



Exploring the Geographic Distribution of Childbed Fever Deaths in Mid-19th Century Rochester, NY



Introduction

Records from Mt. Hope cemetery were used to look at occurrences of childbed fever and stillbirths in Rochester NY in the 19th century. The data collected from the records was plotted geographically on a 1895 map of Rochester. Originally this project hoped to focus on cases of childbed fever in the early 19th century. However, because there were less cases than expected in Mt. Hope Cemetery’s records the project was expanded to include incidences of stillbirths as a secondary indicator of maternal health.

Background

- Rochester
 - Rochester is located just south of Lake Ontario with the Genesee River running through it
 - Rochester used to have twenty wards
 - Rochester lacked adequate sanitation until 1873 (McKelvey 1956)
 - In 1876 the city began to pump water from Hemlock Lake, thus reducing water borne diseases (McKelvey 1956)
- Childbed Fever
 - Childbed fever results from a bacterial infection (Whiffin, 1903)
 - Group A and B Streptococcal are common causes(Hamilton et al. 2013) (Boe 1994)
 - Bacteria was spread to patients from doctors because of poor hygiene practices (Simmelweis et al. 1981)
- Stillbirths
 - Poor maternal health can increase the likelihood of stillbirths (Zile et. al. 2019)

Methods

- Getting the Data
 - Data on deaths in Rochester was retrieved from Mt. Hope Cemetery’s records
 - Death record information was transcribed by hand
- Organizing the Data
 - RStudio was used to
 - Extract the data for specific causes of death
 - Clean the data to eliminate null values & duplicates
 - Plot total stillbirths per decade
 - Sum the stillbirths in the 1890s in each ward
- Mapping the Data
 - An 1895 map of Rochester was used for both maps
 - A database of street names per ward was created manually from the 1895 map.
- ArcGIS Pro was used to
 - Georeference the map
 - Create a vector layer showing Rochester’s wards
 - Plot cases of Childbed Fever on the map
 - Map the percent of stillbirths in the 1890s in each ward

