MORTUARY ANTHROPOLOGY: THE POTENTIAL OF HISTORIC RESEARCH WITHIN AN HISTORIC CEMETERY

A Thesis by

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Master of Arts

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The following faculty members have examined the final copy of this thesis for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts with a major in Anthropology.

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Ariel Loftus, Committee Member

DEDICATION

To David, my husband. Without his support and constant dedication, this would have never been possible.

To my children, Jessica, Joshua, Katelyn, Benjamin, Lily, and Parker. You are all the reason I pushed so hard. I wanted to show you that an education is one of the most important things in life, whether it is through a university, or just living life. You are never too old to learn!

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And finally, to my family. Without my sisters (Brandi, Harlie, and Danielle, and yes, you too Krystal Hart), brother Dusty, and my mother, I would have gone crazy. You listened to me rant. You helped me in the cemetery. You gave me a place to stay while working. You asked me "Are you digging up graves???" Yes mom, I'm digging up graves. Sort of…

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ABSTRACT

Biological data is traditionally derived from cemetery excavations and documents a physical representation of the sample community being investigated. Further documentation using mortuary data including archival records, physical placement, date of birth and death, occupation, and more represent social demographics within a skeletal population. These types of information can complement significant components to the biological record. A study of demographic patterns based on cemetery records will be studied and analyzed in a non-invasive context using the detailed records of different cemetery associations. Using the historic records in conjunction with ArcGIS mapping to establish connections between individuals within a cemetery, a visual representation of the skeletal population can be demonstrated, as well as connections to manners of death and tracing pandemic or epidemic disease outbreaks outside of those communities in further studies. The expressions of influenza, tuberculosis, and typhoid within the Historic Topeka Cemetery's records during 1895-1920 illustrate the comparability to that of state and national recordings. The records from the Historic Topeka Cemetery illustrated influenza and tuberculosis and both followed the national and state trends recorded from standard historic documents. Typhoid was not expressed similarly, as Topeka enacted many different measures against communicable diseases during this time, including chlorination, water treatment, and hygienic regulations. As a result of this study, defined patterns of disease can be compared between recorded disease arrays and historic records which could be examined in further studies.

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Chapter 1

INTRODUCTION

Anthropologists reconstruct historic populations through the analysis of skeletal remains discovered in burial grounds or cemeteries (Ubelaker 1974). Data is usually compiled through invasive exhumations and destructive techniques. A site or location exposed to this type of fieldwork may no longer provide primary deposits and features and makes it difficult or even impossible to ascertain further information about certain details of the physical appearance and construction of said site or location. Non-invasive techniques provide ways to analyze the same data within a historic context without destroying the sites in which the investigation is taking place. This study demonstrates that historic documentation can take the place of invasive exhumations and still exhibit the same research assessments as an exhumation when investigating accurate population expressions.

This thesis focuses on the biocultural cemetery study of Topeka, Kansas. The study employs two types of data, including archival information found in cemetery records and physical mapping of interments in a effort to develop an efficient method of recording and compiling demographic information. Previous demographic studies of the area are based primarily on census data, CDC research statistics, and familial accounts. This information was used to discern patterns and material regarding migration of disease. It is suggested here that historic records can provide additional information necessary to further enhance the complete demographic representation. The potential need for alternative data services include the disastrous fire and ultimate destruction of the national census data of 1890. These records of the 1890 census were destroyed in a fire at the Commerce Building in Washington, D.C. in 1896,

leaving researchers without a critical source of documentation about the U.S. population during the decade of the 1890 census. The main goal of research presented here is to illustrate the potential of establishing a meaningful, bio-culturally based demographic database utilizing solely primary historical documentation. This study focuses on the time period of 1895-1920 within the Historic Topeka Cemetery. It seeks to illustrate patterns in internment strategies, patterns of disease, and patterns of certain death categories within the cemetery within this time period and contrast the observed patterns of other recording agencies of the time period.

The history of the cemetery was reviewed and analyzed to distinguish the skeletal population within the 1895-1920 timeframe. Data was then gathered, including name, date of birth, date of -death, plot location, section number, and cause of death from the Historic Topeka Cemetery's vault records. Using the data collected, it was then manipulated within Microsoft Excel and sorted by year of death to select only the interments between 1895-1920. The amount of interments within these parameters registered at 8,874 out of 33,187 total interments, as of October 2012. The cause of death was then gathered and analyzed to determine frequency of affliction within the population. The information was then set into bar and line graphs to further illustrate the patterns of disease within each year and also each cause of death to better see the rise and falls of each ailment. These results were then compared to the state and national reporting agencies to discriminate the correlation between what was reported through the cemetery and what was recorded through the agencies. With this information, it will be possible to successfully illustrate patterns of disease within the aforementioned time period, with increases and decreased in death rates where known epidemics were historically documented.

Chapter 2

BACKGROUND

History of Kansas

The state of Kansas is located on the eastern edge of the Great Plains and is set at almost the geographic center of the United States. It is bordered by Nebraska to the north, Missouri to the east, Oklahoma to the south, and Colorado to the west (Figure 1). The State is 204 miles in width from north to south, and slightly exceeds 400 miles in length from east to west. It contains an area of 81,318 square miles (Cutler, 1883, part 1).

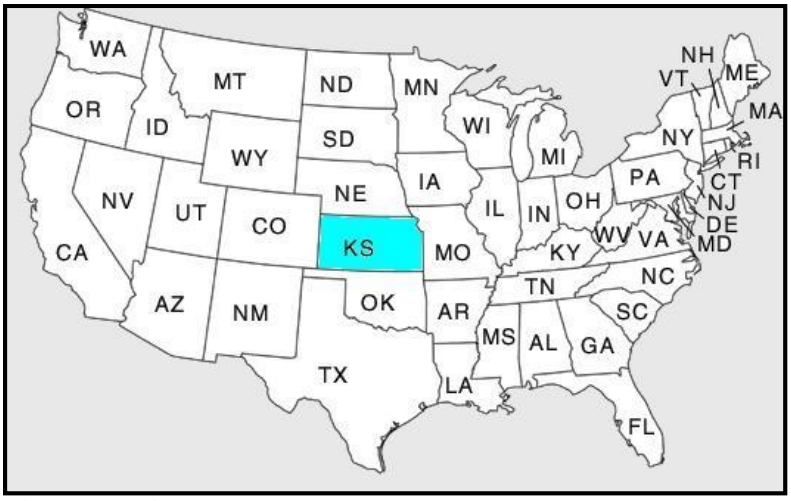


Figure 1. Map of Kansas

Historically, Kansas was part of the Louisiana Purchase of 1803, where the United States acquired 828,000 square miles of land from France for the purchase price of $15 million dollars. France ceded to the United States all the country drained by the Mississippi and its tributaries to which she had any right or title. (Library of Congress, 2014).

Kansas' boundaries were defined in the act of statehood, as a point on the western boundary of the State of Missouri, where the thirty-seventh parallel of north latitude crosses the same; west on said parallel to the twenty-fifth meridian of longitude, north on meridian to the fortieth parallel of north latitude, east on parallel to the western boundary of the State of Missouri. The portion of Kansas lying west of the twenty-third meridian and south of the Arkansas River was ceded to Spain. (Cutler, 1883, part 1).

The name Kansas is derived from the name of the dominant tribe of Indians found in the territory. They were variously spoken of by early explorers as Kanzas, Canceas, Cansez, Kansez, Canzas, Canzes, Okanis, Kansies, Canses, Canzon, Kanzon, Konza, Konzas, Kasas, Kanzan, Kanzans (Cutler, 1883, part 1) and by other varied spellings, all having a similar phonetic expression. It is from these phonetic spellings that the present spelling of Kansas was settled.

Starting in the 1820s, the United States government agreed to use Kansas and parts of Oklahoma into a "permanent refuge" for displaced eastern Native American groups. This meant that the territory was not available for settlement. However, in 1830, President Andrew Jackson signed the Indian Removal Act. This prompted the moving of many tribes into different areas: primarily, the Five Civilized Tribes (Cherokee, Chickasaw, Choctaw, Creek (Muscogee), and Seminole) (Kansas State Historical Society, 2014) They were moved into what was then known as Indian Territory and later became Oklahoma. The Cherokee were given the north portion of Oklahoma from the Oklahoma/Arkansas border on the east to the area known as "No Man's Land," which was 228 miles. The area began at the Kansas/Oklahoma State line and was 58 miles wide. The Cherokee were given the eastern part of their land to live on and the western remainder all the way to the west was known as the Cherokee Outlet because it was to be their

outlet to hunting grounds, which they never used due to the fact that they were horticulturists. So, they leased much of the western portion of their land to cattlemen for grazing. (Cherokee Land Rush Museum, 2014).

During the years of 1854-1860, some 100,000 people immigrated into Kansas (Shortridge, 1995). This increase in migration into the state was an attempt by northern and southern factions during the Civil War to encourage supporters to flood the state with people supporting either a north or south view. Because the state was neither a free or slave state at this time, there was much debate over which side would be victorious (Miner, 2002). After years of skirmishes and small scaled battles, Kansas was admitted to the Union as a free state on January 29, 1861 (Miller, 1906). During the Civil War, the numbers of people migrating into Kansas declined. After the war, migration continued into Kansas, as Kansas was a land of economical opportunities, speculation rights, and a "healthfulness of climate" (Miller, 1906).

After the Civil War, Native Americans were not so optimistic. Much of the land in the middle of the Cherokee outlet was taken from the Cherokee and given to other tribes as punishment for the Cherokee's participation in the war on the side of the Confederacy. Their tribal lands became split in two with the Osage, Kaw, and Pawnee in the center of the Cherokee Outlet. The western portion of their land was leased to the Cherokee Strip Livestock Association, as association founded in 1883 by cattlemen under the laws of Kansas (Savage, 1990).

