

Descriptive Epidemiology

Diseases do not affect different populations in the same way and the aim of descriptive epidemiology is to describe how diseases are distributed in populations. Descriptive epidemiology summarizes and presents data on a particular disease according to three major variables (**epidemiological variables**) which are **person, place** and **time**. In other words it tells us who is affected by the disease (person characteristics), where the disease occurs (places of occurrence) and when it occurs (time and period of occurrence).

Uses of descriptive epidemiology

Analysing and presenting data of health events according to person, place and time is important for the following reasons:

1. Finding trends and changes regarding occurrence of the disease/health event
2. Understanding the public health problem in relation to the disease described
3. Providing detailed data about time, person and place of occurrence which are essential for public health interventions
4. Providing ideas and hypotheses for analytical research to search for aetiology of the disease.

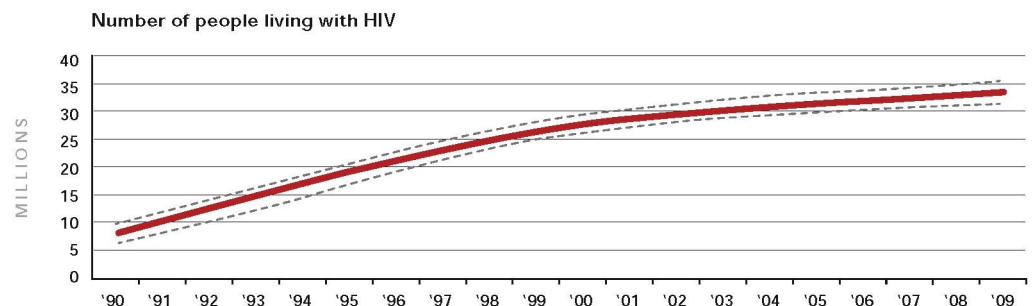
Types of descriptive studies

Descriptive epidemiological data could be collected in several ways including the three types of studies briefly described below:

1. **Case reports:** a case report is description on a single or a few cases of a disease or health-related event which the epidemiologist or clinician thinks is noteworthy and important for advancement of knowledge and practice. Case reports could be about new events, complications of clinical procedures or atypical presentations of known diseases.
2. **Case series:** a case series collects information on a larger number of cases of the same disease happening in a particular population. The information is classified to highlight common features and differences in disease characteristics which will be useful for better understanding of the disease and control and possibly its aetiology.
3. **Cross-sectional studies:** a cross-sectional study collects information on a sample of the population and aims to describe prevalence of a particular health-related problem. This will be explained in a separate lecture.

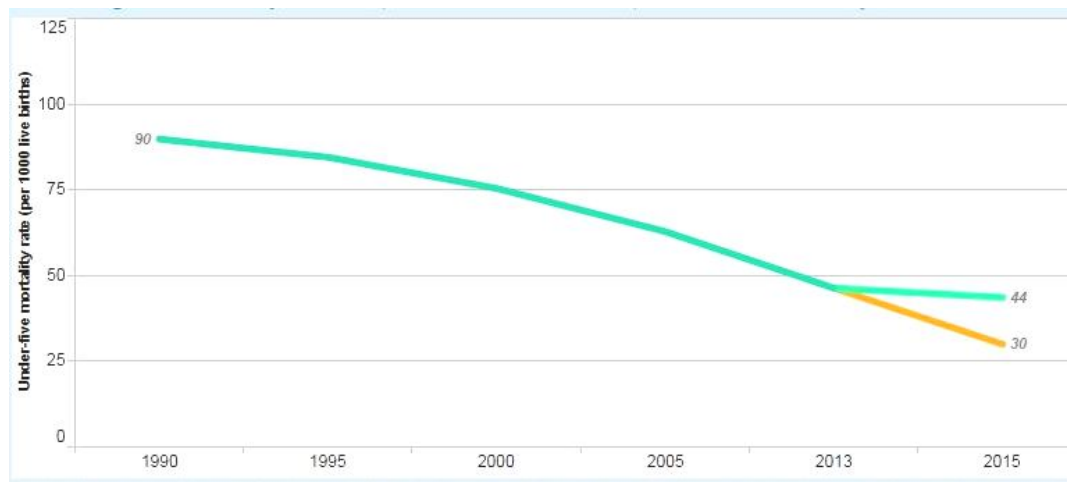
Time variables

Diseases do not occur at a constant rate around the year and over longer periods of time. Variation of disease rates over time may be regular or irregular. For example more cases of influenza occur with the start of the cold season while diarrhoea is more frequent in hot seasons. Awareness on these changes gives the health authorities the ability to be prepared in time to undertake needed measures to prevent the disease e.g. to vaccinate vulnerable individuals against influenza. In descriptive epidemiology we tabulate the time variations or even better we present it graphically with the time on the horizontal (x) axis and number of cases on the vertical (y) axis. The period could be days, months, years or even decades depending on the health event we are describing. Time trends in disease variation could be present and reported in the following ways:



Secular (long-term) trends: secular trends reflect gradual changes in the occurrence of the disease over long periods of time. This is important particularly for chronic disease and tells us how the disease is evolving over years and decades; whether it is decreasing, increasing or being stable. The UNAIDS graph above shows number of people living with HIV from 1990 to 2009 and show that HIV cases have been increasing through the period from less than 10 million to 35 million. .

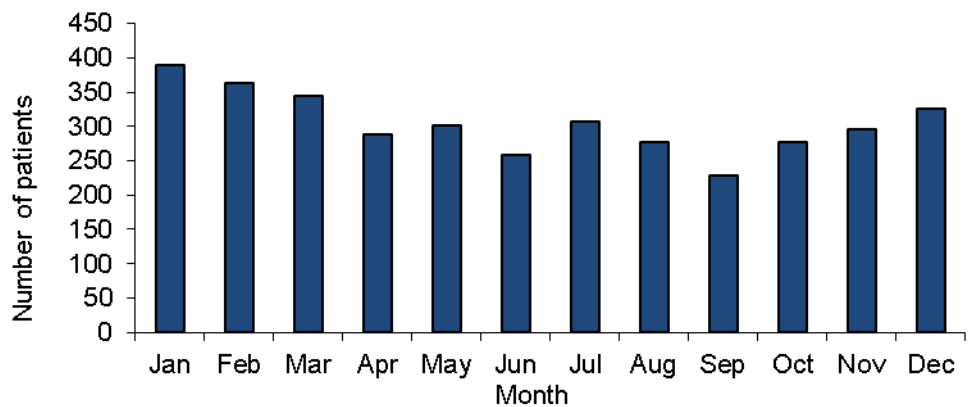
Secular trends data can be used to show progress over time in relation to control of health-related problems. The WHO graph below shows that mortality rate of children under 5 years of age had been steadily decreasing globally from 90 per 1000 live births in 1990 and expected to reach 44 in 2015.



Seasonal (Cyclic) trends: Occurrence of some diseases increases and decreases during a year, seasons, months or even days.

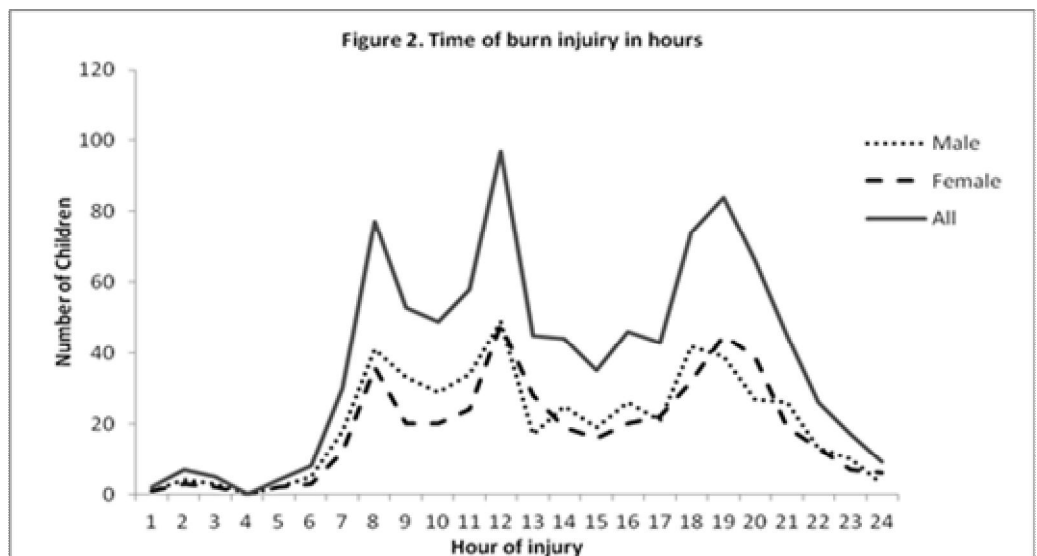
This cyclic variation happens in some infectious diseases and chronic diseases. Number of cases of influenza usually increases with start of the cold season and diarrhoea usually increases in summer months. Graphing such trends will show any patterns of variation if present and will be useful for control measures. Seasonal patterns may also provide some clues about the cause of the disease and the reason for its increased occurrence in that particular period of time. The graph (figure 1) shows frequency of burn injuries in Sulaimani province population by month and indicates that they are more common in colder months of winter.

