A General Mortality Analysis in 19th and Early 20th Century Rochester, New York: "Exploring Sex-Based Differences in Childhood and Adolescence Mortality Rates Across Age Groups"

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Background

"Child and adolescence mortality is [and has been] an everyday tragedy of enormous scale that rarely makes the headlines" ~ Max Roser

Mortality rate refers to the proportion of a population that dies in a specified geographic area in each period (Ram and Ram 2014). In the 19th and 20th centuries, Rochester, NY experienced significant growth and development. While there were numerous advantages to residing in Rochester, infectious diseases were rampant and posed a significant health threat to the population (McKelvey 1956). During this time, child and adolescence mortality were prevalent, and many individuals did not survive beyond their childhood years, with children and infants being particularly susceptible to these diseases. During the 19th and 20th centuries, in the United States (U.S.)–across all age ranges and for most causes of death–boys had a higher death rate than girls (Field and Behrman 2023).

However, while in the U.S., females' average life expectancy at birth is approx. 7 years greater than that of males, females give poorer self-evaluations of health, show higher rates of acute illness, have more (but less severe) chronic conditions, use more outpatient services, and consume greater amounts drugs (Shrestha 2006). An early (1928) American study titled "*Sex differences in the incidence of certain diseases at different ages*" provides clear evidence of changes in the male-female patterning of illness during early childhood and adolescence (Sweeting 1995). In children younger than 10 years, the incidence of infectious diseases was higher among males than females, reversing to an excess among females thereafter, "an indication which is not so generally observed and regarding which not a great deal of data has been published"(Sweeting 1995).

Research Objectives

- The main research objective was to investigate the historical mortality rates among males and females during childhood and adolescence; across various age groups in Rochester, NY, using data from cemetery records at Mount Hope Cemetery.
- The study aimed to compare the average ages at death between males and females and identify potential factors that may have contributed to mortality rates in these age groups. By examining the cemetery records, information on the causes of death was obtained. This helped to identify potential risk factors associated with mortality in childhood and adolescence.
- Overall, this poster presentation aims to provide insights into the mortality rates of males and females during childhood and adolescence and to identify factors that may contribute to these rates. By understanding the factors that impact mortality in these age groups, the research study can help inform public health policies and interventions aimed at reducing mortality rates and improving the health outcomes of children and adolescents.

Results

- Although there were multiple causes of death in kids and adolescents, the diseases and causality listed in Fig 1 are the **top causes** of mortality.
- Fig 1 showcases that **boys** exhibit a higher mortality rate than girls across most age groups and for most causes of death.
- Fig 2 showcases that in the 19th century; the highest cause of death between males and females aside from Still Birth is **Consumption (Tuberculosis)**. However, for males, cholera was a leading cause of death.
- Fig 3 showcases in the Early 20th century; **Broncho Pneumonia/Bronchitis** was the leading cause of death.

DISEASES/CAUSALITY	0-5 YEARS		6-10 YEARS		11-15 YEARS		16-20 YEARS	
Total n of females/males	F (n=983)	M (n=855)	F (n=204)	M (n=218)	F (n=130)	M (n=109)	F (n=263)	M (n=199)
Cholera infantum	9%	12%	2%	16%	16%	15%	0%	1%
Consumption (Tuberculosis)	10%	9%	7%	**34%**	**34%**	**28%**	**72%**	**47%**
Diphtheria/Croup	**21%**	22%	19%	28%	28%	30%	3%	1%
Diarrhea	11%	11%	**23%**	0%	0%	0%	0%	0%
Dysentery	10%	12%	2%	4%	4%	9%	3%	3%
Nephritis	1%	2%	5%	0%	0%	0%	0%	0%
Scarlet Fever	19%	**23%**	22%	12%	12%	6%	3%	9%
Typhoid Fever	3%	2%	11%	3%	3%	11%	18%	34%
Still Born	7%	0%	0%	0%	0%	0%	0%	0%
Bronch Pneumonia/Bronchit	6%	4%	5%	3%	3%	2%	2%	4%
Enteritis	2%	3%	0%	0%	0%	0%	0%	0%
Lobar pneumonia	2%	1%	4%	0%	0%	0%	0%	0%

Figure 1:The mortality rate and causes of death among males and females across four age groups (in %)

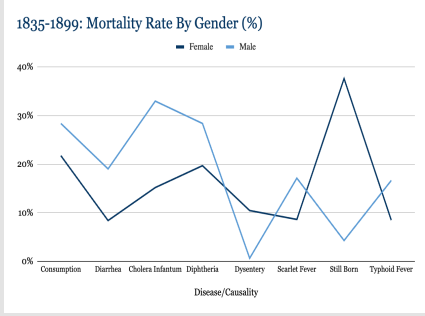

Figure 2: The mortality rate and causes of death in children and adolescents throughout the 19th century (in %)