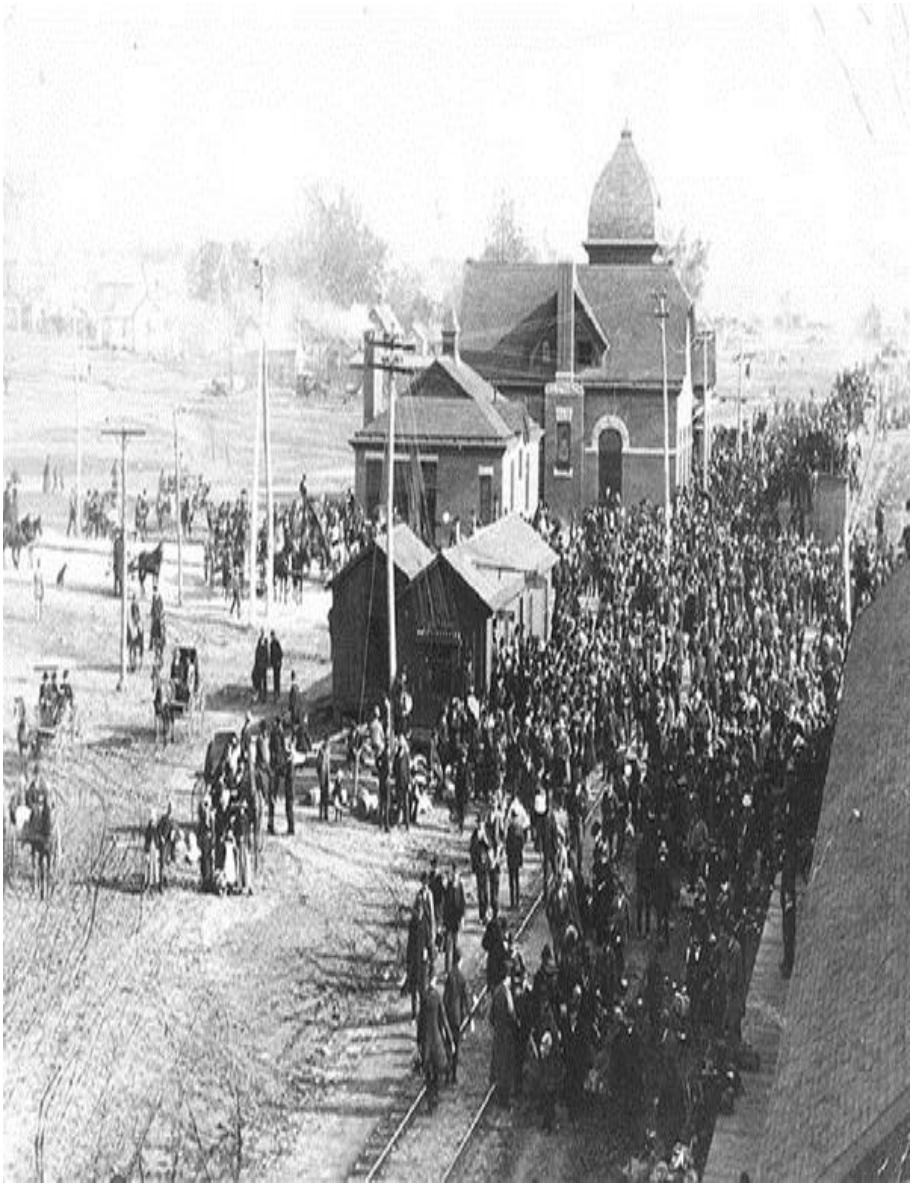


Figure 2. People arriving for the race. Photo courtesy Cherokee Strip Land Rush Museum

President Benjamin Harrison declared the Cherokee Strip public domain. The U.S. government purchased the land in 1891 for $8,595,750 and at noon, September 16, 1893, the biggest land rush in history began (Figure 2) (Cherokee Strip Land Rush Museum, 2014). This solidified the migration into Kansas, as well as led the way for other regions to develop strategies for development of formerly protected territories.

Shawnee County and the city of Topeka

Shawnee County is located in the northeastern part of Kansas, in the third tier of counties west of the Missouri River and about fifty-four miles south of Nebraska (Figure 3). It is bordered by Jackson County on the north, Jefferson County on the north and east, Douglas County on the east, Osage County on the south, Wabaunsee County on the west, and Pottawatomie County on the west (Kansas State Historical Society, 2014).

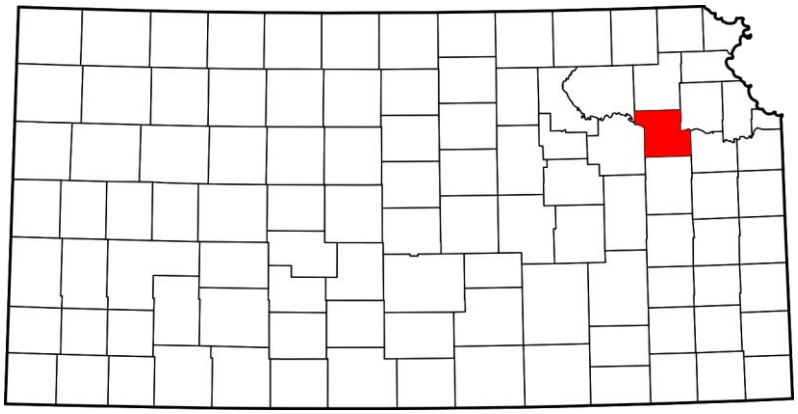


Figure 3. Map of Shawnee County

On the 8th of November 1854, the Kansas territory was divided into 17 election districts, one of which was named Shawnee County. The original boundary was described as:

> "Beginning at the south-east corner of Douglas County; thence west twenty-four (24) miles; thence north to the main •channel of the Kaw or Kansas River; thence down said channel to the northwest corner of Douglas County; thence south to the place of beginning." All of the tract thus described was south of the Kansas River. The boundary lines were changed in 1857, and again in

> 1860. Under the latter change six government townships on the south were detached and became a part of Osage County, and the northern boundary of Shawnee County was extended to include all of the territory formerly belonging to Jackson County lying south of the second standard parallel. This gave Shawnee County two congressional townships north of the Kansas River. In 1868 four other concessional townships were added on the north. (Cutler, 1883, part 4).

Shawnee county consists of twelve townships: Soldier, Menoken, Silver Lake, Grove, and Rossville north of the Kansas River; Tecumseh, Topeka, Mission, and Dover south of the river; and Monmouth, Williamsport, and Auburn in the southernmost tier of townships occupying the Wakarusa River valley (Kansas State Historical Society, 2014). Shawnee county was named after an area Indian tribe, the Shawnee. Historically, the Shawnee occupied the country southwest of the Missouri and hunted over the land between Wisconsin and the upper branches of the Illinois river. The Shawnees were one the first of the Eastern tribes to be located in Kansas, along with the Pottawatomies and the Kaw. (Cutler, 1883, part 4).

Topeka is the capital city of the State of Kansas and the county seat of Shawnee County. It is situated along the Kansas River in the central part of Shawnee County, located in northeast Kansas (Figure 4).

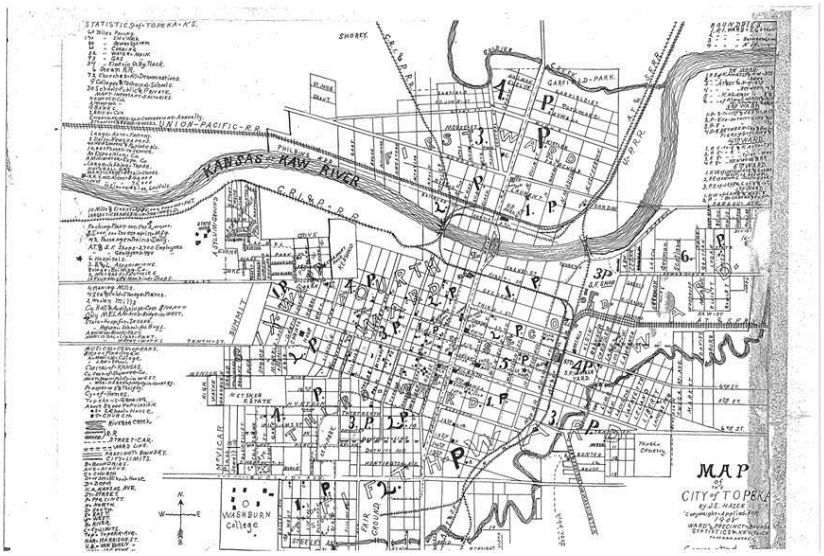


Figure 4. Map of Topeka - 1908

Among the first permanent settlers in this area were three French-Canadian brothers named Pappan. They married three Kanza Indian sisters and established a ferry over the river to accommodate travelers on the Oregon Trail in 1842 (Cutler, 1883, part 4). A grandson from one of the marriages was Charles Curtis, the only Vice-President of the United States to be of Native American heritage. On December 5, 1854, nine men met on the banks of the Kansas River at what is now Kansas Avenue and Crane Street and drew up an agreement. This agreement later became the basis for the Topeka Association, the organization mainly responsible for the establishment of the city of Topeka. The nine founding fathers were Cyrus K. Holliday, F.W.

Giles, Daniel H. Horne, George Davis, Enoch Chase, J.B. Chase, M.C. Dickey, Charles Robinson and L.G. Cleveland. The City of Topeka was incorporated February 14, 1857, with Cyrus K. Holliday as Mayor (Kansas State Historical Society, 2014). Although the drought of 1860 and the ensuing period of the Civil War slowed the growth of Topeka and of the state, Topeka rebounded and enjoyed a period of growth and revival from the close of the war in 1865 until 1870 (Cutler, 1883, part 4). During the late 1880's, Topeka was one of many cities participating in a boom period due to speculation. This bubble burst in 1889 and many investors who were prosperous during the beginning of the decade fell into ruin. However, Topeka did not falter like other cities. Contrary to other areas, Topeka doubled in population during this period and was able to maintain their numbers during the depression of the 1890's. (Kansas State Historical Society, 2014)

In the spring of 1903, flooding on the Kansas River besieged North Topeka, which lies in the valley near the river. Hundreds were stranded in their homes and many people died. Dikes were constructed a few years after the 1903 flood to help prevent a repeat flooding. During the high waters in 1908, 1923, and 1935, residents in North Topeka expressed concern at the rising of the waters, but the dikes held. Overflowing water in North Topeka continued to be a problem for years after, but businesses and homes were safe once again (Kansas State Historical Society, 2014).

