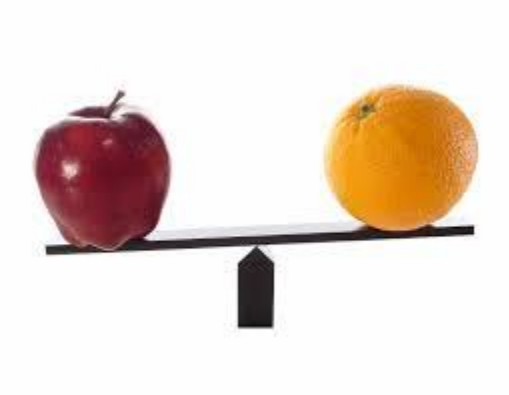
EPIDEMIOLOGY APPROACH

Asking Questions



Making Comparisons

EPIDEMIOLOGY APPROACH

Asking Questions

Related to Health Events

a. What is the event (problem)?
b. What is the magnitude?
c. Where did it happen?
d. Who are affected?
e. Why did it happen?

Related to Health Action

a. What can be done to reduce the problem and its consequences?
b. How can it be prevented?
c. What action should be taken by the community, health services and other sections?
d. What resources are required?
e. How are the activities to be organized?
f. What difficulties may arise? How might they be overcome

EPIDEMIOLOGY APPROACH

Making Comparisons

Comparison of two groups (Infected and non infected groups or Exposed and unexposed groups

Comparison between individuals

By making comparisons , Epidemiologist tries to find out crucial differences between the groups

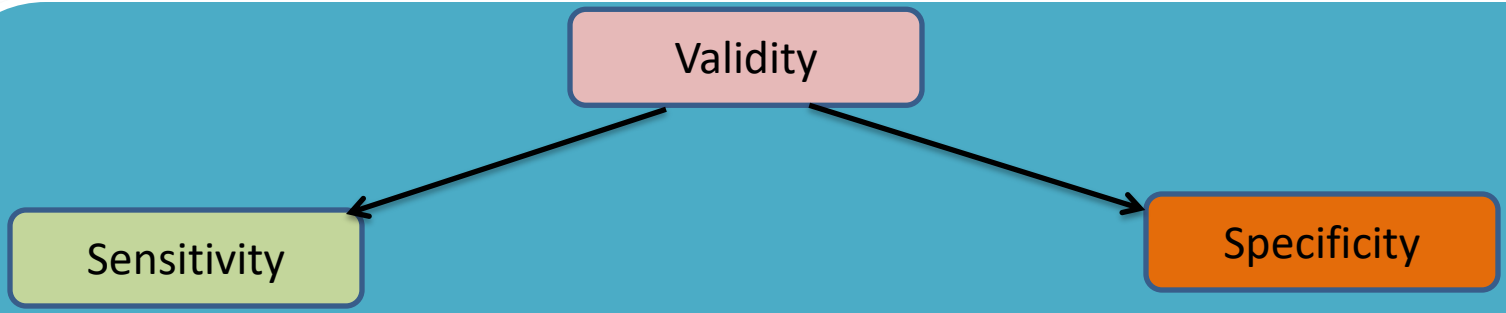
Comparability

Draw inferences

BASIC MEASUREMENTS IN EPIDEMIOLOGY

- Measurement of Mortality
- Measurement of Natality
- Measurement of Morbidity
- Measurement of Disability
- Measurement of Medical needs, Health care facilities, Utilization of health services, Health related events
- Measurement of Demographic variables
- Measurement of Suspected factors
- Measurement of Psycho-socio Aspects

BASIC MEASUREMENTS IN EPIDEMIOLOGY



- Validity refers to what extent the test accurately measures which it purports to measure.
- Validity measures the ability of the test to separate or distinguish those who have disease from those who do not.