Meaghan Parks



Fig. 1- Childbed Fever cases

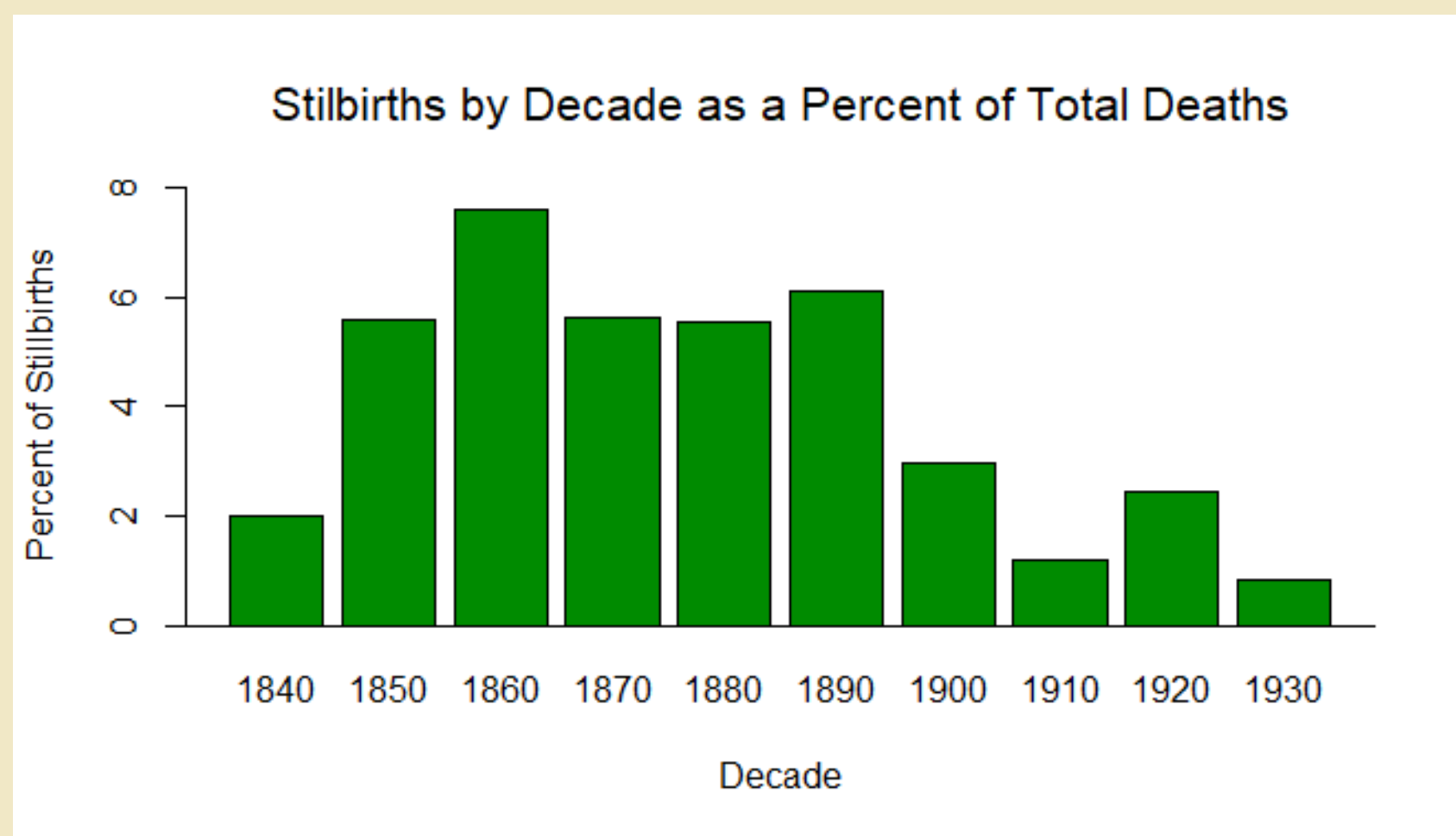


Fig. 2- Percent of Stillbirths by Decade

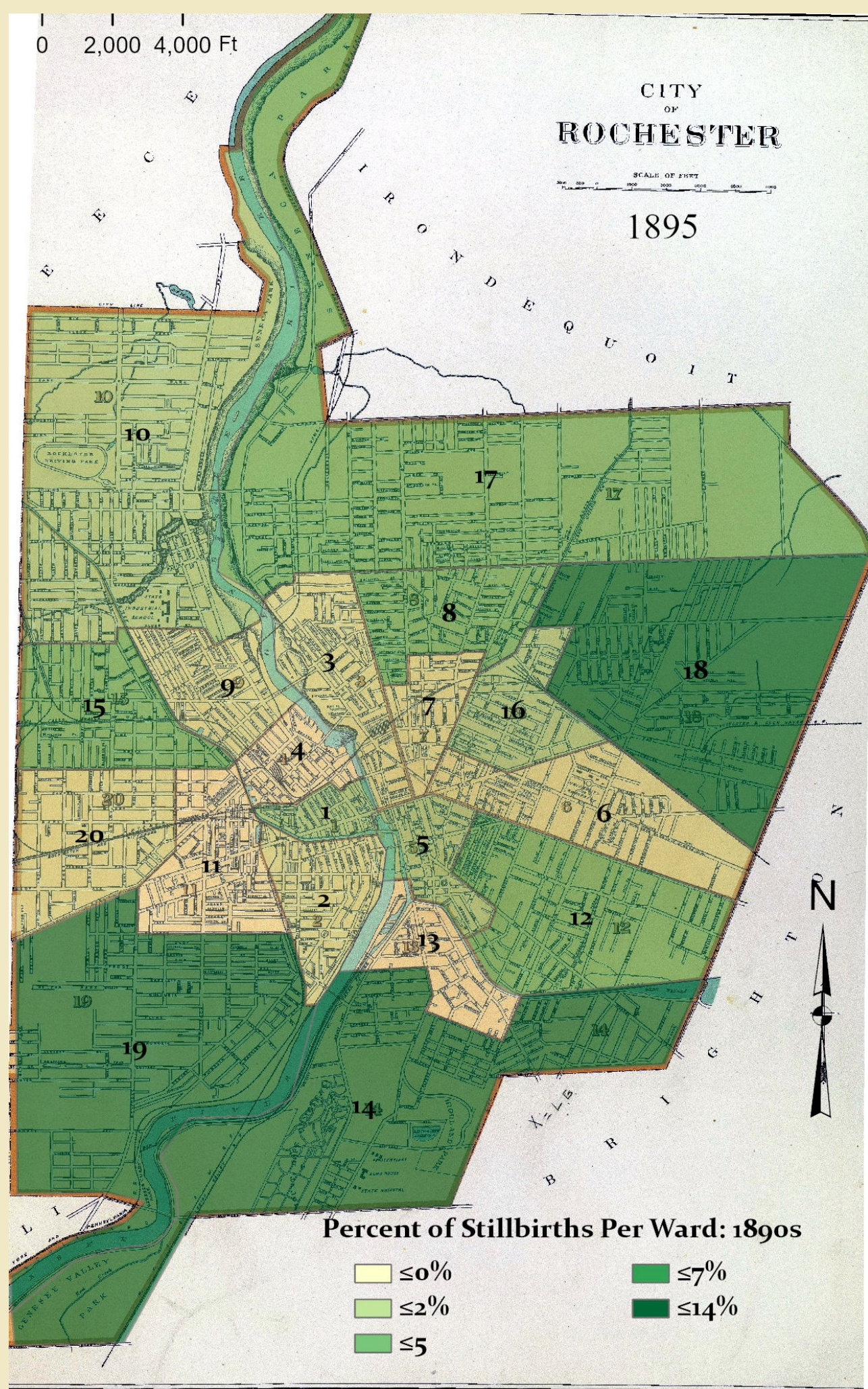


Fig. 3- Percent of Stillbirths by Ward

Results

- Fig.1 shows the cases of Childbed Fever plotted on the street where they occurred
 - Fig.1 also shows the wards of the city
- There were fewer cases of Childbed Fever than expected
 - Clustering of cases was minimal
 - There was a slight tendency towards the center of the city, around the Genesee River
- Fig.2 is a graph of stillbirths as a percent of total deaths from 1840-1930
 - As you can see there was a spike in stillbirths in the 1860s
- The decade with the highest total number of stillbirths was the 1890s
 - Stillbirths in the 1890s were more common in the outskirts of the city
 - This can be seen in fig.3 which shows the percent of stillbirths by ward for the 1890s, darker colors representing a higher percentages

