

Prevalence

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Prevalence or **prevalence proportion**, in epidemiology, is the proportion of a population found to have a condition (typically a disease or a risk factor such as smoking or seat-belt use). It is arrived at by comparing the number of people found to have the condition with the total number of people studied, and is usually expressed as a fraction, as a percentage or as the number of cases per 10,000 or 100,000 people. "Point prevalence" is the proportion of a population that has the condition at a specific point in time. "Period prevalence" is the proportion of a population that has the condition at some time during a given period ("12-month prevalence", etc.), and includes people who already have the condition at the start of the study period as well as those who acquire it during that period. "Lifetime prevalence" (LTP) is the proportion of a population that at some point in their life (up to the time of assessment) have experienced the condition.^[1]

Prevalence estimates are used by epidemiologists, health care providers, government agencies, and insurers.

Prevalence is contrasted with incidence, which is a measure of *new* cases arising in a population over a given period (month, year, etc.). The difference between prevalence and incidence can be summarized thus: prevalence answers "How many people have this disease right now?" and incidence answers "How many people per year newly acquire this disease?".

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Examples and utility

In science, *prevalence* describes a proportion (typically expressed as a percentage). For example, the prevalence of obesity among American adults in 2001 was estimated by the U. S. Centers for Disease Control (CDC) at approximately 20.9%.^[2]

Prevalence is a term which means being widespread and it is distinct from incidence. Prevalence is a measurement of *all* individuals affected by the disease at a particular time, whereas incidence is a measurement of the number of *new* individuals who contract a disease during a particular period of time.

To illustrate, a long term disease that was spread widely in a community in 2002 will have a high prevalence at a given point of 2003 (assuming it has a long duration) but it might have a low incidence rate during 2003 (i.e. lots of existing cases, but not many new ones in that year). Conversely, a disease

that is easily transmitted but has a short duration might spread widely during 2002 but is likely to have a low prevalence at any given point in 2003 (due to its short duration) but a high incidence during 2002 (as many people develop the disease). As such, prevalence is a useful parameter when talking about long lasting diseases, such as HIV, but incidence is more useful when talking about diseases of short duration, such as chickenpox.

Uses

Lifetime prevalence

Lifetime prevalence (LTP) is the number of individuals in a statistical population that at some point in their life (up to the time of assessment) have experienced a "case" (e.g., a disorder), compared to the total number of individuals (i.e. it is expressed as a ratio or percentage). Often, a 12-month prevalence (or some other type of "period prevalence") is used in conjunction with lifetime prevalence. There is also point prevalence, the prevalence of disorder at a more specific (a month or less) point in time. There is also a related figure lifetime morbid risk - the theoretical prevalence at any point in life for anyone, regardless of time of assessment.

Period prevalence

In epidemiology, **Period prevalence** is the proportion of the population with a given disease or condition over a specific period of time. It could describe how many people in a population had a cold over the cold season in 2006, for example. It is expressed as a percentage of the population and can be described by the following formula:

Period prevalence (ratio) = Number of cases that occurred in a given period ÷ Number of people in the population during this period

The relationship between incidence (rate), point prevalence (ratio) and period prevalence (ratio) is easily explicated via an analogy with photography. Point prevalence is akin to a flashlit photograph: what is happening at this instant frozen in time. Period prevalence is analogous to a long exposure (seconds, rather than an instant) photograph: the number of events recorded in the photo whilst the camera shutter was open. In a movie each frame records an instant (point prevalence); by looking from frame to frame one notices new events (incident events) and can relate the number of such events to a period (number of frames); see incidence rate.

Point prevalence

In epidemiology, **point prevalence** is a measure of the proportion of people in a population who have a disease or condition at a particular time, such as a particular date. It is like a snap shot of the disease in time. It can be used for statistics on the occurrence of chronic diseases. This is in contrast to period prevalence which is a measure of the proportion of people in a population who have a disease or condition over a specific period of time, say a season, or a year. Point prevalence can be described by the formula: Prevalence = Number of existing cases on a specific date ÷ Number of people in the population on this date ^[3]

Limitations

It can be said that a very small error applied over a very large number of individuals (that is, those who are *not affected* by the condition in the general population during their lifetime; for example, over 95%) produces a relevant, non-negligible number of subjects who are incorrectly classified as having the condition or any other condition which is the object of a survey study: these subjects are the so-called false positives; such reasoning applies to the 'false positive' but not the 'false negative' problem where we have an error applied over a relatively very small number of individuals to begin with (that is, those who are *affected* by the condition in the general population; for example, less than 5%). Hence, a very high percentage of subjects who seem to have a history of a disorder at interview are false positives for such a medical condition and apparently never suffered a fully clinical syndrome.

A different but related problem in evaluating the public health significance of psychiatric conditions has been highlighted by Robert Spitzer of Columbia University: fulfillment of diagnostic criteria and the resulting diagnosis do not necessarily imply need for treatment.^[4]

A well-known statistical problem arises when ascertaining rates for disorders and conditions with a relatively low population prevalence or base rate. Even assuming that lay interview diagnoses are highly accurate in terms of sensitivity and specificity and their corresponding area under the ROC curve (that is, AUC, or area under the receiver operating characteristic curve), a condition with a relatively low prevalence or base-rate is bound to yield high false positive rates, which exceed false negative rates; in such a circumstance a limited positive predictive value, PPV, yields high false positive rates even in presence of a specificity which is very close to 100%.^[5]

See also

- Denominator data
- Rare disease
- Base rate fallacy

References

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- http://www.cdc.gov/nccdphp/dnpa/obesity/trend/prev_reg.htm
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External links

- PlusNews, the UN's HIV/AIDS news service provides HIV prevalence rates for nearly 60 countries worldwide (<http://www.plusnews.org/country-profile.aspx>)
- Synopsis of article on "How Prevalent Is Schizophrenia?"

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from Public Library of Science (<http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0020146>)

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