

## **Describing disease occurrence**

Some basic terms

Endemic occurrence

'Endemic' is used in two senses to describe:

1. The usual frequency of occurrence of a disease in a population;
2. The constant presence of a disease in a population
  - Thus, the term implies a stable state; if a disease is well understood, then its endemic level is often predictable.
  - The term 'endemic' can be applied not only to overt disease but also to disease in the absence of clinical signs and to levels of circulating antibodies. Therefore, the exact context in which the term is used should always be defined.
  - 'Endemic' is applied not only to infectious diseases but also to non-infectious ones: the veterinary meat hygienist is just as concerned with the endemic level of carcass bruising as is the veterinary practitioner with the endemic level of pneumonia in pigs.

Epidemic occurrence

- 'Epidemic' originally was used only to describe a sudden, usually unpredictable, increase in the number of cases of an infectious disease in a population. In modern epidemiology, an epidemic is an occurrence of an infectious or non-infectious disease to a level in excess of the expected (i.e., endemic) level.

Pandemic occurrence

- A pandemic is a widespread epidemic that usually affects a large proportion of the population. Many countries may be affected.

### Sporadic occurrence

- A sporadic outbreak of disease is one that occurs irregularly and haphazardly. This implies that appropriate circumstances have occurred locally, producing small, localized outbreaks.

### The structure of animal populations

- The structure of populations influences the extent to which the size of the population at risk can be assessed, as well as affecting the ways in which disease occurs and persists in animals. The organization of animal populations can usually be described as either contiguous or separated.

### Contiguous populations

- A contiguous population is one in which there is much contact between individuals in the population and members of other populations. Contiguous populations therefore predispose to transfer and persistence of infectious diseases over large areas because of the inherent mixing and movement of animals.
- Most human populations are contiguous because there is mixing of individuals by travel. Populations of small domestic animals also are usually contiguous.
- Dogs and cats that are not confined to houses move freely within cities, coming into contact with other urban, suburban and rural animals of their own and different species. African nomadic tribes similarly own animals that comprise contiguous groups. Many wild animals belong to this category, too.

### Separated populations

- Separated populations occur as discrete units such as herds and flocks. They are particularly common in countries that practise intensive animal production, with many animals on one farm (e.g., many of the developed countries). Table 4.3 illustrates the various sizes of these units in the UK; most animals of all species are kept in larger units.

- A separated population can be closed, with no movement of animals into or out of the unit (except to slaughter). An example is a dairy herd that raises its own replacements, or is under statutory control of movement. Two extreme examples of closed populations are the specific-pathogen-free (SPF) and gnotobiotic colonies of laboratory animals.
- A separated population can also be open, with limited movement of individuals in and out. Examples include beef herds where animals are brought in from other farms and markets for fattening, and dairy herds that receive replacements from other farms.