BASIC MEASUREMENTS IN EPIDEMIOLOGY

Sensitivity= a/(a+c) X100

Specificity= d/(b+d) X100

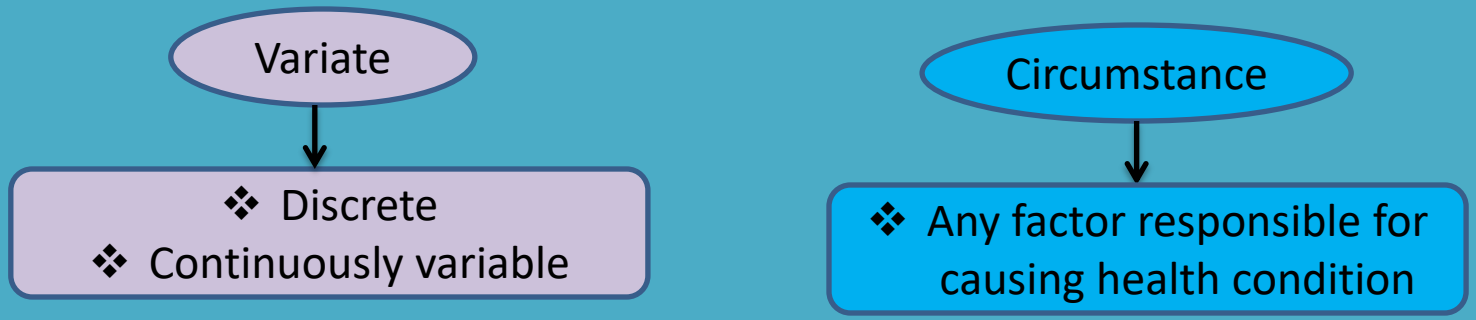
Ability of the test to identify correctly all those who have disease i.e True Positive

Diagnosis (screening test results)

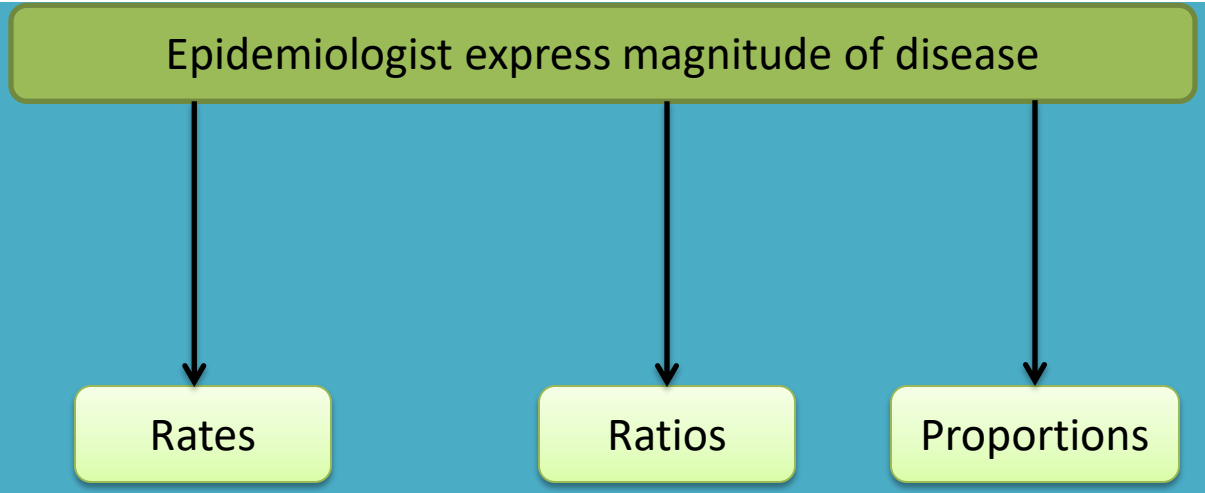
	Diseased	Not diseased	Total
Positive	(True positive) a	(False positive) b	(Total positive) a+b
Negative	(False negative) c	(True negative) d	(Total negative) c+d
Total	(Total disease) a+c	(Total non diseased) b+d	(Grand total) a+b+c+d

Ability of the test to identify correctly all those who do not have disease i.e True Negative

BASIC MEASUREMENTS IN EPIDEMIOLOGY



TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY



TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

Rates

Measures the occurrence of some particular event (development of disease or occurrence of death) in a population during given time period

