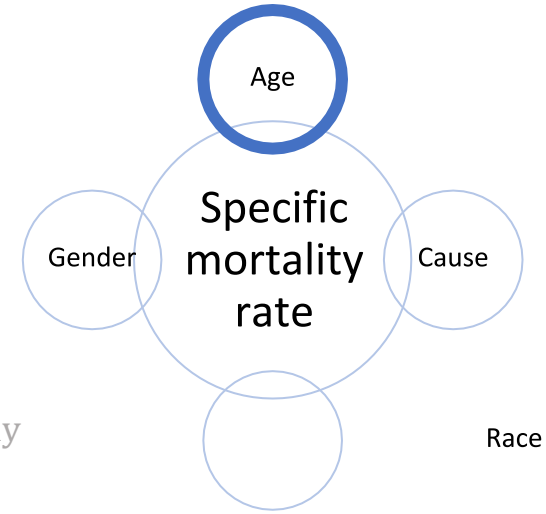
Example

Specific death rate due to tuberculosis =

$$\frac{\textit{No. of deaths of TB in a certain year and locality}}{\textit{Estimated mid} - \textit{year population in same year and locality}} \textit{ X 100,000}$$

Age specific mortality rate: it is very broad and it differs from different age group

ex. Number of deaths of people between 15 to 25? divided it on estimated mid year population, and multiply it by 1000.



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.

Adult mortality rate (per 1000 population)

Adulthood: between 15- 60 years of age

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

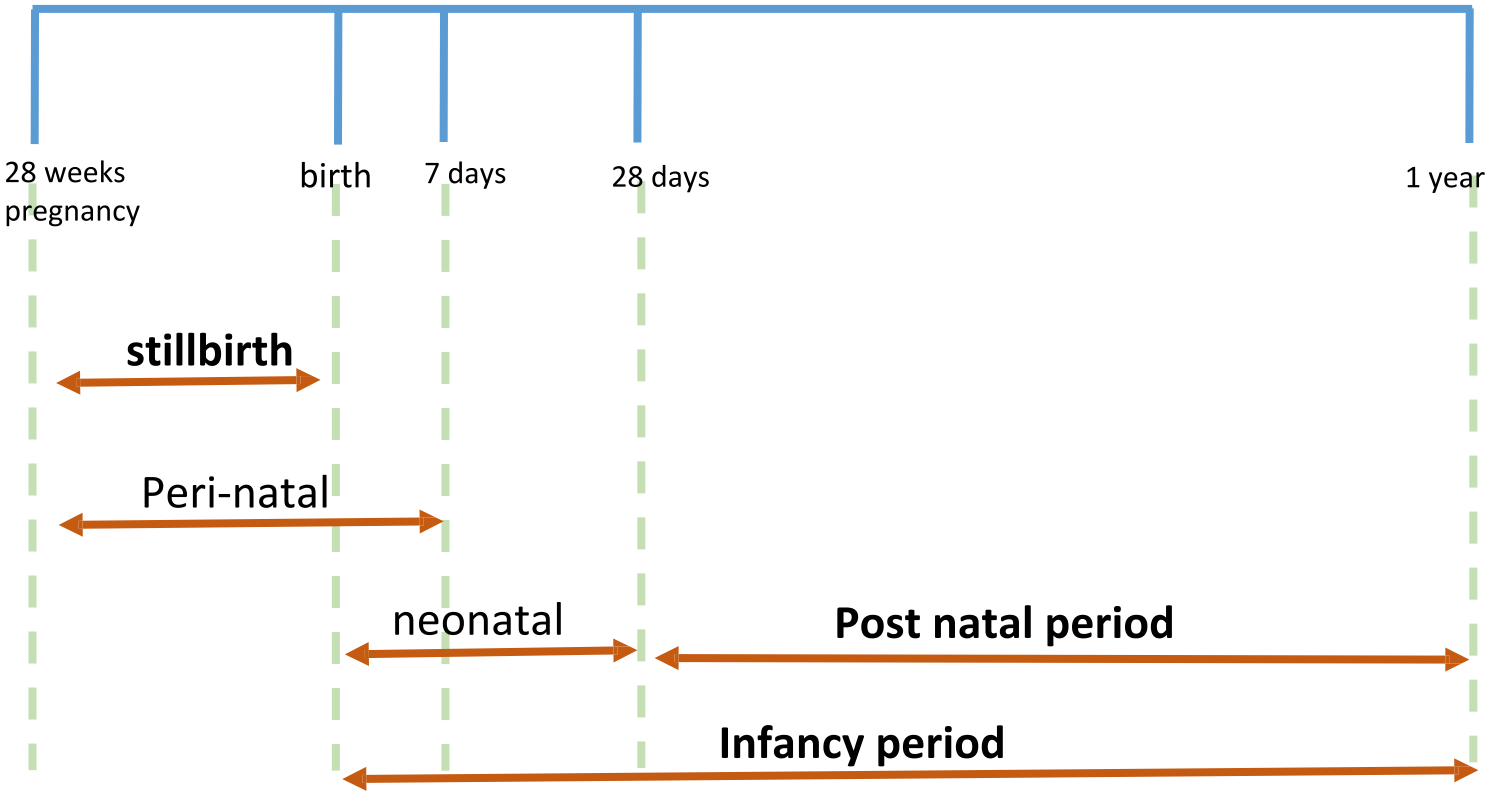
Maternal mortality ratio (MMR) (per 100 000 live births). (مهم)

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.

$$\text{Maternal mortality ratio} = \frac{\textit{Number of Maternal deaths assigned to causes related to pregnancy in a given year and locality}}{\textit{Number of live births in the same year and locality}} \times 100.000$$

Period of Infancy



Infant mortality rate (per 1 000 live births). (مهم)

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

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

Neonatal mortality rate (per 1 000 Neonatal live births)

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

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

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

Stillbirth rate (per 1000 total births)

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

Third trimester from 28 weeks of gestation till termination of pregnancy, if death happen it is called stillbirth (fetal death).

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. (متعلق بالحمل والولادة)

It the best indicator of Maternal and Child Health services

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

$$M.R. = \frac{\text{No.of stillbirths + No.of early neonatal deaths in certain year and locality}}{\text{Total births (Still and livebirths) in the same year and locality}} \times 1000$$ Perinatal

Under-5 mortality rate (per 1000 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

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

Case fatality rate (Death to case ratio)

$$\text{Case fatality rate} = \frac{\text{Total number of deaths from a certain disease in a year and in a given locality}}{\text{Total number of cases having the same disease in the same year and locality}} x100$$

EX. malaria deaths/cases of malaria multiplied by 100

It reflects severity and virulence of diseases

Survival Rate (SR)

- Survival rate: Is the proportion of survivors in a group (e.g. of patients), studied and followed over a period of time (e.g. over a period of 5 years)
- Is used to 'describe prognosis' in certain disease conditions
- Quite useful in cancer studies
- Can be used as a 'yardstick for the assessment of standards of therapy'
- Survival period is usually calculated from date of diagnosis or start of treatment

$$SR = \frac{\text{Total no. of patients alive after 5 years}}{\text{Total no. of patients diagnosed/treated}} \times 100$$

Standardized (adjusted) death rates

Removes confounding effect
Direct comparison

Community Medicine

THE END

436 TEAMS