During the depression years of the 1930's, Topeka's growth rate fell to its lowest point. The region's economic structure was dependent primarily on its agriculture base. At the beginning of World War II, like many other Midwest towns, economies shifted from the railroad, meat packing and agricultural base into manufacturing government and military services. Forbes

Air Force Base was built during the war, and the Goodyear Tire and Rubber Company opened their plant in Topeka in 1944 (Bird, 1976).

Because of the predisposition of flooding in North Topeka, the government built many flood control dams to harness the power of the Kansas River. However, that would not protect the town from all of nature's storms. On June 8, 1966, an F-5 tornado ripped its way through the city, destroying many parts of the city and narrowly missing the Capitol building.

After Forbes Field closed in 1974, over 10,000 people within the military sector left the capital city. This impacted the city's growth for years to come. New construction in the 1980s included a new mall; Westridge Mall, a new raceway; Heartland Park, and a new way to shop; Hypermart. This increase in the area economy made Topeka an attractive place to live and work, helping the city rebound from the migration of 1974 (Kansas State Historical Society, 2014).

Historic Topeka Cemetery

The Historic Topeka Cemetery in Topeka, Kansas was established in 1859 and has a varied history that traces to the creation of the territory in 1854. Interred in this cemetery are farmers, lawyers, politicians, blue collar workers, and even a vice president. The reason this cemetery was chosen for my research was its dedication to housing the most complete cemetery records system in the state. Also within these records, the history of the land, including the founding and establishment of the cemetery and the charter that solidified the foundation of the site, are recorded. The founding was described as such:

> "Topeka Cemetery Association…the city was at this time surveyed no further south than Sixth avenue and the interment was made as far away as the crossing of Tenth and

> Kansas avenues, as determined by the subsequent plat and survey. This locality, south of Tenth and east of Kansas avenues, became quite a graveyard in appearance before the Topeka Cemetery was established, there being then not far from 100 interments made, all of which were removed to the Topeka Cemetery after it was established in 1859, the city and township purchasing a section in said cemetery for that purpose: Section thirty-one of the grounds. On the 2nd of February, 1859, an act was approved by the Governor of the Territory of Kansas incorporating the Topeka Cemetery Association, the corporators being Loring Farnsworth, F. L. Crane, C. C. Kellam, A. F. Whiting, M. C. Dickey, John Ritchie, H. W. Farnsworth, Wilson L. Gordon and James T. Holliday. The records now show there have been 3,157 interments in the Topeka Cemetery". (Cutler, 1883, part 15).

Topeka Cemetery originally was plotted as six acres on top of Crane's hill and designed with a Victorian touch, in accordance with Mr. Cutler's description. Every space in the cemetery had a road leading to it, and tombstones stood tall rather than lying close to the ground (Topeka Capital Journal, 2009). Figure 5 illustrates Dr. Crane's farmhouse and barn before the land was transformed.

Figure 5. Dr. Crane's Farmhouse. Courtesy of the Historic Topeka Cemetery.

During the next four years, close to 100 people were buried in this cemetery at 1601 Southeast 10th Avenue. Until it's closing during the 1860s, the primary cemetery of Topeka had been Prairie Cemetery (Cutler, 1883, part 15). After the Prairie cemetery close, the Topeka township purchased land within the Historic Topeka cemetery and roughly 300 graves were transferred from Prairie cemetery to this new addition. A historical reference to the transfer speaks to the employment of people to exhume individuals from the Prairie cemetery and re-inter them into family lots within the new Topeka Cemetery. The reference also speaks to at least four individuals which were overlooked in the transfer and were found during later downtown construction projects in the 1980s. (Topeka Capital Journal, 2009). The Topeka Cemetery organization restructured as a stock company in 1877 and received a new charter in October of that same year. Dr. Crane, of the Topeka Cemetery, grew increasingly concerned about the life of the cemetery after he passed away. Thus, when Dr. Crane did pass in 1884, his son, David Orville Crane, took over management of the cemetery and continued to do so until 1918. The younger Crane was succeeded by his son-in-law, Will Carrie, who ran the cemetery until 1934.

Doris and Carl Trace, the granddaughter of David Orville Crane and her husband, served as superintendents from 1934 to 1958. Harold Manis became the cemetery's superintendent in 1958 and was succeeded by his son, Lowell Manis, in 1971 (Topeka Capital Journal, 2009).

Sections of the cemetery were acquired by religious communities and families for their own private resting places. In 1877, Mr. Manis stated, a Jewish section within the cemetery was established (Topeka Capital Journal, 2009). For many years, the Historic Topeka Cemetery was the burial place of the city's most recognized citizens, as well as the grounds for monumental erections dedicated to many soldiers and prominent figures of the day. Many of these older monuments and memorials are still enjoyed today (Kansas State Historical Society, 2014).

"Mausoleum Row," section 66 of the Historic Topeka Cemetery, is on the National and Kansas registers of historic places (Figure 6).

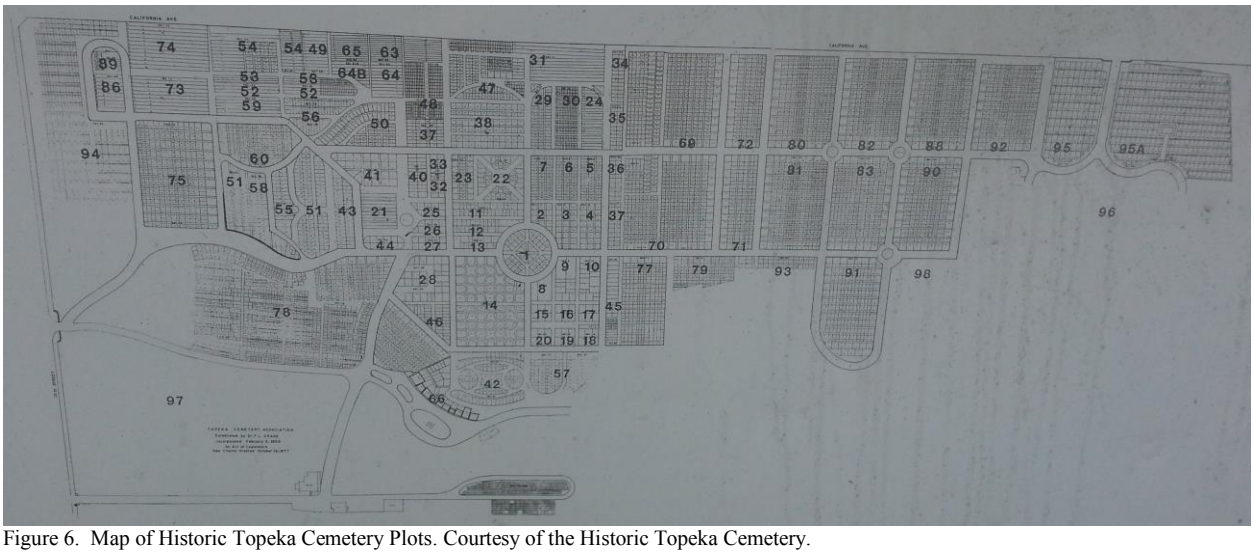


Figure 6. Map of Historic Topeka Cemetery Plots. Courtesy of the Historic Topeka Cemetery.

Some of the more interesting interments include “one War of 1812 veteran, John Logan, executives of the Atchison, Topeka and Santa Fe (ATSF) (now Burlington Northern Santa Fe) Railway; Vice President Charles Curtis; Cyrus K. Holliday, a founder of both the ATSF and the city; Kansas Governors Samuel Crawford, George Anthony, Thomas Osborne, Arthur Capper,

John Martin, and Territorial Governor Hugh Walsh; Edward P. McCabe, who was the first African American statewide officeholder in Kansas or any Northern State; seventeen mayors of Topeka; one Confederate soldier, John Spivey; and about 250 other veterans from all American conflicts since the War of 1812. Within the Topeka Cemetery is the community's Jewish cemetery, along with originally separate sections for people associated with the Topeka Orphans Home, Odd Fellows and Elks lodges, the Topeka Typographical Union, St. John's Evangelical Lutheran Church, and the Episcopal Diocese of Kansas" (Kansas State Historical Society, 2014).

The Topeka Cemetery continued to struggle with a lack of a permanent maintenance fund. The first attempt to address this concern was in 1909 when the Perpetual Care Plan was implemented, in where ten percent of the proceeds from lot sales were invested and the interest used to care for the cemetery. The cemetery itself remained governed by the Crane family until 1959, when it was sold in error to William Weber, who later sold it to William Barr in 1968 (Kansas State Historical Society, 2014). In March of 1976, the error was corrected and the cemetery was returned to the Topeka Cemetery Association. It is currently owned by the lot owners who elect a seven-member Board of Directors to manage the cemetery. The Topeka Cemetery now receives a $100,000 grant each year from the city, as well as community-wide contributions for the perpetual care fund and improvements to the cemetery. (Historic Topeka Cemetery Association, 2014). This grant makes is possible to maintain the 33,000+ interments with a possibility of over 18,000 more.

History of disease in Topeka

Throughout the history of Topeka, disease and illness affected much of the city as well as the surrounding rural areas. Tuberculosis, influenza, and typhoid were the three top ailments

during this time period in Northeast Kansas, afflicting young and old, rich or poor, and all denominations of religion and group affiliations. Examining not only the history of each disease, but the impact it made in the biological profile of this time period, illustrates the importance of researching and discovering these records.