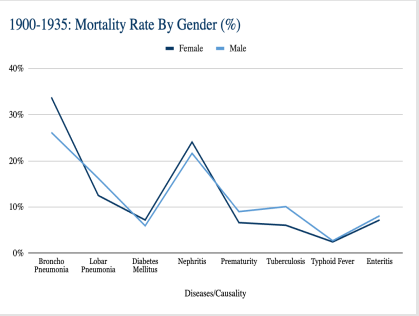

Figure 3: The mortality rate and causes of death in children and adolescents throughout the 20th century (in %)

References

Ram, Bali, and Shefali Ram. 2014. "Mortality Rates." Encyclopedia of Quality of Life and Well-Being Research, 4142–44. https://doi.org/10.1007/978-94-007-0753-5_1851.
McKelvey, B. 1956. "The History of Public Health in Rochester, New York." Rochester History 18 no. 3 pp: 1-28
Marilyn J Field, and Richard E Behrman. 2023. "Patterns of Childhood Death in America." When Children Die: Improving Palliative and End-of-Life Care for Children and Their Families. Nih.gov. National Academies Press (US). 2023. https://www.ncbi.nlm.nih.gov/books/NBK220806/.
Scally, G. 2004. "The Importance of the Past in Public Health." Journal of Epidemiology & Community Health 58 (9): 751–55. https://doi.org/10.1136/jech.2003.014340.
Shulman, Stanford T. 2004. "The History of Pediatric Infectious Diseases." Pediatric Research 55 (1): 163–76. https://doi.org/10.1203/01.pdr.0000101756.93542.09.
Shrestha, Laura B. 2006. "Life Expectancy in the United States." Everycrsreport.com. Congressional Research Service. August 16, 2006.
Sweeting, Helen. 1995. "Reversals of Fortune? Sex Differences in Health in Childhood and Adolescence." Social Science & Medicine 40 (1): 77–90. https://doi.org/10.1016/0277-9536(94)e0059-2.
Woolf, S. H., & Aron, L. Y. 2013. "US health in international perspective: shorter lives, poorer health". Washington, D.C: National Academies Press. https://doi.org/10.17226/13497.

Methodology

The data for this study was gathered through the transcription of death records from Mount Hope Cemetery, sourced from the esteemed University of Rochester Rare Books, Special Collections, and Preservation (RBSCP) library. Each record documented the names, dates of internment, ages of death, causes of death, and places of residence for individuals buried in the cemetery. In order to focus exclusively on the objectives of the study, records from 1835 to 1935 were selected and filtered accordingly. A total of **15,719** individuals were included in the dataset, with **3,070** individuals identified as children and adolescents. Data analysis was conducted using Google Sheets, with the findings accurately obtained through thorough examination of the specified population data.

Discussion

This research study found that the main causes of death in the 1835-1899 was Still Birth, with a large disparity between males and females. This may likely be because stillborn baby girls are more likely to be named than baby boys. Also, diseases such as tuberculosis, cholera, diphtheria, scarlet fever, and diarrhea, with tuberculosis being the most prevalent. As pediatric organizations were established in America in the late 19th and early 20th centuries, during the period from 1835 to 1899, infectious diseases were the primary causes of death among children and adolescents, and medical science had not yet advanced enough to address them (Shulman 2004).

This study also found that between 1900 and 1935, the mortality rate for these diseases such as pneumonia and diabetes began to emerge. However, infectious diseases slowly declined. This decrease in mortality was due to advancements in public health, living standards, medical science and technology, and clinical practice (McKelvey 1956).This study further concurs with the argument put forth by Field and Behrman (2023) that during the 19th and 20th centuries, boys had a higher mortality rate than girls across most age groups and for most causes of death. Although girls also had high death rates, boys had a higher mortality rate for most diseases.

Also, this study found that children between the ages of **0-5 years** suffered the most deaths. In the age group of **0-5 years**, diphtheria caused more deaths among females, while scarlet fever caused more deaths among males. Among children between the ages of **6-10 years**, tuberculosis caused the most deaths, with an equal rate for males and females. Among adolescents, females dominated the deaths caused by tuberculosis in the age groups of **11-15 years** and **16-20 years**.

Notably, there is quite a disparity of deaths in the 19th century compared to the 20th century where we see an even distribution of deaths between males and females across all age groups. Scholars have identified that this is because in the 19th century, people were obviously more susceptible to infectious disease in the U.S. because of lack of proper public health (McKelvey 1956). Also, these scholars noted that various factors, such as social, economic, behavioral, and environmental factors, that may have contributed to these diseases, as well as possible health disparities. They include:

- Poverty and Income
- Ethnicity and Culture
- Epigenetic effects
- Unemployment
- Poor geographical location (lack of sewage care, clean water, and healthy food)
- Household competition (McKelvey 1956; Woolf and Aron 2013).

The results from this study can be used for many further studies. It is important to note Carr's view that **"A society which has lost belief in its capacity to progress in the future will quickly cease to concern itself with its progress in the past"** (Scally 2004). Therefore, the history of public health can be a useful tool for teaching and learning public health principles. Examining the interplay between fact and interpretation in history can help professionals analyze current beliefs and practices and challenge those that are no longer "relevant." This is why historical research is significant and what this study aimed to contribute to the critical importance of public health.