It is a statement of risk of developing a condition

It indicates the change in some event that takes place in a population over a period of time

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

A rate describes how quickly disease occurs in a population

Example:
70 new cases of breast cancer per 1,000 women per year.
This measure conveys a sense of the speed with which disease occurs in a population, and seems to imply that this pattern has occurred and will continue to occur for the foreseeable future.
This rate is an ***Incidence rate***

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

- **Attack rate** is the proportion of the population that develops illness during an outbreak.
- For example, 20 of 130 persons developed diarrhea after attending a picnic.
- **Incidence proportion**

- **Case-fatality rate** is the proportion of persons with the disease who die from it.
- Example, one death due to meningitis among County A's population.

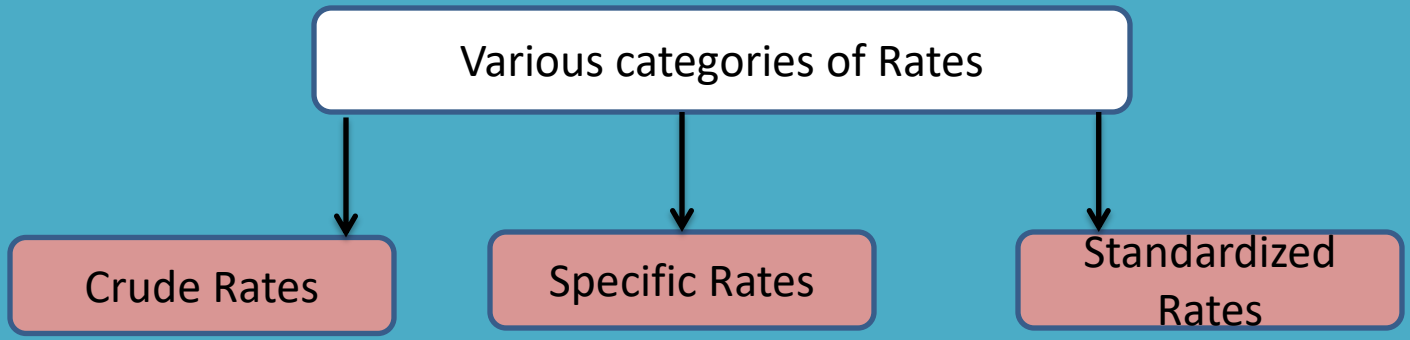
TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

- **Prevalence rate** is the proportion of the population that has a health condition at a point in time.
- For example, 70 influenza case-patients in March 2005 reported in County A.

- All of these measures are proportions, and none is expressed per units of time.
- Not considered “true” rates

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

$$\text{Death rate} = \frac{Number\ of\ death\ in\ one\ year}{Total\ population} \times 1000$$



TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

Crude Rates

Unstandardized Rates

Actual observed Rates

Birth Rates
Death Rates

Specific Rates

Actual observed rates due to
- specific causes
- Occurring in specific groups
- During specific time period