Influenza

During the latter part of World War I, influenza was struck servicemen in large numbers all over the country. As more and more people across the United States developed symptoms, physicians sought not only the cause of the illness, but the targets. Age, gender, and group affiliation were all investigated as possible vectors for this new affliction. Judith Johnson (1992) stated that the influenza epidemic hit the United States in three waves. The first, during the spring of 1918, focused on servicemen stationed in army installations. Camp Funston, in Ft. Riley, Kansas is one such installation. Many historians believe that the case in Ft Riley is one of the first documented cases of influenza in the United States. In March, 1918, Private Albert Gitchell, a cook, complained of flu-like symptoms, combined with a headache and fever. By noon that same day, many of the other soldiers had reported similar symptoms. This initial outbreak in a military encampment was just the beginning. It began spreading through army camps and prisons all over the country. As high as the rate of illness was, the death rates were not significantly above normal. During the second wave from September to November 1918, however, the fatality rates were much more extreme. The winter wave produced fatalities in massive numbers within the United States. The third wave occurred globally and was just as deadly.

Tuberculosis/Consumption

Tuberculosis, also known as consumption, phthisis, and the white plague was considered a death sentence in the later part of the 19th century and early 20th century. It was once stigmatized as a "social" or poor man's disease (Dubos, 1952) and some even believed it to be hereditary. During the early 20th century, any respiratory condition that could not be easily be identified was given the blanket term consumption, due to the gaunt look it gave the patient (Dubos,1952). It wasn't until Dr. Robert Koch's identification of the tuberculosis bacillus in 1882 that doctors started to recognize the contagious ways tuberculosis was distributed (Dubos, 1952). Some social scientists believed that tuberculosis was a "visible symbol to contemporary social problems and inequities that resisted remedy"(Dubos, 1952). Consumption was described as:

> "custom has now so much prevailed with Physicians that whenever they speak of a Consumption it is generally and more especially taken for a Phthisis or that Consumption of the Body which has its rise from an Ulceration of the Lungs. A Phthisis or Consumption of the Lungs may be very justly defined to be a wearing away or consuming of all the muscular or fleshy Parts of the Body, accompanied with a Cough, purulent Spitting, hectic Fever, shortness of Breath, Night Sweats, etc." (Dubos, 1952).

Typhoid

Typhoid is caused by a specific serotype of the bacterium *Salmonella typhi*. The infection usually begins with the ingestion of contaminated food or water. The infection first enters the bloodstream within 24 to 72 hours, causing septicemia (blood poisoning) and systemic infection. A person usually starts feeling symptoms with 10-14 days of infection. These include headache, body aches, and fever. After two weeks, small rose colored spots appear on the body that can last four to five days. After three weeks, the patient is emaciated and mental instability begins to show. If left untreated, typhoid fever proves fatal in up to 25% of all cases (Stedman, 1900).

Residents of Topeka and Manhattan were warned to boil their drinking water as early as 1896. But the state Board of Health were unsuccessful in preventing sewage dumping into the water supplies. In 1907, Kansas adopted the stream pollution law. It gave the Board of Health power to "preserve the purity of the waters of the state." (Kansas State Historical Society, 2014) Cities and industries were required a permit from the Board to dump wastes in a river and all public water supply systems had to receive the state's approval.

Chapter 3

MATERIALS AND METHODS

The initial data collection involved the location and examination of historic records from the Historic Topeka Cemetery's vault (Figure 9). The vault records were recorded by last name, first name, date and state of birth, date and place of death, disease, name of relatives, lot and section number, plot purchaser, and remarks, which could include occupation, information regarding death, or war and veteran information.

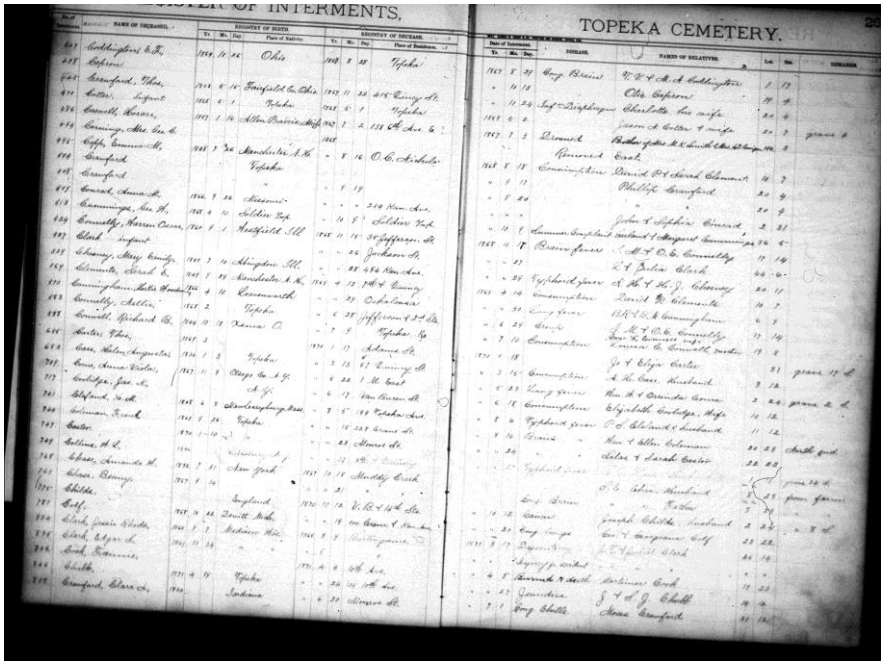


Figure 7. Historic Topeka Cemetery Vault Records. Courtesy of the Historic Topeka Cemetery.

The vault records were hand written in cursive and posed a number of difficulties when trying to read and sometimes interpret individual entries. Each interment was logged and recorded in these vault archives.

The individual interment records were then transferred to a database within Filemaker Pro 5, as seen in Figure 10, by the administrative staff of the Topeka Cemetery Association. This method was used because it created cards that the staff could easily read and refer to while selecting plots for family members or original plot owners. The same categories were used in Filemaker Pro 5 as were used in the original vault records, however, the categories were expanded and much easier to read. They included surname, given name, interment number, section, lot, space, residence, birthdate and deathdate, birth and death place, interment date, relation, lot owner, funeral home, marker, cause of death, military service, and any additional information on the individual. (Figure 10).

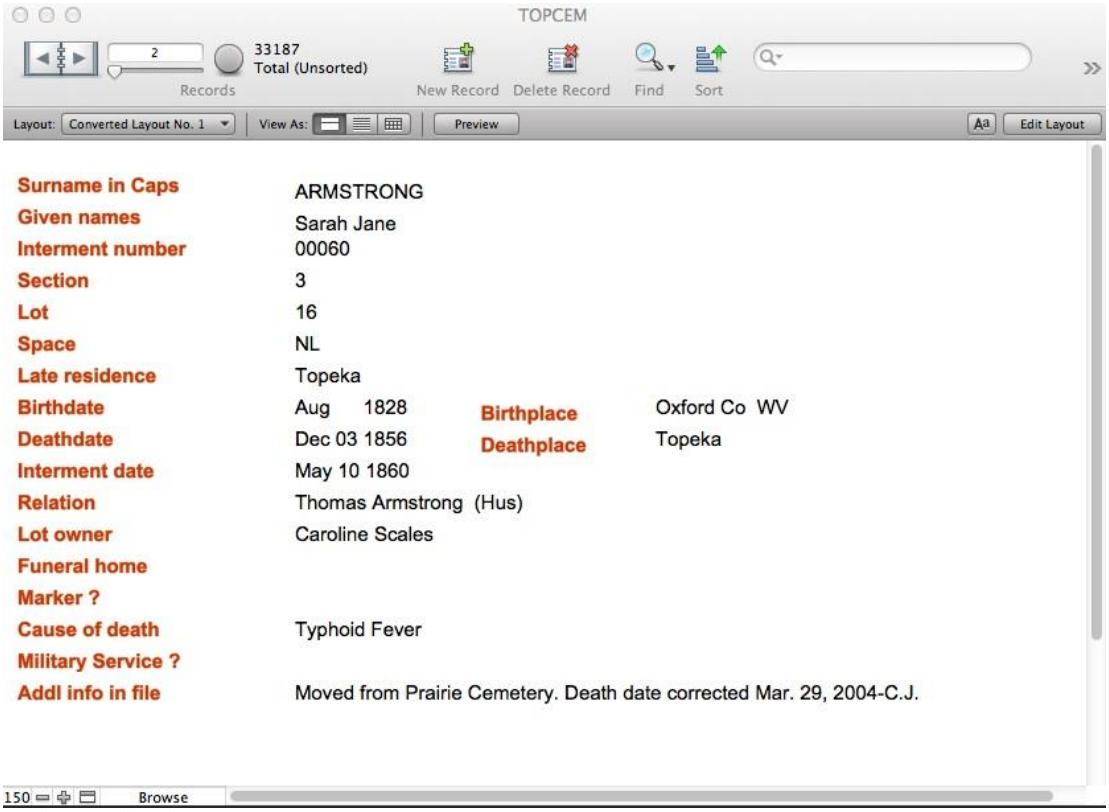
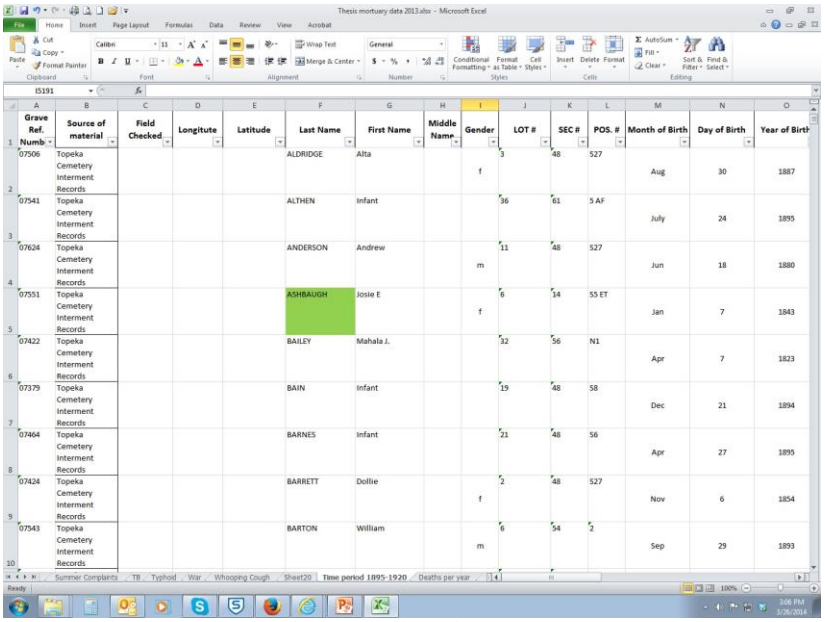


Figure 8. FileMaker Pro 5.

