

Epidemiology: A Very Short Introduction
By Rodolfo Saracci

Epidemiology is the study of the changing patterns of disease. It is a vital field, central to the health of society, to the identification of causes of disease, and to their management and prevention. This *Very Short Introduction* dispels some of the myths relating to clinical trials, vaccination campaigns, and statistics concerning disease.

Questions for thought and discussion

- Is epidemiology the scientific discipline that investigates epidemics and local outbreaks of contagious infectious diseases? Or does it also deal with other diseases?
- Does epidemiology deal with populations or individuals?
- How many items of information need to be known in order to measure how often a disease occurs in a population? Is it enough to know the number of recorded cases?
- When inquiring as to whether AIDS is more frequent in the cities than in the countryside you realize that the urban population includes substantially more young people than the rural population: how can you take this into account when comparing the frequency of AIDS in the two populations?
- It is reported that in many cases of car accidents the driver was using a mobile phone at the moment of the accident. How can you exclude that this is just a coincidence?
- How can the uncertainty in the result of a study, for example in the measure of the frequency of hypertension in a population, be expressed in numerical form?
- It is often said that ‘correlation is not causation’ meaning that if you find that stork nests are more frequent in areas with high birth rates it does not mean that babies are brought by storks. By which reasoning can you support this intuitive judgement?
- Not all subjects who smoke develop lung cancer, and a number of non smokers get lung cancer. Does this imply that tobacco smoke is not a cause of lung cancer?
- The fact that no cases of diseases have been reported in people exposed to genetically modified organisms can be taken as evidence that those organisms currently on the market have no adverse effect on health? If yes, why? If not, why?
- What is the best way to test whether a new vaccine, judged to be promising from studies in the laboratory and in experimental animals, is efficacious in humans?
- Are people with skin cancer exposed to sunlight too often or too exposed to sunlight without protection? To correctly answer this question with whom should they be compared?
- For what kind of epidemiological studies are repositories for long-term storage of blood samples (‘bio-banks’) established?
- How can the start of an epidemic of influenza be detected and its development monitored?
- If everybody smoked the same type and amount of cigarettes since the same age would it be possible to identify tobacco smoking as a cause of lung cancer? And what about other causes?
- In which way can the results of several separate studies, for example on the role of physical exercise in heart attacks, be combined to provide a single answer?

- What are the ‘number needed to treat’ (NNT) and the ‘number needed to screen’ (NNS)?
- Which ethical principles need to be respected when conducting an epidemiological investigation?
- What are the social determinants of health and disease and how important they are at national and international level?

Other books by Rodolfo Saracci

Olsen J, Saracci R, *Trichopoulos D. Teaching epidemiology*, 2nd ed. (Oxford: Oxford University Press, 2010.)

Vineis P, Saracci R. *Gene-environment interactions in public health*. In *Oxford Textbook of Public Health* (eds.) , 5th ed. (Oxford : Oxford University Press, 2009, p.957-970.)

Further reading

Bonita R, Beaglehole R, Kjelleström T. *Basic epidemiology*, 2nd ed. (Geneva: World Health Organization, 2006.)

Rothman KJ. *Epidemiology: An introduction*. (Oxford: Oxford University Press, 2002.)