

Basic Health Indicators

Cases

Before understanding any of the following terms, it's important to define what a case of a disease is, otherwise it is impossible to compare data. A case could be hospitalized patients or deaths. It can be either discrete (present or absent) or continuous (BP, serum cholesterol, intensity of infection).

Morbidity

It is the diseased state, disability, or poor health due to any cause. Morbidity rate can refer to either the incidence rate, or the prevalence of a disease or medical condition. This measure of sickness is contrasted with the mortality rate of a condition, which is the proportion of people dying during a given time interval.

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

Prevalence

Existing cases = prevalent cases. Prevalence is the proportion of individuals in a defined population that has the outcome (disease) under study at a defined instant (a point) in time ("point prevalence"); - Ranges between 0 and 1 (0%-100%). We use cross-sectional studies to obtain it. Achieved in intervals, cases are monitored in given time period (1 month, 1 year).

Mortality

Mortality rate is a measure of the number of deaths (in general, or due to a specific cause) in some population, scaled to the size of that population, per unit time. Mortality rate is typically expressed in units of deaths per 1000 individuals per year.^[1]

Various mortality types exist:

- **Cause-specific mortality rate:** number of deaths by a specific cause in a defined population in a defined period of time. No need for these people to be already sick (we look at the total population).
- **Crude (death) rate:** the number of events (deaths) in a specific period divided by person years at risk (often estimated as the population at the midpoint of the total period).
- **Age-specific mortality rates:** a rate for a specific age group.
- **Infant mortality rate:** number of deaths in children under 1 year of age divided by the number of live births in the same period, in a specified population.
- **Perinatal mortality rate:** the sum of neonatal deaths and fetal deaths (stillbirths) per 1000 births.
- **Maternal mortality rate:** number of maternal deaths by the number of women-years in the reproductive age (15-49). Maternal deaths are defined as "The death of a woman while pregnant or within 42 days from the end of the pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes".

Survival Rate

Survival rate is the proportion of survivors in a specified group, usually patients with a disease, who survived in a specified period of time. Survival rate is the proportion of survivors in a specified group, usually patients with a disease, who survived in a specified period of time.

Lethality Rate

Lethality = number of deaths / over number of sick with **a specific disease** (x100) It is also known as **Case fatality rate**. It is the proportion of cases in a designated population of a particular disease, which die in a specified period of time.

Note: lethality is a *better measure* of clinical significance of the disease than mortality. For example: *Naegleria fowleri* has a much higher lethality (it will surely kill you once you get it), than heart attacks who have a higher mortality, that is, more people die from heart attacks (due to much higher prevalence of cardiac disease) rather than from *N. fowleri* infection (very low prevalence).

Links

Related articles

- Descriptive Studies
- Analytical Studies
- Experimental Studies

References

1. Wikipedia.org. *Mortality rate* [online]. The last revision 2011-11-17, [cit. 2011-11-28]. <http://en.wikipedia.org/wiki/Mortality_rate>.

Bibliography

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