The records were then converted into Filemaker Pro 12 to export into a Microsoft Excel spreadsheet (Figure 11). Again, the same categories were used as were present in the vault records and Filemaker Pro5. This conversion was necessary to ensure the ease of manipulation during my analysis section of my research. Excel is also the necessary program for further data manipulation in ESRI's ArcGIS 10 mapping program.



Grave Ref. Numb	Source of material	Field Checked	Longitute	Latitude	Last Name	First Name	Middle Name	Gender	LOT #	SEC #	POS. #	Month of Birth	Day of Birth	Year of Birth
07506	Topeka Cemetery Interment Records				ALDRIDGE	Alta		f	3	48	527	Aug	30	1887
07541	Topeka Cemetery Interment Records				ALTHEN	Infant			36	61	5 AF	July	24	1895
07624	Topeka Cemetery Interment Records				ANDERSON	Andrew		m	11	48	527	Jun	18	1880
07551	Topeka Cemetery Interment Records				ASHBAUGH	Josie E		f	6	14	55 ET	Jan	7	1843
07422	Topeka Cemetery Interment Records				BAILEY	Mahala J.			32	56	N1	Apr	7	1823
07379	Topeka Cemetery Interment Records				BAIN	Infant			19	48	58	Dec	21	1894
07464	Topeka Cemetery Interment Records				BARNES	Infant			21	48	56	Apr	27	1895
07424	Topeka Cemetery Interment Records				BARRETT	Dollie		f	2	48	527	Nov	6	1854
07543	Topeka Cemetery Interment Records				BARTON	William		m	6	54	2	Sep	29	1893

Figure 9. Historic Topeka Cemetery Excel Information

All records between 1895-1920 were maintained in a separate spreadsheet and organized by date of death and cause of death from 1895-1920. The three primary diseases include influenza, tuberculosis, and typhoid and were the most reported causes of death in this time period. Therefore, it was decided for the study to focus on these in order to compare their occurrences as referenced in the Historic Topeka Cemetery. This decision also facilitated more focused analysis of records of disease occurrences, resulting in a somewhat more defined set of findings. The completed spreadsheets eventually became the data base for all subsequent analysis and disease patterns in the cemetery profile.

Field Protocol

During the Spring and Summer of 2013, a large group of staff descended upon the Historic Topeka Cemetery with one goal in mind: mapping the interments from 1895-1920 (Figure 6), which included 8,875 graves. After training the volunteers to use the handheld Trimble GPS units, each interment was plotted and mapped through ESRI's ArcGIS 10 program. With this program, the interments could be visualized and grouped according to name isonomy, date of birth or death, cause of death, funeral home, and even plot purchaser. During the first part of the spring of 2013, the spreadsheets were sorted by cemetery sections. Each interment within the date range of 1895-1920 were plotted within each section. This became problematic as the researcher sought to find every name on the spreadsheet developed for that section. This process also ended up taking more time because of unexpected but necessary searching for missing headstones and because of the walking through the same sections multiple times to reconcile inconsistencies between the physical and archival records generated. Some of the family stones were not easily located and others were sunken into the ground to the point the names were illegible. Many were vacant all together, making the examination impossible. After two months of mapping the headstones, a more efficient way of obtaining the data was developed. In this new approach, sections were examined by sight, using the date of death as reference. After mapping for each section was completed, the data from that section was then uploaded into ArcGIS 10 and mapped. This process proved itself to be much faster and more efficient than the previous protocol. Further, while mapping the interments, it became clear that in the interest of time, not all of the interments could be included in this study. 1,600 graves, all of which were

mapped and uploaded into ArcGIS 10 software, are illustrated in yellow by sections that were completed by November 2013 (Figure 12).

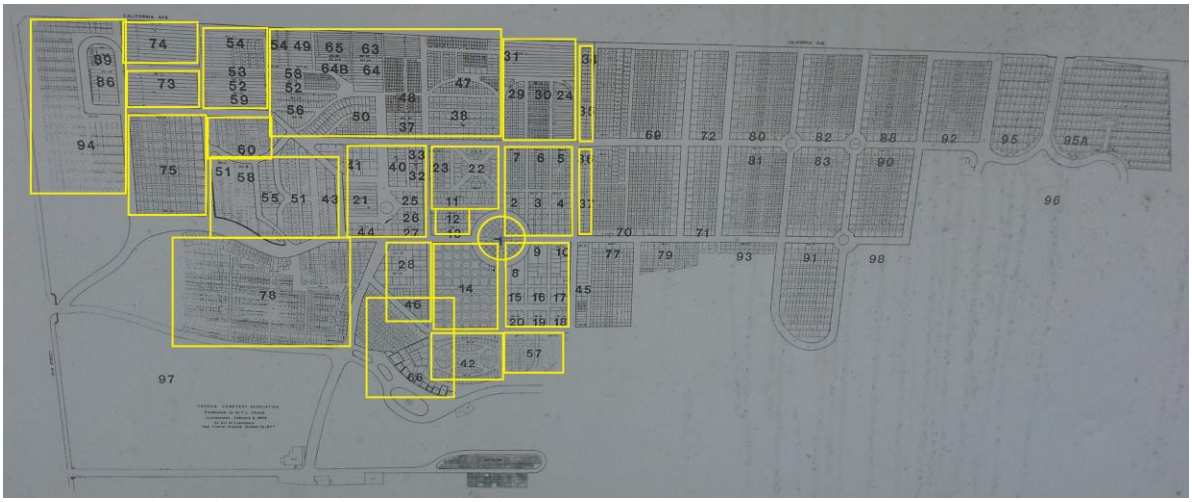


Figure 10. Historic Topeka Cemetery Plot Map – Finished

The completed sections include approximately 5% of the total cemetery and 18% of my total sample size.

Figure 11. ArcGIS Map of Historic Topeka Cemetery

The rest of the 8,875 interments will be completed during the summer and fall of 2014. An example of the completed mapping through the ESRI program, including the plot of each individual interment is shown in Figure 13.

Chapter 4

RESULTS

Using the cemetery and archival data collected from the Historic Topeka Cemetery, patterns of disease, specifically influenza, tuberculosis, and typhoid were examined and data manipulated to illustrate the connection between the association's vault documents and the official recorded disease patterns of the city during the years of 1895-1920 .

The Historic Topeka Cemetery was surveyed for this thesis between the years of 1895-1920. These years best illustrate the disease patterns that inundated the city during the turn of the century and can reflect known patterns throughout the period of interment.

From 33,178 overall interment within the Historic Topeka Cemetery, they accepted 8,875 interments between the years of 1895-1920. Ages were based on birth and death dates from the Historic Topeka Cemetery vault records: 1,706 infants (0-2 years old), 598 juvenile (3-15 years old), 953 young adult (16-30 years old), 1,413 middle aged adults (31-50), 3293 older adults (51-80), and 559 elderly adults (81+). 353 interments could not be aged due to incomplete records or unavailable birth dates. Age sets were determined by the author, as shown in Figure 14.

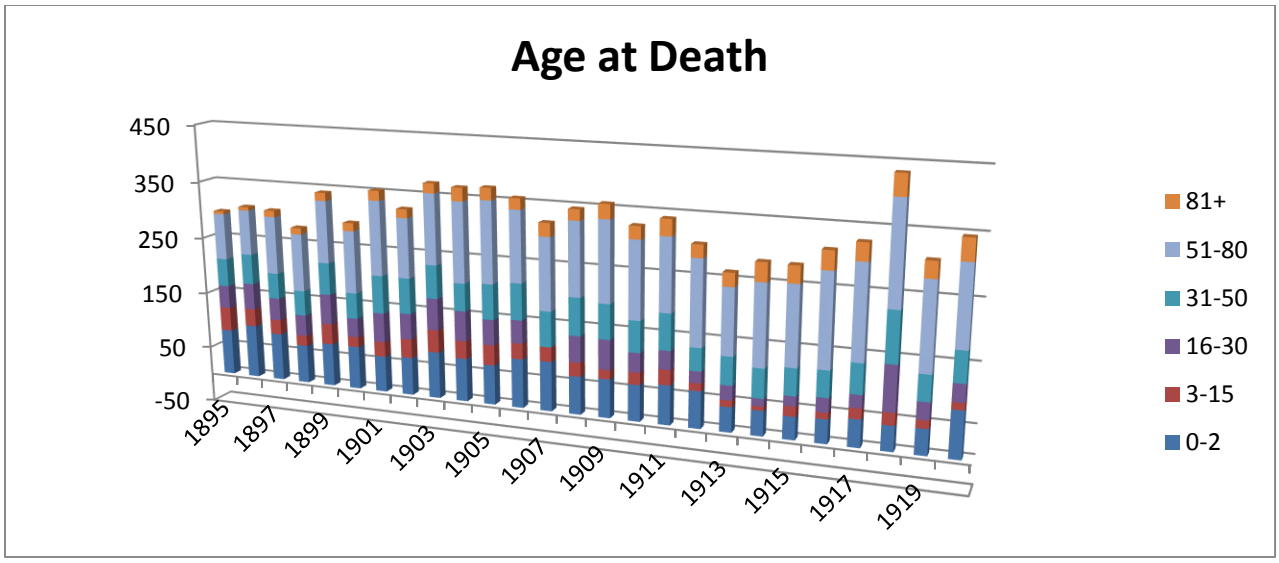


Figure 12. Age at Death 1895-1920

Sex was determined by names on the records and associations with husbands or wives. Out of 8,875 interments, 4,475 were male, 3,747 were female, and 653 were indeterminate, because of lack of marital association and/or given names were not gender specific, as seen in Figure 8.