Standardized Rates

Adjusted Rates

Comparison of two or more populations

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

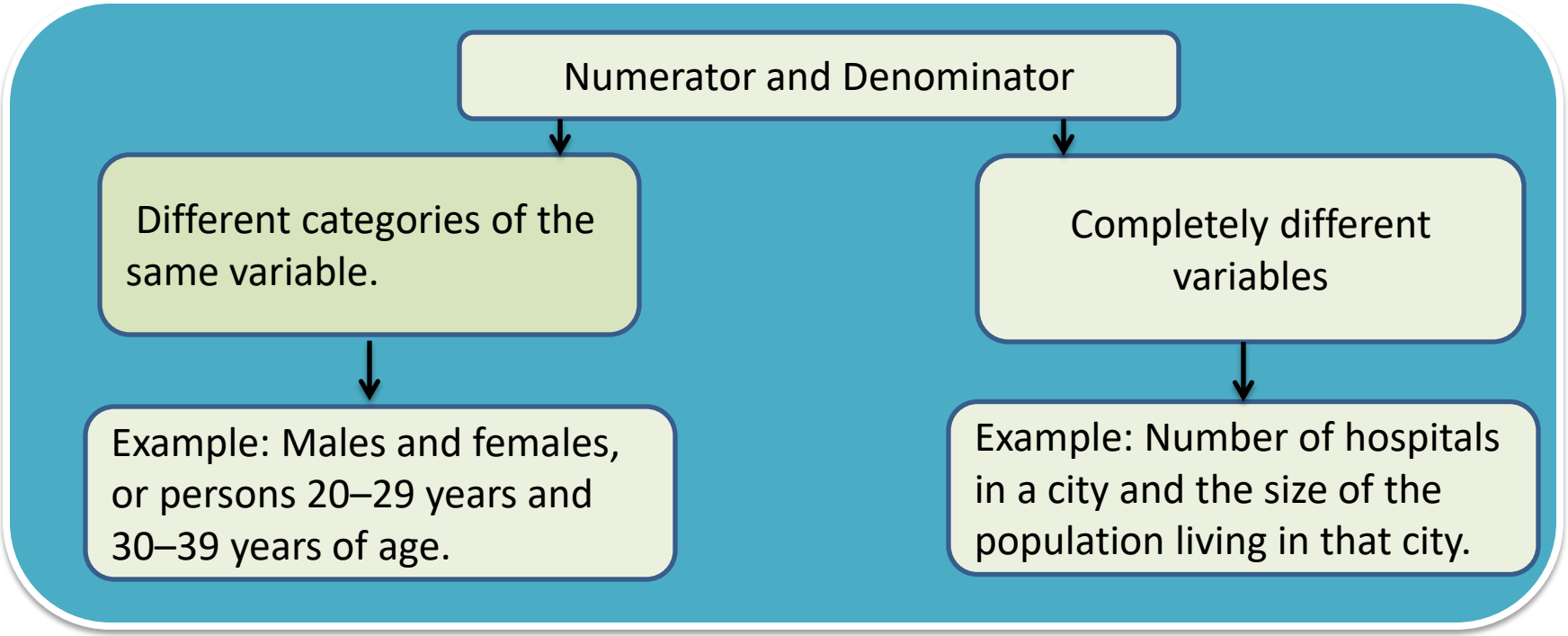
Ratio

A ratio is the relative magnitude of two quantities or a comparison of any two values.

Example: The number of children with scabies at certain time
The number of children with malnutrition at certain time

The numerator and denominator need not be related.

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY



TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

Example A: A city of 40,00,000 persons has 500 clinics.

1.25 clinics per 10,000 persons

Example B: Country X infant mortality rate in 2019was 10.7 per 1,000 live births.
Country Y infant mortality rate in 2019 was 3.8 per 1,000 live births.
Calculate the ratio of the infant mortality rate in Country X to that in Country Y.
$10.7 / 3.8 \times 1 = 2.8:1$
Thus, Country X's infant mortality rate was 2.8 times high as compared to Country Y's infant mortality rate in 2019.

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

A commonly used epidemiologic ratio

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Death-to-case ratio

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- Number of deaths attributed to a particular disease during a specified period divided by the number of new cases of that disease identified during the same period.

↓

- It is used as a **measure of the severity of illness**
- Death-to-case ratio for rabies is **close to 1** (that is, almost everyone who develops rabies dies from it), whereas the death-to-case ratio for the common cold is **close to 0**.

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

PROPORTION

A proportion is the comparison of a part to the whole.

It is a type of ratio in which the numerator is included in the denominator.

A proportion may be expressed as a decimal, a fraction, or a percentage.

Proportion can be used to describe:
What fraction of clinic patients tested positive for HIV,
What percentage of the population is younger than 25 years of age.

TOOLS OF MEASUREMENTS IN EPIDEMIOLOGY

Proportions are also used to describe the amount of disease that can be attributed to a particular exposure.

For example, on the basis of studies of smoking and lung cancer, public health officials have estimated that greater than 90% of the lung cancer cases that occur are attributable to cigarette smoking.