Conclusion

- The cause of the low number of Childbed Fever cases is unknown but could have resulted from:
 - Midwives being favored over doctors
 - The deaths being attributed to a different cause
 - A combination of the two reasons listed above
- The causes of the spike in stillbirths in the 1890s and the higher rates on the outskirts of the city are also unknown
 - Further research on Rochester in the 1890s is needed to find the causes



Fig. 4 “View of Rochester, New York 1880”
(H.H. Rowley & Co., Beck & Pauli 1880)

Citations

Bien, Joseph R. "City of Rochester. Copyright 1895, Julius Bien & C." Map. *Atlas New York state*. Julius Bien & Co., 1895, p. 33.
Boe, N. M. "Group B Streptococcal Infections in Pregnancy." *The Western Journal of Medicine*, vol. 161, no. 2, Aug. 1994, pp. 160–61.
Charles, D., and B. Larsen. "Streptococcal Puerperal Sepsis and Obstetric Infections: a Historical Perspective." *Reviews of Infectious Diseases*, vol. 8, no. 3, May 1986, pp. 411–22.
Colyer, Christa. "Death in a Viennese Maternity Ward." *Journal of College Science Teaching*, vol. 29, no. 5, Mar. 2000, pp. 297–300.
Colton, G. W. "Colton's New York. (insets) Oswego, Buffalo, Rochester." Map. *Colton's General Atlas*. G.W. & C.B. Colton, 1866, pp. 33-34.
Goldenberg, Robert L., and Elizabeth M. McClure. "Maternal Mortality." *American Journal of Obstetrics and Gynecology*, vol. 205, no. 4, Mosby, Inc, 2011, pp. 293–95, doi:10.1016/j.ajog.2011.07.045.
Hamilton, Stephanie M., et al. "Pregnancy-Related Group A Streptococcal Infections: Temporal Relationships Between Bacterial Acquisition, Infection Onset, Clinical Findings, and Outcome." *Clinical Infectious Diseases: an Official Publication of the Infectious Diseases Society of America*, vol. 57, no. 6, Sept. 2013, pp. 870–76, doi:10.1093/cid/cit282.
Harmon, G. E. "Death Rates from Puerperal Septicemia and Their Variability." *Journal of the American Statistical Association*, vol. 19, no. 146, Taylor & Francis Group, June 1924, pp. 221–26, doi:10.1080/01621459.1924.10502884.
H.H. Rowley & Co., Beck & Pauli. *View of Rochester, New York 1880*. 1880. Library of Congress. April 2020.
Irisa Zile, et al. "Maternal Risk Factors for Stillbirth: A Registry–Based Study." *Medicina*, vol. 55, no. 7, MDPI AG, July 2019, doi:10.3390/medicina55070326.
Lockwood, Charles J. "Puerperal Fever through Time." *The Lancet*, vol. 357, no. 9249, Elsevier Ltd, 2001, pp. 79–79, doi:10.1016/S0140-6736(05)71584-1.
Mitchell, Samuel Jr. A. "County map of the State of New York." Map. *Mitchell's New General Atlas*. S.A. Mitchell Jr., 1868, pp. 18-22.
Peck, William F. (William Farley). *History of Rochester and Monroe County, New York, from the Earliest Historic Times to the Beginning of 1907*. Pioneer Pub. Co., 1908.
Porter, Dorothy. "General -- Death in Childbirth: An International Study of Maternal Care and Maternal Mortality 1800-1950 by Irving Loudon." *History*, vol. 80, no. 258, Blackwell Publishing Ltd., 1 Feb. 1995, p. 90, <http://search.proquest.com/docview/218429221/>.
RStudio Team (2018). RStudio: Integrated Development for R. RStudio, Inc., Boston, MA URL <http://www.rstudio.com/>.
Rush Rhees Library, University of Rochester. <https://rbscp.lib.rochester.edu/mthope/results>
Simmelweis, Ignaz P., and Frank P. Murphy. "Childbed Fever." *Reviews of Infectious Diseases*, vol. 3, no. 4, 1981, pp. 808-11.
Smith, Virginia Jeffrey. *A Century of Service: Rochester General Hospital, 1847-1947*. 1947.
Whiffin, R. A. "Puerperal Septicemia." *California State Journal of Medicine*, vol. 1, no. 13, BMJ Publishing Group LTD, Dec. 1903, pp. 395–97, <http://search.proquest.com/docview/1774657950/>.
Yamada, Takahiro, et al. "Invasive Group A Streptococcal Infection in Pregnancy." *Journal of Infection*, vol. 60, no. 6, Elsevier Ltd, 2010, pp. 417–24, doi:10.1016/j.jinf.2010.03.011.