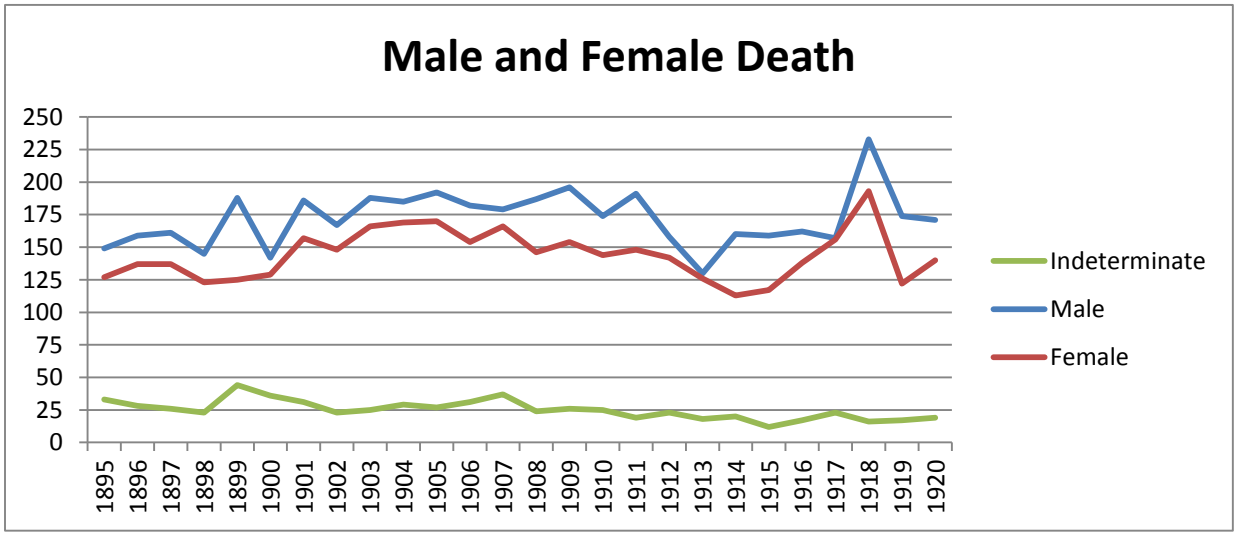


Figure 13. Male and Female Death 1895-1920

In Figure 14, death by influenza in the Historic Topeka Cemetery is illustrated. The frequency of deaths identified as the result of influenza shows minimally between 1895-1915, after which there is a recognizable peak (n=33) in 1918. The number of deaths related to influenza as recorded among the sample of interments of the Topeka Cemetery used here exhibit a return to low frequencies in 1919 (n=14) and 1920 (n=7).

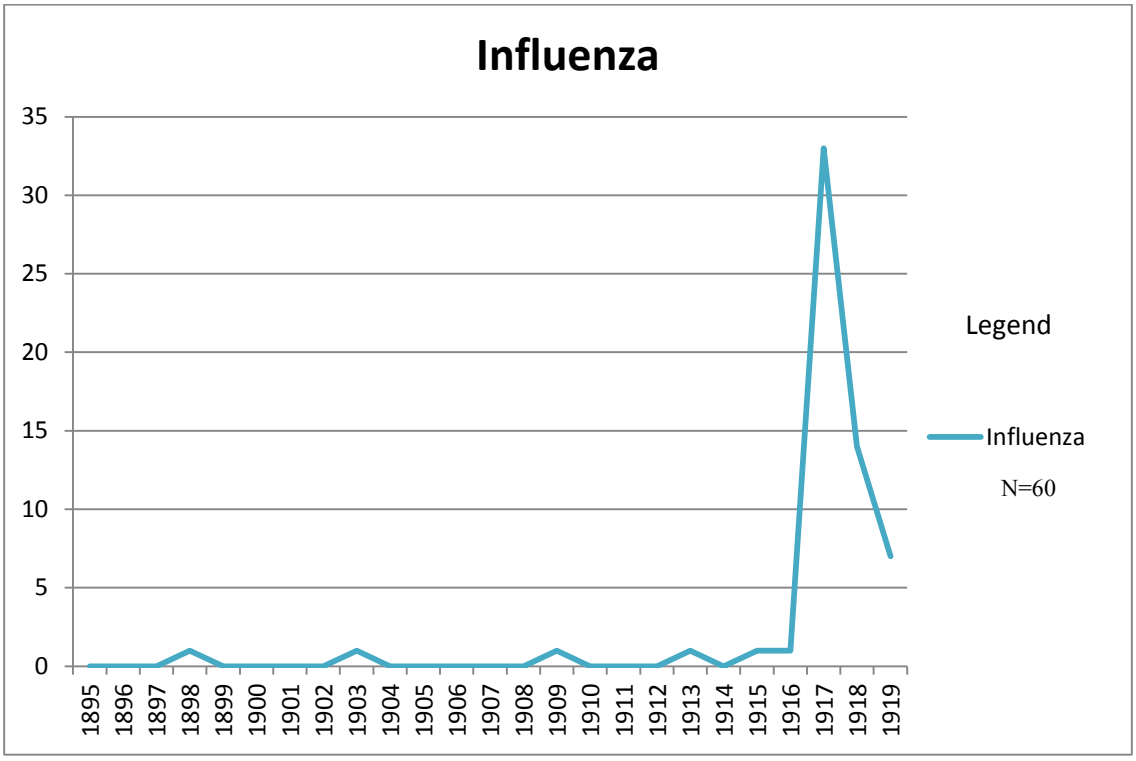


Figure 14. Rates of Influenza 1895-1920.

An important observation was made with regard to how influenza was diagnosed during the time period from 1895-1920. Different ailments which were also associated with the influenza epidemic were separated. The diagnosis of influenza thus reflects a certain level of subjectivity and it is dependent on the preference of individuals. A diagnosis of Spanish Flu, La Grippe, and pneumonia, in addition to influenza, were seemingly used to describe the same strain

of ailments. Thus, records leaving each of these ailments separate were combined and pooled (Figure 15).

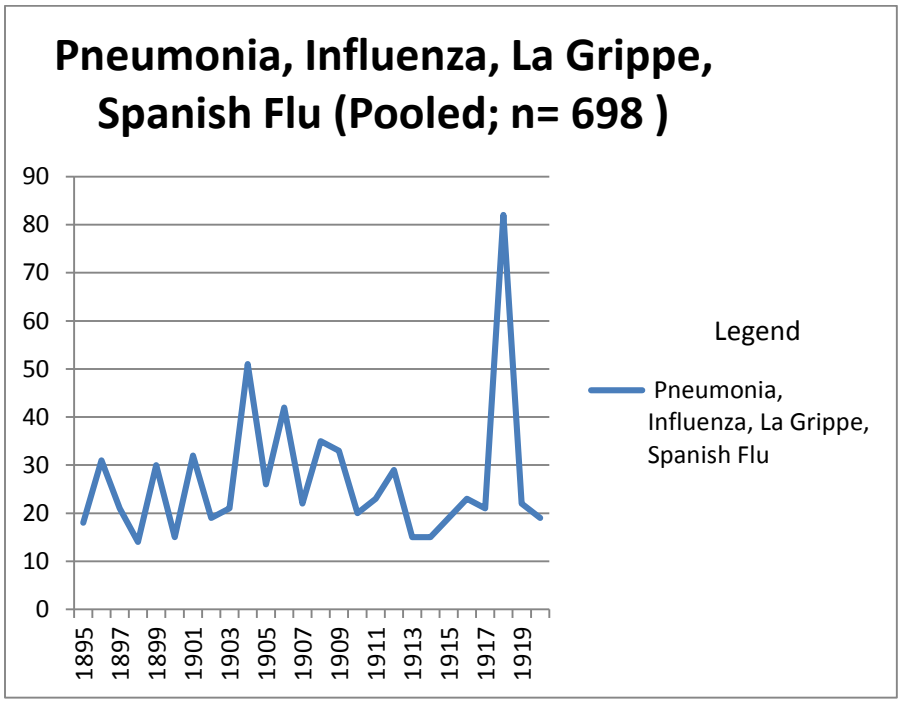


Figure 15. Rates of Pooled Pneumonia, Influenza, La Grippe, and Spanish Flu 1895-1920

The frequency of the combined ailments, each of which translates into some form of influenza, shows a fairly stable rate of approximately 30 deaths in 1896, 1899, 1905, and 1912. A noticeably higher frequency of 51 deaths are recorded in 1904 and 42 deaths in 1906. A frequency of 35 deaths were observed in 1908 and 33 in 1909. A string of influenza related deaths were noted in 1910 (n=20), followed by a slight increase in 1911 (n=23) and another noticeable drop in 1913 (n=15). Starting in 1915, the number of deaths associated with influenza related ailments begin to increase again, reaching its highest peak in 1918 (n=82), followed by another equally dramatic decrease in 1919 (n=22).

As previously discussed, the arrays of each individual disease follow distinct patterns within the influenza epidemic. Although separate, each individual illness still follow subsequent patterns of the other influenza related diseases. The frequency of the separated ailments illustrate a stable rate of increase and decrease similar to the pooled samples. However, in this illustration, the frequencies of Spanish flu does not appear until it reaches a peak in 1918 (n=9). La Grippe has an overall lower frequency of other ailments, with the largest showing in 1899 (n=8).

