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The Use of Geospatial Tools to Study and Control the Lisbon's Yellow Fever Outbreak in 1857

Although the most known example of the use of geospatial tools to study diseases spread in the 19th century is continuously connected with John Snow's Broad Street Pump study in 1854, the use of these tools can be tracked since 1798. At the beginning of the 19th century, geospatial tools started to be used by Medical Officers to control diseases, mainly for yellow fever and cholera control. These tools were deeply implemented in the United Kingdom by the 1840s, and it is possible to see the advanced level of analysis at that time with the "Report of the General Board of Health on the epidemic cholera of 1848 & 1849" published in 1850 by the Royal College of Physicians.

It is possible that the use of these tools then spread to the rest of Europe. One of those best examples was the use of spatial tools to the yellow fever control in Lisbon in 1857. The "Report of the yellow fever epidemic in Lisbon in the year of 1857" released in 1859 by the Portuguese Kingdom's Extraordinary Council of Public Health.

The outbreak had a profound impact on Lisbon's, affecting 7,94% of its population. Between the period of September 15th to December 31st, 1857 — from 13425 cases of yellow fever — 4812 people died, a fatality rate of 35.8%.

This report describes not only a detailed urbanistic plan of the city of Lisbon but also the hotpots of yellow fever incidence by Lisbon's neighborhoods and parishes. To process this data within a map, the council collected data on the number of deaths by Lisbon's parishes and streets. This map supported the analysis carried out on the rest of the report, namely the different hypotheses for disease spread and options for disease control and its future prevention.

The report included a detailed chronogram of the disease progression between 1855 and 1857, a summary of the meteorological conditions in Lisbon in 1857, and disaggregated data by age groups, civil status, gender, profession, number of deaths per month, mean of the disease duration, health services performance and vaccination status. The report also underlined the differences in hygiene conditions in different locations as an explanation for the disease outbreak in specific neighborhoods in Lisbon.

In conclusion, the use of geospatial tools started to be used as an important tool for disease control by national public health institutions since the 1840s in Europe, and these tools also played an essential role in the study and control of the yellow fever outbreak in Lisbon in 1857.

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