Center for Spatially Integrated Social Science

John Snow: The London Cholera Epidemic of 1854
By Scott Crosier

Background

John Snow (1813–1858) was educated at a private school until, at the age of fourteen, he was apprenticed to a surgeon living at Newcastle-on-Tyne. After serving as a colliery surgeon and unqualified assistant during the London Cholera epidemic of 1831–1832, he became a student at the Huntierian School of Medicine in Great Windmill Street, London. After two years of schooling, he was accepted a member of the Royal College of Surgeons of England. He graduated M.D. of the University of London in 1844.

In 1849 Snow published a small pamphlet "On the Mode of Communication of Cholera" where he proposed that the "Cholera Poison" reproduced in the human body and was spread through the contamination of food or water. This theory was opposed to the more commonly accepted idea that Cholera, like all diseases, was transmitted through inhalation of contaminated vapors. Although he was awarded for this work, without the technology and knowledge that we have today, Snow had no way to prove his theory.

Innovation

It wasn't until 1854 that Cholera struck England once again, that Snow was able to legitimate his argument that Cholera was spread through contaminated food or water. Snow, in investigating the epidemic, began plotting the location of deaths related to Cholera (see illustration). At the time, London was supplied its water by two water companies. One of these companies pulled its water out of the Thames River upstream of the main city while the second pulled its water

from the river downstream from the city. A higher concentration of Cholera was found in the region of town supplied by the water company that drew its water form the downstream location. Water from this source could have been contaminated by the city's sewage. Furthermore, he found that in one particular location near the intersection of Cambridge and Broad Street, up to 500 deaths from Cholera occurred within 10 days.

After the panic-stricken officials followed Snow's advice to remove the handle of the Broad Street Pump that supplied the water to this neighborhood, the epidemic was contained. Through mapping the locations of deaths related to Cholera, Snow was able to pinpoint one of the major sources of causation of the disease and support his argument relating to the spread of Cholera.

Snow's classic study offers one of the most convincing arguments of the value of understanding and resolving a social problem through the use of spatial analysis. Nonetheless, there is some controversy regarding whether Snow made the map prior to or after the removal of the pump handle and about the timing of this removal relative to the temporal pattern of cholera deaths.

While mapping has become a standard research approach in medical geography and epidemiology, today's researchers express the incidence of disease as a rate relative to the population or to the population within age cohorts (e.g., deaths per 1,000 population) so as to factor out the influence of population density. Using such refinements to the methods employed by Snow, mapping and spatial statistical techniques assist medical practitioners in understanding the diffusion and spread of diseases within communities and across the globe.

This is a portion of the original map created by Dr. John Snow. Through plotting the deaths (signified by a line parallel to the building front in which the people died), Dr. Snow was able to trace the spread of Cholera to the pump at the corner of Cambridge and Broad Street. Click the image to view a bigger area.

Publications

Snow on Cholera, New York: The Commonwealth Fund: Oxford University Press, 1936.

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Related Works

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Brody, H., M. R. Pip, et al. Map-making and Myth-making in Broad Street: The London Cholera epidemic, 1854. *The Lancet* 356(9223): 64–68. 2000

Links Snow's Cholera Map
John Snow - A Historical Giant in Epidemiology