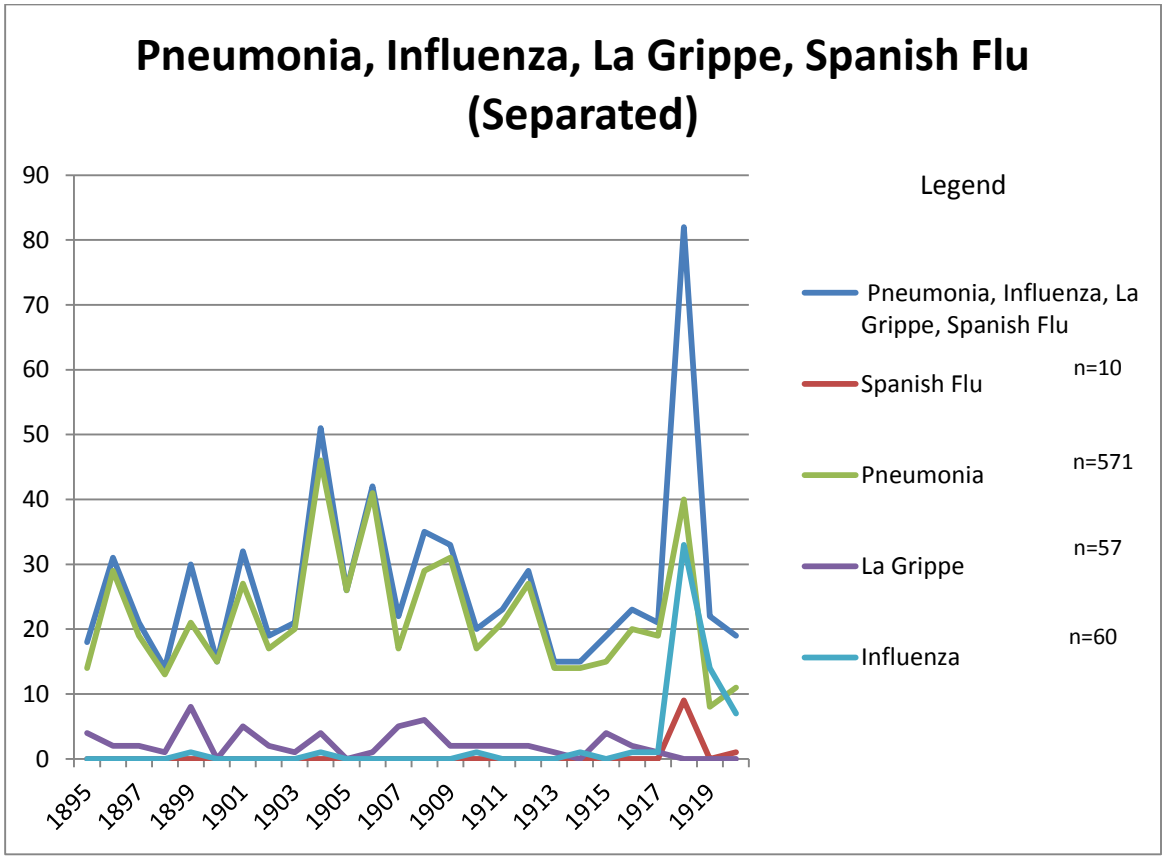


Figure 16.Rates of Separated Pneumonia, Influenza, La Grippe, and Spanish Flu 1895-1920

In Topeka, the casualties from influenza were comparable to those at a national level. During the epidemic year of 1918, 82 people within the cemetery died as a result of influenza or a related respiratory ailment. This was nearly 22% of the total deaths of 1918. When added to the Rochester cemetery interments of 146 (27%), the numbers were close to the national average of 50%(CDC, 2014).

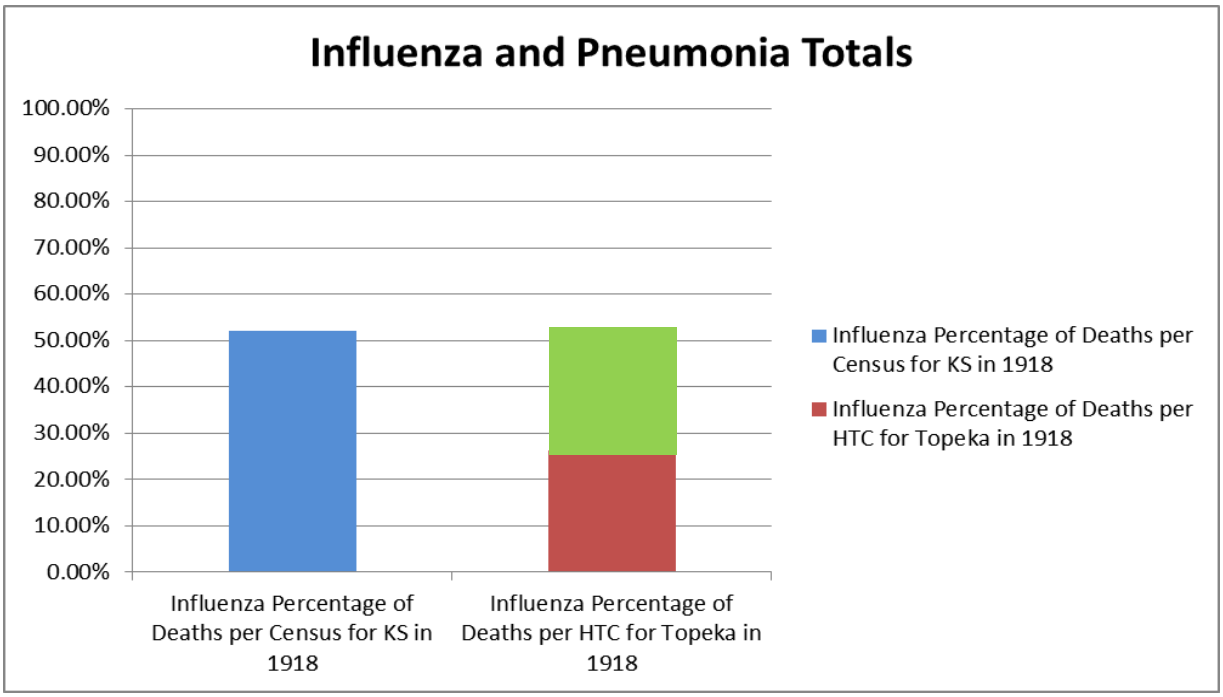


Figure 17. Topeka Cemetery and Rochester Cemetery totals 1918

Tuberculosis was another an illness that threatened Topeka and the nation throughout this time period. Here, the research from the Historical Topeka Cemetery illustrates the increasing frequencies with a slight peak in 1901 (n=8), then continuing in 1907 (n=9) and 1908 (n=14), continuing in a stable rate of increase and decrease into 1920 (n=11) (Figure 17).

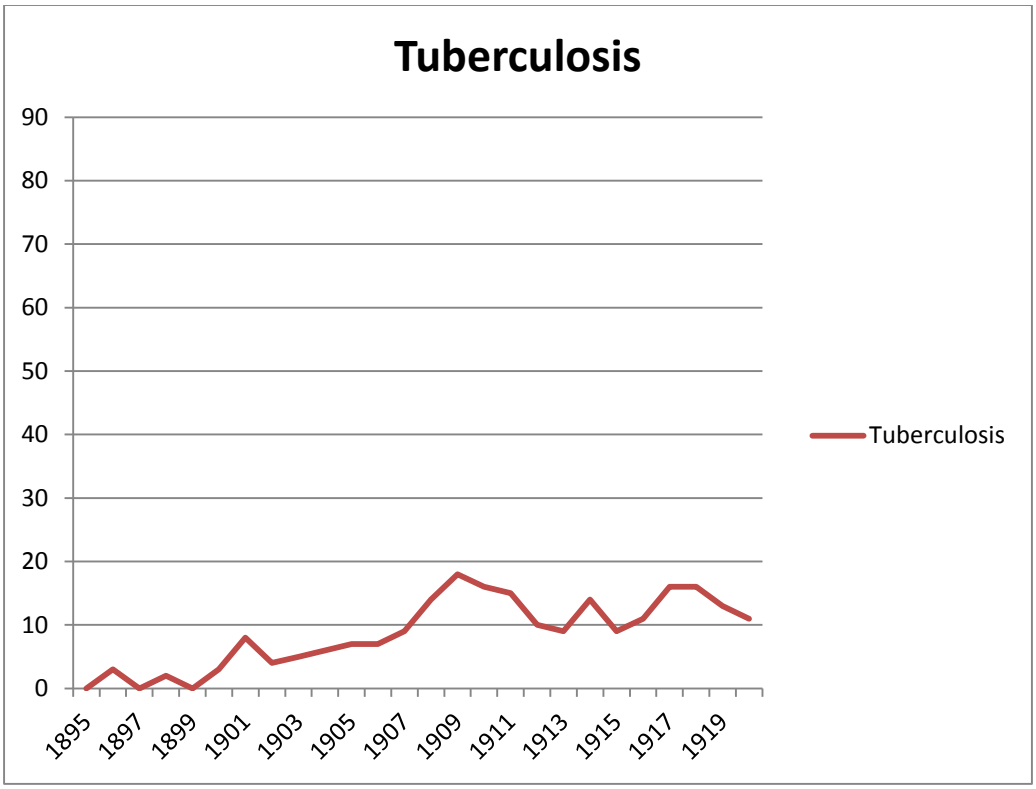


Figure 18. Rates of Tuberculosis 1895-1920

Figure 18 observes the rise and fall of consumption during the 1895-1920 period. The illustration shows the frequency peak in 1896 (n=35) and steadily decrease up to 1900 (n=16) only to rise again in frequency in 1903 (n=31). After 1903, consumption rates drop dramatically and by 1911, the frequency is close to zero.

