**Interactive map section**

**Use the text below and copy and paste when adding the descriptive details about the pop-up images for the interactive map tutorial.**

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| **Title** | **Description** |
| Broad Street Pump | Image of icon Broad Street Pump.  Lore: John Snow knew that this pump was contaminated with some pathogen, and it was the source of the Cholera outbreak. He broke the handle as a measure to prevent people using it which lowered the disease burden |
| John Snow Pub | This iconic location is a Pub named after the great John Snow for his works in Soho District.  Lore: John Snow (15th March 1813 to 16 June 1858) was an English physician and a leader in the development of anaesthesia and medical hygiene. He is considered one of the founders of modern epidemiology, in part because of his work in tracing the source of Cholera outbreak in Soho, London, in 1854. He painstakingly visited every household to pin down those who were cases to document potential risk factors and sources for infection. He curtained the spread of infection by removing the handle of a water pump as he knew it was through contaminated water, as a drinking source, that's causing the outbreak. |
| Location with the highest deaths | I wanted to visit this location and to document a video for this tutorial. However, it was unreachable. It was blocked with so many buildings with business activities. Thus, I settled with going to Jo & Co Barbers which the second highest deaths.  Lore: This location has the highest reported number of deaths (18), which is very close to the Broad Street pump. |
| Jo & Co Barber Store | The location currently belongs to a barber shop named 'Jo & Co'. The barbers and customers were awfully kind to allow me to take video footage of the location.  Lore: This location historically has the second highest number of deaths. It was recorded to have 12 people dying of Cholera in the outbreak. I asked the barbers if they were aware of this fact, and they were bewildered. |
| Berwick Street Market | Along Berwick Street has the Berwick Market.  Lore: The Berwick Market is indeed one of London's oldest markets dating back to 1778. It has lived through the Cholera outbreak. You can see there significant various in the number of houses along this street that has recorded deaths. It's now a bustling street food destination including Greek2Go, Savage Salads and Jerusalem Falafel, in addition to traditional fruit and vegetable and florist stalls. The food there is delicious! |
| Starting point of my trip | I got off at Oxford Circus Station as the starting point of my trip (and where I started to track my route with Strava) and accidently lost my bearings to the study area for these tutorials. I realised I was heading in the wrong bloody direction as soon as I saw Bond Street Station [**what an epic fail!**] |