Figure 1. Variation of number of burn injuries by month, Sulaimani 2008 (n=3657)



Frequency of some health events may vary in shorter time periods. Figure 2 shows occurrence of burn injuries by single hours amongst pre-school children in Sulaimani and clearly indicates that more burns occur during the 3 main meal times and least during sleeping hours.

Figure 2. Time of burn injury in hours

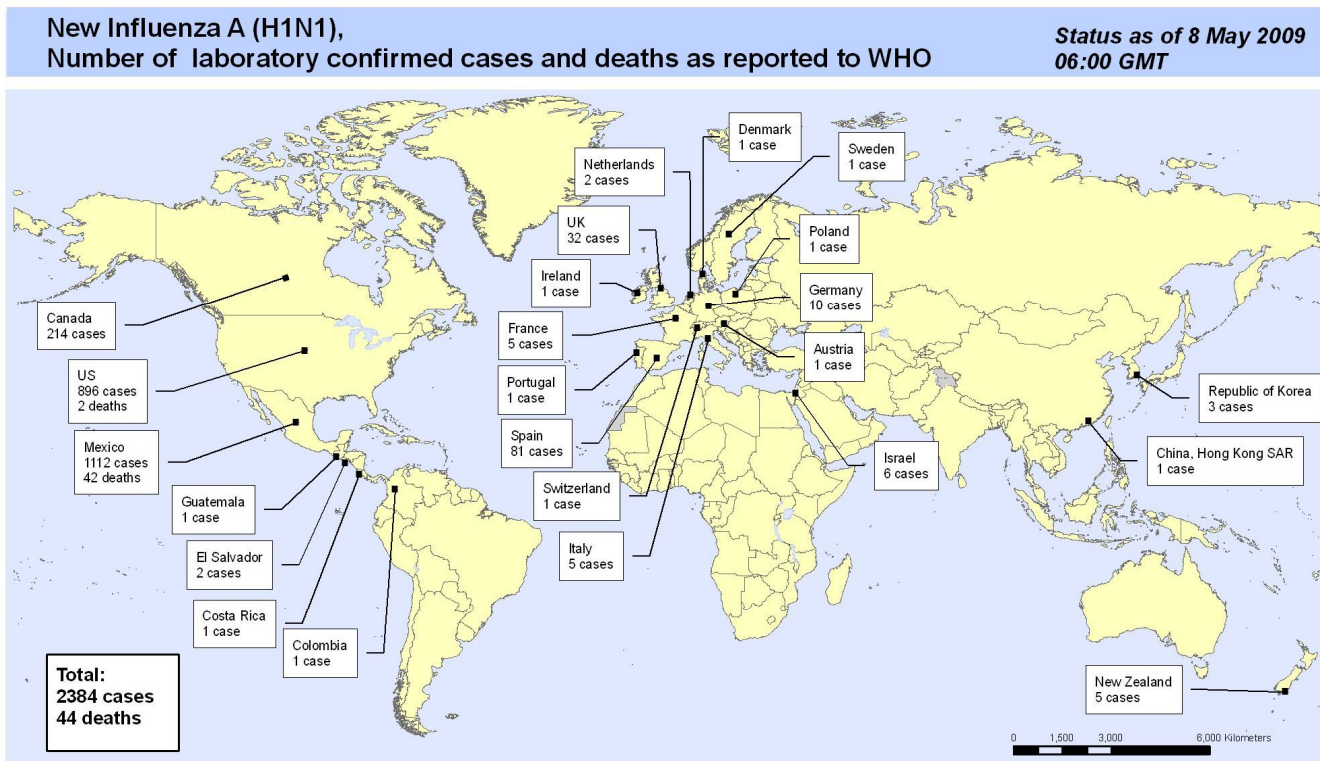


Epidemics: Sometimes a sudden unexpected increase happens in number of cases of a particular disease and this change is called an epidemic or an outbreak if it is limited to a small locality. An epidemic means occurrence of an infectious disease in a

