

## Designing epidemiological studies for biomedical research.

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### Introduction

Epidemiology researchers are interested in determining or evaluating the link between exposure and disease or result. They start by developing the hypothesis based on the research topic, and then choose which study design will best answer it. How the researcher performs the investigation is determined by the study design. The method used to establish if exposure and a specific outcome are linked can be classified as either experimental or observational. In an experimental study design, researchers assign patients to intervention and control/comparison groups in order to determine the intervention's effects. Researchers can control a variety of aspects of the experimental study design to identify causal links between actions and expected results. An experimental study design is not always practicable or appropriate, thus observational studies are utilised instead. Observational studies are non-experimental in nature since they merely monitor patients in an uncontrolled situation without intervening with or influencing other aspects of the study. The observation can be prospective, retrospective, or current, depending on the type of observational study [1].

### Modern era

A doctor from Verona named Girolamo Fracastoro was the first to suggest a theory that these very minute, unseen particles that cause disease were living in the middle of the 16<sup>th</sup> century. They were said to be able to spread through the air, multiply on their own, and be destroyed by fire. He disputed Galen's miasma idea in this way (poison gas in sick people). He was the first to preach personal and environmental cleanliness to avoid sickness in his book *De contagione et contagiosis morbis*, published in 1543. Antonie van Leeuwenhoek's invention of a strong microscope in 1675 provided visible evidence of living particles, supporting the germ theory of disease [2].

Wu Youke created the theory that some diseases are caused by transmissible agents during the Ming Dynasty, which he named after witnessing many epidemics flare around him between 1641 and 1644. His book *Wen Yi Lun* (Treatise on Pestilence/Treatise on Epidemic Diseases) is considered the primary etiological work that established the concept. His

ideas were still being studied by WHO in 2004 when they looked into the SARS outbreak in the context of traditional Chinese medicine [3].

In the late 1600s, another pioneer, Thomas Sydenham, was the first to distinguish the fevers of Londoners. His thoughts on fever treatments were met with a lot of scepticism from orthodox doctors at the time. He couldn't figure out what caused the smallpox fever he was researching and treating [4].

*Natural and Political Observations. Concerning the Bills of Mortality* was published in 1662 by John Graunt, a haberdasher and amateur statistician. He analysed London's mortality rolls prior to the Great Plague, provided one of the first life tables, and recorded time trends for a variety of diseases, both new and old, in it. He offered statistical proof for several disease theories, as well as refuting other well held beliefs [5].

John Snow is renowned as the "Father of (Modern) Epidemiology" for his study into the causes of the 19<sup>th</sup>-century cholera epidemics. He began by seeing the much higher death rates in two Southwark Company-supplied districts. The classic example of epidemiology is his identification of the Broad Street pump as the origin of the Soho epidemic.

### References

1. Pearce N. Classification of epidemiological study designs. *Int J Epidemiol.* 2012;41(2):393-7.
2. Petersen I, Douglas I, Whitaker H. Self controlled case series methods: an alternative to standard epidemiological study designs. *bmj.* 2016;354.
3. Bombardier C. Research challenges: overview of epidemiological study designs. *J Rheumatol. Supplement.* 1988;17:5-8.
4. Martin RM. Epidemiological study designs for health care research and evaluation. *Handbook of Health Research Methods: Investigation, Measurement and Analysis*, McGraw-Hill Education, Berkshire. 2005;16:98-163.
5. Li L, Zhang M, Holman DA. Population versus hospital controls for case-control studies on cancers in Chinese hospitals. *BMC Med Res Methodol.* 2011;11(1):1-8.

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