**Story Map section**

**Copy and paste this text as you see it in the story map.**

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| **Main title** | Short revisit to the Cholera Outbreak in Soho, London (1854) |
| Subtitle | Introduction to GIS & Mapping [GIF 1] |
| **What is Cholera?** | Cholera is an infectious disease caused by the pathogen known as the Vibrio Cholerae. The Vibrio Cholerae is a bacterium, which causes acute diarrheal illness, vomiting and severe dehydration. The disease is a waterborne infection which is typically acquired through consuming water (or other food sources) that are contaminated with the pathogen.  The biggest risk factor for Cholera on an environmental and personal-level poor sanitation and unhygienic conditions, and this is often pertained to how offensive materials (e.g., faecal matter) are treated. Areas with poor infrastructure and lack of sewage treatment facilities often have outbreaks of such disease. Conflict and natural disasters cause a significant disturbance in these sewage treatment facilities which, in turn, causing sewage to enter in drinking water sources leading to outbreaks. Cholera is currently endemic in some countries in the Global South. To name a few, examples include Nigeria, Democratic Republic of Congo, Afghanistan, Yemen and many more.  As of now (since 24 September 2022), there are approximately 39,857 suspected cholera cases, including 114 deaths, have been reported worldwide. |
| Image caption | Geographical distribution of new cholera cases reported worldwide, July - September 2022 (Source: ECDC) |
|  | Cholera is not endemic anywhere in the Global North. All countries, including the United Kingdom, have not reported cases of Cholera unless someone has travelled to an endemic country and contracted the disease there, and brought it into to the Global North. However, 170 years ago, the UK experienced quite a number of outbreaks, and one of the worst Cholera outbreaks occurred in 1854. |
| **Cholera Outbreak in Soho (1854)** | Between 1848 and 1854, a series of cholera outbreaks occurred in London with large-scale loss of life. One epidemic of cholera occurred in Broad Street, in Soho, a poor district of central London with unhygienic industries and housing. It was so severe. The prevailing believe was that it was an airborne disease (i.e., Miasma Theory ). John Snow, a renowned physician was sceptical of such theory, and theorised that it was transmitted through contaminated water particularly in drinking water sources.  He painstakingly went from one household to another to spatially reference and document cases of Cholera, as well as deaths, and recorded what risk factors were linked to such outbreak. He wanted to observe if cases where clustered at some focal point which can lead to some clues. He discovered:   1. Most cases were clustered around the Broad Street Pump 2. He identified that cases of mortality from cholera by place of residence and by a particular water companies supplied to a home was high.   Based on the following pieces of information: |
| Image caption | Snow’s map showed cholera cases were clustered around a water pump (Source: John Snow's map) |
| Image caption | Snow’s map showed some water companies were safer than others (Source: John Snow's map on water supply) |
|  | He was able to quantify the disease burden of Cholera in homes supplied by each of the two water supply companies in possibly the most famous presentation table in epidemiology. |
| Image caption | Result table was taken from the paper titled: "John Snow, Cholera, the Broad Street Pump; Waterborne Diseases Then and Now" |
|  | Homes supplied by the Southwark and Vauxhall Water Company were affected by high cholera death rates, whereas adjacent homes supplied by the Lambeth Company had rates lower than throughout the rest of London. This provided overwhelming epidemiologic support for his hypothesis that the source of the cholera epidemic was the contaminated water from the Thames River, distributed to homes in a large area of south London. Of course, the water from the Broad Street pump were supplied by the Southwark and Vauxhall Water Company, and thus, he broke the handle to prevent further consumption. |
| **My visit to this iconic location** |  |
| Insert video one | URL: <https://youtu.be/l9-9uTtwwm0> |
| Video one caption | Video 1: My visit to the Broad Street Pump in Soho |
| Insert video two | URL: <https://youtu.be/J5gEWUBhlK8> |
| Video two caption | Video 2: My visit to one of the point locations (Jo & Co Barbers) in Soho |
| Insert interactive map | [Use your own that you create from example] |
| Interactive map caption | Cholera map using the original data collated by John Snow (1854-56) faithfully recreated using ArcGIS Maps Online and stitched to this Storymap. |
|  | IMPORTANT NOTES OF MAP: Red points are house locations with one or more cholera deaths; Green points are house locations with no documented deaths; All points are clickable: 1.) Camera icon represents a location of interest with significant lore; 2.) Death rate icon represents a point location with highest documented deaths; and 3.) Footprint icon represent my starting point of tracking my steps with the Strava app. |
| **References** | 1. James Cheshire, (2022) Sewage alerts: the long history of using maps to hold water companies to account, Web Article: The Conversation. Source: [LINK] 2. Theodore H. Tulchinsky, (2018) Chapter 5 - John Snow, Cholera, the Broad Street Pump; Waterborne Diseases Then and Now, Book: Case Studies in Public Health, Source: [LINK] 3. Kelly Elimian et al., (2019) Descriptive epidemiology of cholera outbreak in Nigeria, January–November, 2018: implications for the global roadmap strategy, Research Article: BMC Public Health, Source: [LINK] |
| **Attributions** | 1. John Snow's cholera disease map was sourced from Wellcome Trust [LINK] 2. John Snow's cholera water supply map was sourced from Wellcome Collection [LINK] 3. Global incidence map of Cholera was sourced from European Centre for Disease Control (ECDC) [LINK] 4. Background music played in Videos 1 and 2 were sampled for Nintendo Switch game's soundtrack called Legend of Zelda: Breath of the Wild. The song title is "The Lost Woods" (or alternate title "Labyrinth") [LINK] . |