

**Measures  
of disease Frequency  
&  
Measures of association**

# **Part I**



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## **In this session (Part I,II,III)**

**We are going to introduce:**

- a. Basic measures of disease frequency**
- b. How they are calculated**
- c. Various measures of association between exposure and disease and type of information they each provide**

**During the previous lectures**

**The discipline of epidemiology  
encompasses:**

**Two objectives**

1. The description of the **distribution** of patterns of disease occurrence in population
2. The identification of **disease determinants**

**To achieve either of these objectives**

**It is necessary to measure:**

**the frequency of a disease or  
other outcome of interest**

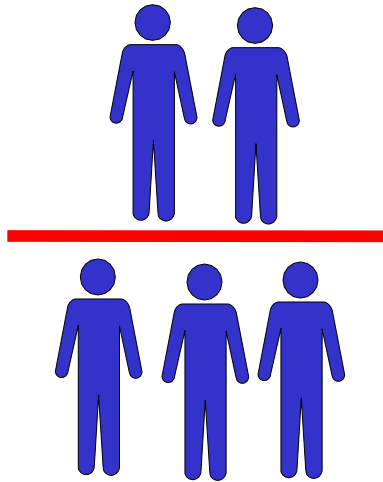
**A prerequisite for any epidemiologic investigation is:**

**the ability to quantify the occurrence of disease**

# Definition

**Three  
mathematical  
parameters:**

- **Ratio**
- **Proportion**
- **Rate**



- Ratio

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**The most basic measure is the ratio, by simply dividing one quantity by another without implying any specific relationship between the numerator and denominator.**

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# Ratio

- The division of two numbers
- Numerator **NOT INCLUDED** in the denominator
- Allows to compare quantities of different nature

$$\frac{\text{males}}{\text{females}} = 5 / 2 = 2.5 / 1$$

$$\frac{\text{beds}}{\text{doctors}} = 850 / 10 = 85 / 1$$

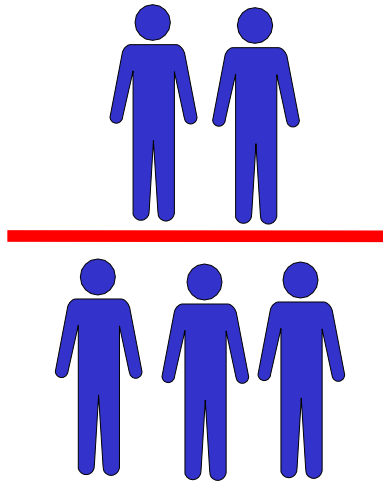
$$\frac{\text{participants}}{\text{facilitators}} = 3 / 1$$

**Ratio is a general term that includes a number of more specific measures, such as:**

**Proportion,**

**Percentage,**

**And rate.**



• **Proportion**

# Proportion

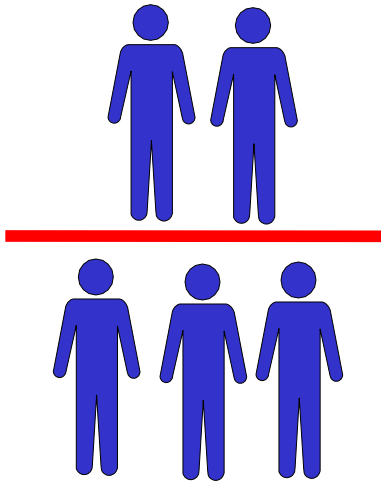
A proportion is **a type of ratio** in which those who are included in **the numerator** must **also be included in the denominator**

The proportion (percentage) of children among cases

# Proportion

- The division of 2 numbers
- Numerator **ALWAYS INCLUDED** in the denominator
- Quantities have to be of same nature
- Proportion always ranges between 0 and 1
- Percentage = proportion x 100

$$\frac{\text{males}}{\text{population}} = 400 / 1000 = 40\%$$



• Rate

# Rate

A rate, **is a ratio** and, most essentially, **a measure of time is an intrinsic part of denominator.**

**Thank  
you**

