

# Incidence

**Incidence is the measure of new cases (new cases = incident cases), per time unit.**

There are 2 measures of incidence: risk and rate.

## Risk

Risk is the probability of new occurrence of disease among individuals in an initially disease-free population during a defined time period.

To calculate a risk ( $r$ ), we divide the number of new cases ( $d$ ) in the defined period by the population at risk at the beginning of the period ( $N$ ):  $r = d/N$  (over a defined period). Risk is a probability but is often multiplied by a suitable number (e.g.: 100000), giving rise to examples such as: "Annual risk of death was 14 per 1000 in Kenya in 1 year"

## Odds of Disease/survival

It is a related measure of disease occurrence. For a defined population and time period, it is the number of cases divided by the number of people who did not become a case: Odds = Cases/Non-cases (in specified observed period of time). Also can be defined as: **Odds = risk/(1-risk)**

## Rate

Rate is a measure of the frequency of occurrence of new cases. Rate relates the number of new cases to the person-time ( $Y$ ) at risk = a measure that **takes into account changes in the size of the population at risk** during the follow-up period. In a defined population followed up for a period of time, we establish the total person-years at risk ( $Y$ ).

The observed rate ( $r$ ) is:  $r = d/Y$  (where  $d$  is number of new cases arising in the population)

We can also use person-months or person-days instead of person-years. The relationship between risk, rate and prevalence:

- Both measures of incidence, risk and rate, have as numerator the number of new cases occurring in a population, **however they have different denominators**
- (point) prevalence depends on the duration of disease ( $T$ ) and on the rate of disease ( $r$ );
- In special conditions (when disease is stable = both incidence rate and duration are stable) prevalence approximates the product of mean duration and incidence rate:
  - Prevalence  $\sim$  rate \* duration (proved by the units: time \* new cases / person\*time = new cases/people = prevalence)
  - Therefore: Duration  $\sim$  prevalence/rate
  - Example: If we have population of 10000 people, 10 new cases of cancer a year and 20 registered cases at any time, then the average duration of (survival from) the cancer is 20/10 (prevalence/rate) = 2 years

## Links

### Related articles

- Descriptive Studies
- Analytical Studies
- Experimental Studies
- Basic Health Indicators

### Bibliography

- BENCKO, Vladimír, et al. *Hygiene and Epidemiology : Selected Chapters*. 2nd edition. Prague. 2004. ISBN 80-246-0793-X.