Measures of disease occurrence

Prevalence, P, is the number of instances of disease or related attributes (e.g., infection or presence of antibodies) in a known population, at a designated time, without distinction between old and new cases. When the time is not specified, prevalence usually refers to point prevalence; that is, the amount of disease in a population at a particular point in time.

Period prevalence refers to the number of cases that are known to have occurred during a specified period of time; for example, a year (annual prevalence). It is the sum of the point prevalence at the beginning of the period and the number of new cases that occur during the period, and can therefore be used when the exact time of onset of a condition is not known (e.g., some behavioural condition). Lifetime prevalence is the number of individuals known to have had disease for at least part of their life.

Prevalence = (number of diseased animals/population at risk) $_x$100

Incidence: is the number of new cases that occur in a known population over a specified period. The two essential components of an incidence value are

1- The number of new cases
2- The period of time over which the new cases occurs

Incidence, like prevalence, can be defined simply in terms of the number of affected animals, but again is usually expressed in relation to the population at risk.

Cumulative incidence

The cumulative incidence, el, (also termed risk) is the proportion of non-diseased individuals at the beginning of a period of study that become diseased during the period: CI= (number of individuals that become diseased during the particular time / number of healthy individuals in population at the beginning of time)

Incidence rate(I.R) measures the rapidity with which new cases of disease develop over time:

$$IR = \frac{\text{number of neww cases of disease that occur in population during the particular period of time}}{\text{the some of individuals of the length of time at risk of developing disease}}$$

The relationship between prevalence and incidence rate

A disease with a long duration is more likely to be detected during a cross-sectional survey than is a disease of short duration. For example, chronic arthritis, lasting for several months, could be detected by a cross-sectional abattoir survey that was undertaken any time during the several months that the arthritis was present. However, clinical lou ping-ill, lasting for a few days, could be detected by a cross-sectional survey only if the survey was conducted during the short period that the disease was apparent. Prevalence, P, therefore depends on the duration, and the incidence rate, I, of a disease: P= I *D.

This means that a change in prevalence can be due to:

• a change in incidence rate;

• a change in the average duration of the disease;

• a change in both incidence rate and duration.

A decrease in the incidence rate of a disease such as Johne's disease in cattle eventually will decrease the overall prevalence of the disease. Improvements in the therapy of diseases that are frequently fatal may decrease mortality, but could increase prevalence by prolonging the life of diseased animals that otherwise would have died quickly. For example,antibiotic treatment of acute bacterial pneumonia could decrease the fatality of the disease but could increase the number of convalescent animals with chronic pneumonia.

The prevalence of a disease also can be decreased if the duration of the disease is reduced. Improvements in therapy, for instance, may accelerate recovery.

Mortaliy is the number of dead animals from the susceptible animals

Fatality is the number of dead animals from the diseased animals