community clearly in excess of what is normally expected, or occurrence of a new infectious disease even only a few cases. In case of rare disease even appearance of few cases may be considered an epidemic but when the disease is common such as diarrhoea, the number of cases must be substantially increased to be considered and epidemic. In a *point source epidemic* a sharp increase in the number of cases happens when all infections happen from a single exposure. For example when attendants of a wedding party eat a contaminated cake and many of them get diarrhoea next morning. In *extended source epidemic* there is repeated exposure to the same source of infection such as when villages getting diarrhoea from drinking water from a contaminated well. In a *propagated epidemic*, the infectious agent continues to spread from persons to person. In this case the increase in number of cases will last for a longer period. Measles and chickenpox can start as a point source or extended source epidemic in a school and continue as a propagated epidemic.

Place variables

Knowing the place or places of occurrence of a health event is also important and essential for preventive activities. A disease could happen over a wide international region, in one country, in a local community, a school, a swimming pool or any other location. Analysis and presentation of disease data by place could be according to these places and others such as place of residence, urban/rural, birthplace, workplace, hospital ward or any other location that could be related to the occurrence of the disease. The map below shows number of avian flu cases in humans reported around the world by 2006.



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization



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Map produced: 8 May 2009 06:00 GMT

Analysis by place of residence could give us a clue about the cause of the health event. When John Snow analysed cholera deaths of London by neighbourhood of residence and location of the water pump supplying the houses with drinking water, he concluded that cholera was caused by polluted water. If we realize that a disease is common in a particular village, the aetiology may be related to geographical factors or host factors unique to the people of this village. Table 1 presents prevalence of female genital mutilation in Iraqi Kurdistan in 2011 classified by place of residence. What you can say from this table?

Person variables

Factors related to the host (person) plays an important role in causation of diseases, therefore frequency of various diseases varies according to those characteristics of people which are relevant to the disease. In descriptive epidemiology we classify diseases according major personal characteristics such age, sex, ethnicity, residence, socioeconomic status variables, occupation and others. By this classification, we will get an initial idea about groups of people who are more at risk of the disease and such information will be important for control purposes. Age is the most important person characteristics because it is relevant to most health-related problems. Frequency of many diseases varies in different age groups. Infants, children, adolescents, adults and older persons have different health problems. When present data by age group we should avoid using wide intervals because it may conceal variations, we better use smaller and more logical intervals such as 0-5 6-10 and so on. However there is no set ranges, and it depends on the disease being studied and the age range included in the study.

Other “person” variables are also important and should be analysed when we think they might be related to the disease. Table 1 opposite displays person characteristics Of 197 women who committed suicide by self-burning and admitted to Sulaimani burns centre in 2008. Look at the percentage (%) column and reflect on the results.

Table 1. Prevalence of FGM in Iraqi Kurdistan

Characteristics	Total Sample	Persons with FGM Number (%)
Province of Residence		
Erbil	502	186 (37.1)
Sulaymaniyah	503	144 (28.6)
Dohuk	503	18 (3.6)
Urban/Rural		
Urban	1225	288 (23.5)
Rural	240	41 (17.1)

Table 1. Background characteristics of patients admitted for deliberate self-burning, Sulaimani 2008 (n=197)

Characteristics	Number	%
Sex		
Male	12	6.1
Female	185	93.9
Age		
11 to 18 years	85	43.2
19 to 29 years	70	35.5
30 to 59 years	37	18.8
60 and over	5	2.5
Residence		
Sulaymaniyah city	55	27.9
Outside Sulaymaniyah city	88	44.7
Other provinces	54	27.4
Living standard		
Poor	45	28.0
Fair/good	116	72.0
Education		
None	44	25.6
Primary	73	42.4
Middle	45	26.2
High school/ higher	10	5.8
Occupation/role		
Child/dependant	89	46.4
Housewife	84	43.8
Employed	14	12.0
Other	5	2.6
Marital status		
Never married	93	47.
Married	88	49.7
Separated	6	3.2