Dr. John Snow is one of the founding fathers of modern epidemiology. As London suffered a series of cholera outbreaks during the mid-19th century, Snow theorized that cholera reproduced in the human body and was spread through contaminated water. This contradicted the prevailing theory that diseases were spread by “miasma” in the air.

London’s water supply system consisted of shallow public wells where people could pump their own water to carry home, and about a dozen water utilities that drew water from the Thames to supply a jumble of water lines to more upscale houses. London’s sewage system was even more ad hoc: prives empitied into cesspools or cellars more often than directly into sewer pipes. So the pervasive stench of animal and human feces combined with rotting garbage made the miasma theory of diease seem very plausible. Disease was more prevalent in lower- class neighborhoods because they stank more, and because the supposed moral depravity of poor people weakened their constitutions and made them more vulnerable to disease .

The September 1854 cholera outbreak was centered in the Soho district, close to Snow’s house. Snow mapped the 13 public wells and all the known cholera deaths around Soho, and noted that spatial clustering of cases around one particular water pump on the southwest corner of the intersection of Broad (now Broad wick) Street and Cambridge (now Lexington) Street. He examined water samples from various wells under a microscope, and confirmed the presence of unknown bacterium in the Broad Street samples. Despite strong skepticism from the local authorities, he had the pump handle removed from the Broad street pump and the outbreak quickly subsided.

Snow subsequently published a map of the epidemic to support his theory. A Detail from this map is shown below. The nated/complete map shows the locations of the 13 public wells in the area and the 578 cholera deaths mapped by home address, marked as black bars stacked perpendicular to the streets

Some anomalies are worth noting. Although the large workhouse just north of Broad Street housed over 500 paupers, it suffered very few cholera deaths because it had its own well (not shown on the map). Likewise, The workers at the brewery one block east of the Broad Street pump could drink all the beer they wanted; the fermentation killed the cholera bacteria, and none of the brewery workers contracted cholera. Many of the deaths further away from the Broad Street pump were people who walked to work or market on the Broad Street and drank from that well. The water from the Broad Street well reportedly tasted better than water from most of the neighboring wells, particularly the smelly water from the Carnaby Street/Little Marlborough Street well a few blocks to the northeast.

**John snow cholera map-1856**

Data visualization brings data to life. It plays a vital role in generating data graphically with interactive graphs, charts and other visual representations. In my last semester we developed a live website using HTML, CSS , PHP, SQL in coding. To implement this project, started to learn JavaScript, D3 and SVG. I tried with the examples that are taught in the class and in the mean while I started searching the options to plot the graphs and map by watching video’s, tutorials and some websites. I listed out all the possible ways to represent the data from the given data files. Then, I started coding the map at first, then Time line graph and bar chart.

The vector map that was created gives the clear idea about where the pumps and maximum deaths has occurred. I used brown background for the map, gray color for streets,

black dots to represent the deaths and pump icon represents the location of the pumps.

The Time line graph shows the number of deaths from 19th Aug to 29th Sep. From the graph we can analyze that maximum deaths happen on Sep 1st. For the line graph I used red color to represent the deaths and blue color for interactive representation of deaths for that particular day.

The Bar graph shows the percentage of deaths with respect to ages. The bars are given blue color and red color is given for interactive representation of deaths for particular age.

Prior to this, I had a very basic knowledge on web design languages such as HTML, CSS. To implement this project, I have then slowly started to learn more about these in addition to Java Script. In part of this, I went through many videos, websites and tutorials mainly on d3.js and SVG. Then by creating my own data, I started to draw lines, rectangles and simple bars following with referring and getting to know more about various kinds of maps using d3.js and leaflet. Using the given data, I have drawn the map and plotted deaths and pumps. Then a timeline graph and bar chart were drawn respectively as shown below.

I created a vector map through which one can clearly look the place of deaths and pumps. In the map I used gray color for the streets and black dots to represent the deaths. A rectangular black boxes were used to represent the pumps. Then to analyze the deaths according to the dates, a timeline graph has been created following with the bar graph, which helps us to find the number of deaths based on the age group. In the timeline graph I used steel blue and for the bar chart I used orange and orange red colors. After checking the colors with the color oracle tool, these colors were selected. I have arranged vector map as the first and most important visualization and then both the line graph and bar chart were placed so through which by looking into the map one can perform more analysis on the other two charts. By looking at the charts we can tell that on September 01, there were more number of deaths and the age group 21-40 has the highest percentage of deaths.

Details