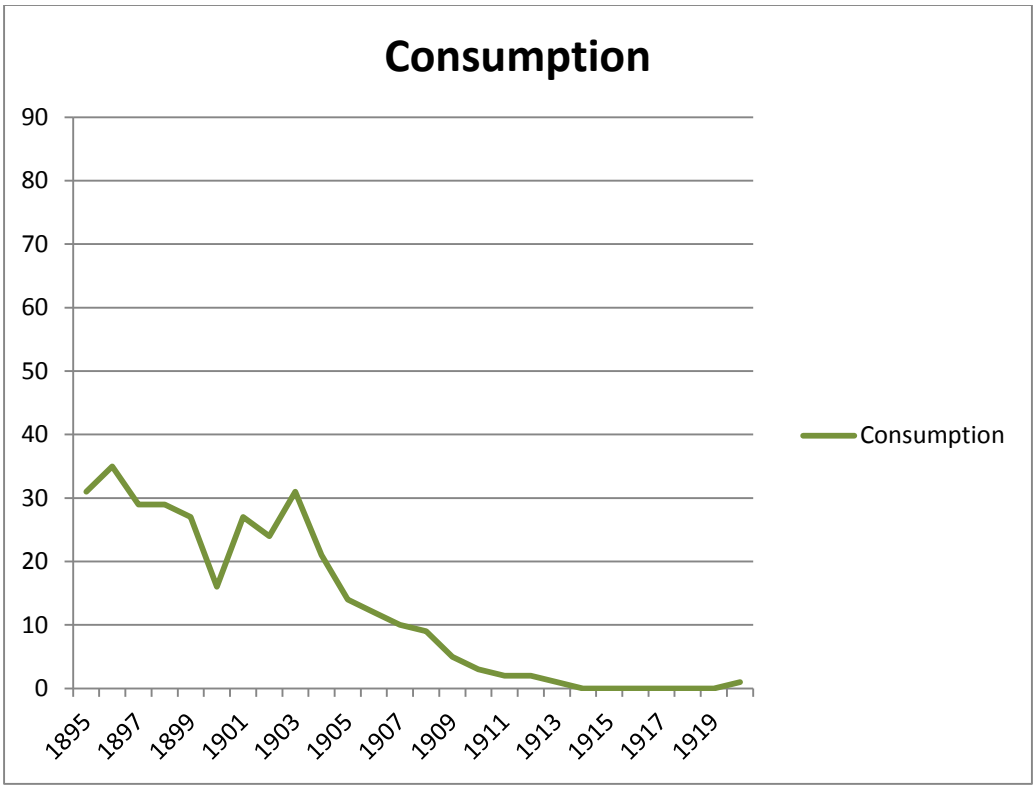


Figure 19. Rates of Consumption 1895-1920

The exchange in terms from consumption to tuberculosis is better illustrated by the yellow circle within Figure 19. Tuberculosis and consumption observe peaks in frequency in 1901, with the pooled rate at 35. In 1903, consumption make a radical drop (n=31) to 1908 (n=9) while tuberculosis makes a somewhat impressive increase in 1903 (n=5) to 1908 (n=14). However, the pooled frequency drops after 1910 (n=19) and then stabilizes in 1914 (n=14) with minimal increases or decreases up to 1920 (n=12).

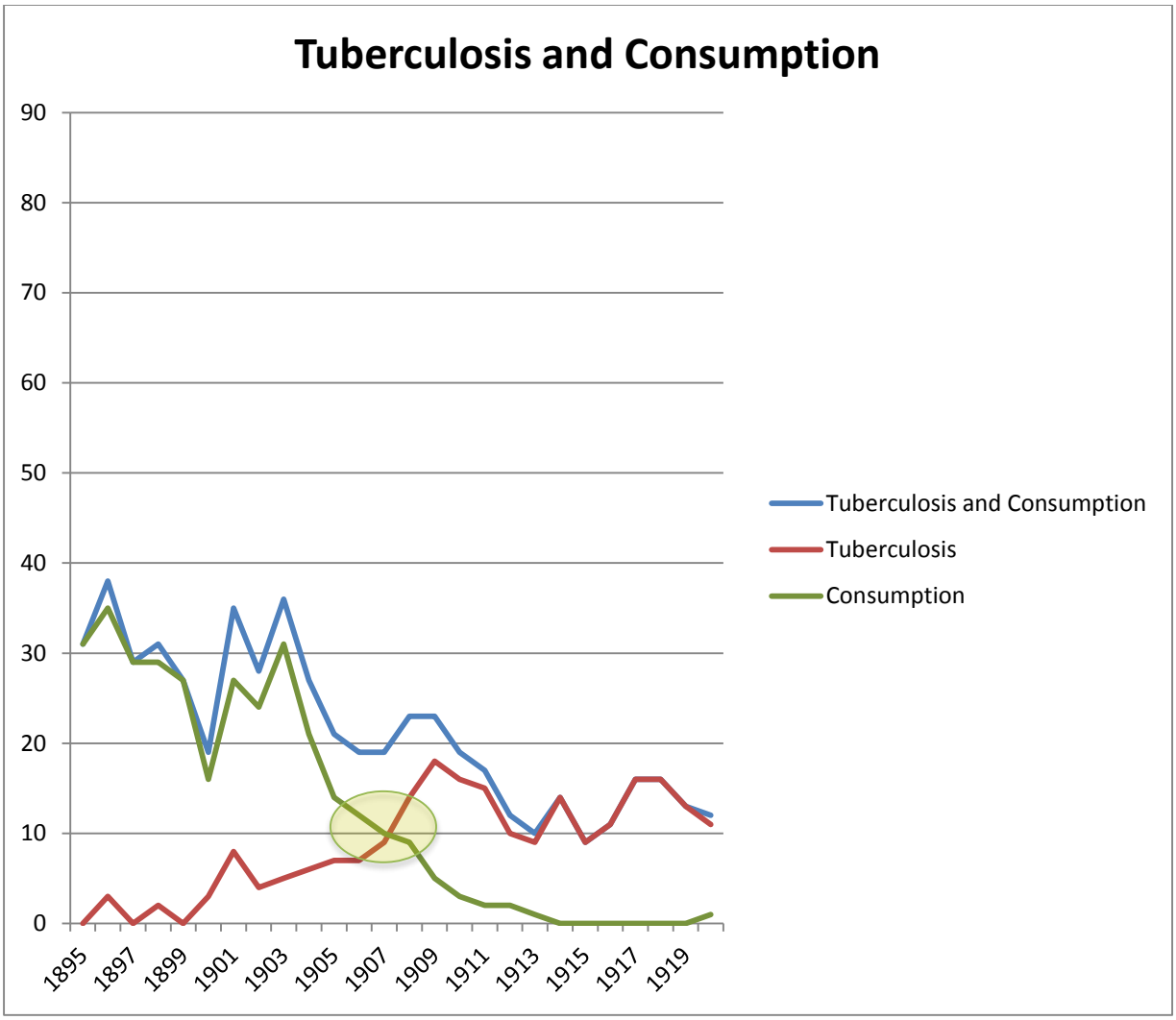


Figure 20. Rates of Pooled Tuberculosis and Consumption 1895-1920

The Kansas Biennial report of 1905-1906 showed consumption/tuberculosis deaths had the highest frequency in the state in 1905 (n=965) and 1906 (n=882). Pneumonia had slightly less occurrences than consumption in 1905 (n=768) and 1906 (861). However, typhoid had dramatically lower frequencies in 1905(n=397) and 1906 (n=368) than consumption and pneumonia. These disease patterns for this two year period were then compared to the records of the Historic Topeka Cemetery.

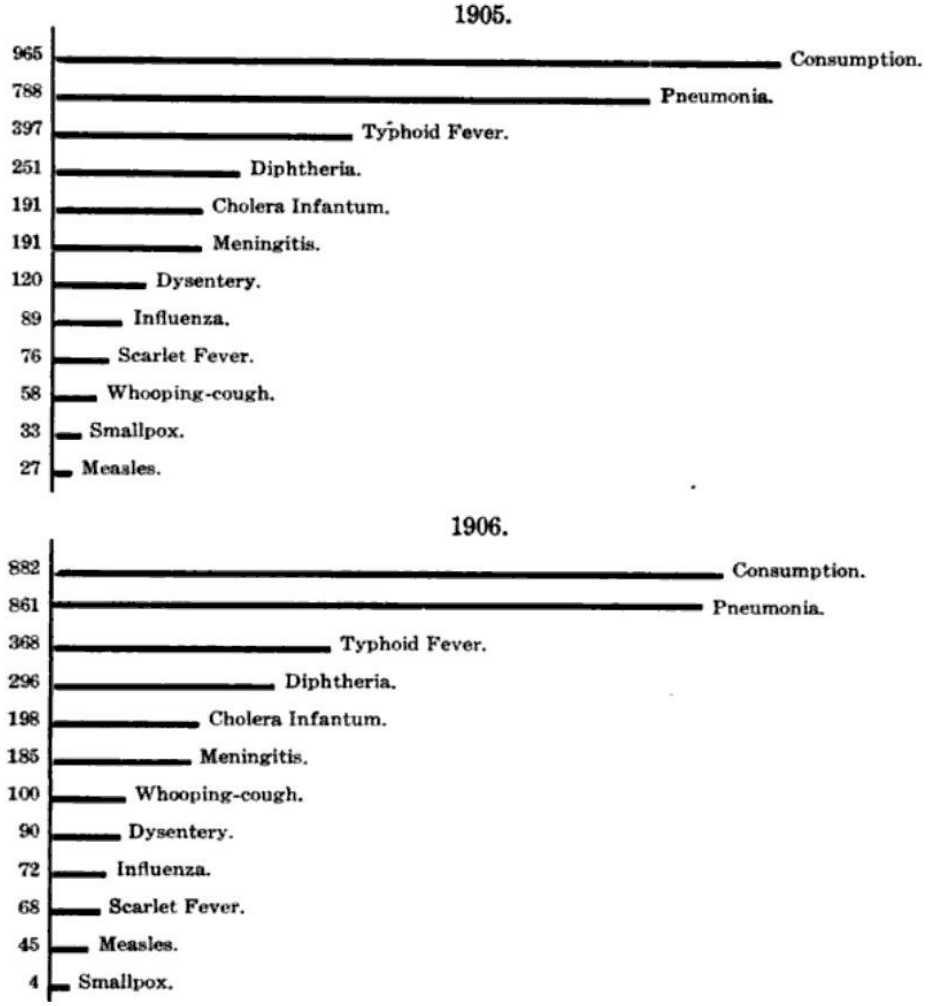


Figure 21. Kansas Biennial report 1905-1906

The Historic Topeka Cemetery records were demonstrated in the same order as the Kansas Biennial report of 1905-1906. The most frequent of the ailments in 1905 was consumption (n=35), with pneumonia at a slightly lower frequency (n=29) and typhoid at a drastic decrease in frequency by comparison (n=7). In 1906, consumption was still the highest frequency of ailments (n=31), with pneumonia coming in second, but at a much lower frequency (n=14). Typhoid is still at a much lower rate in 1906 (n=9).

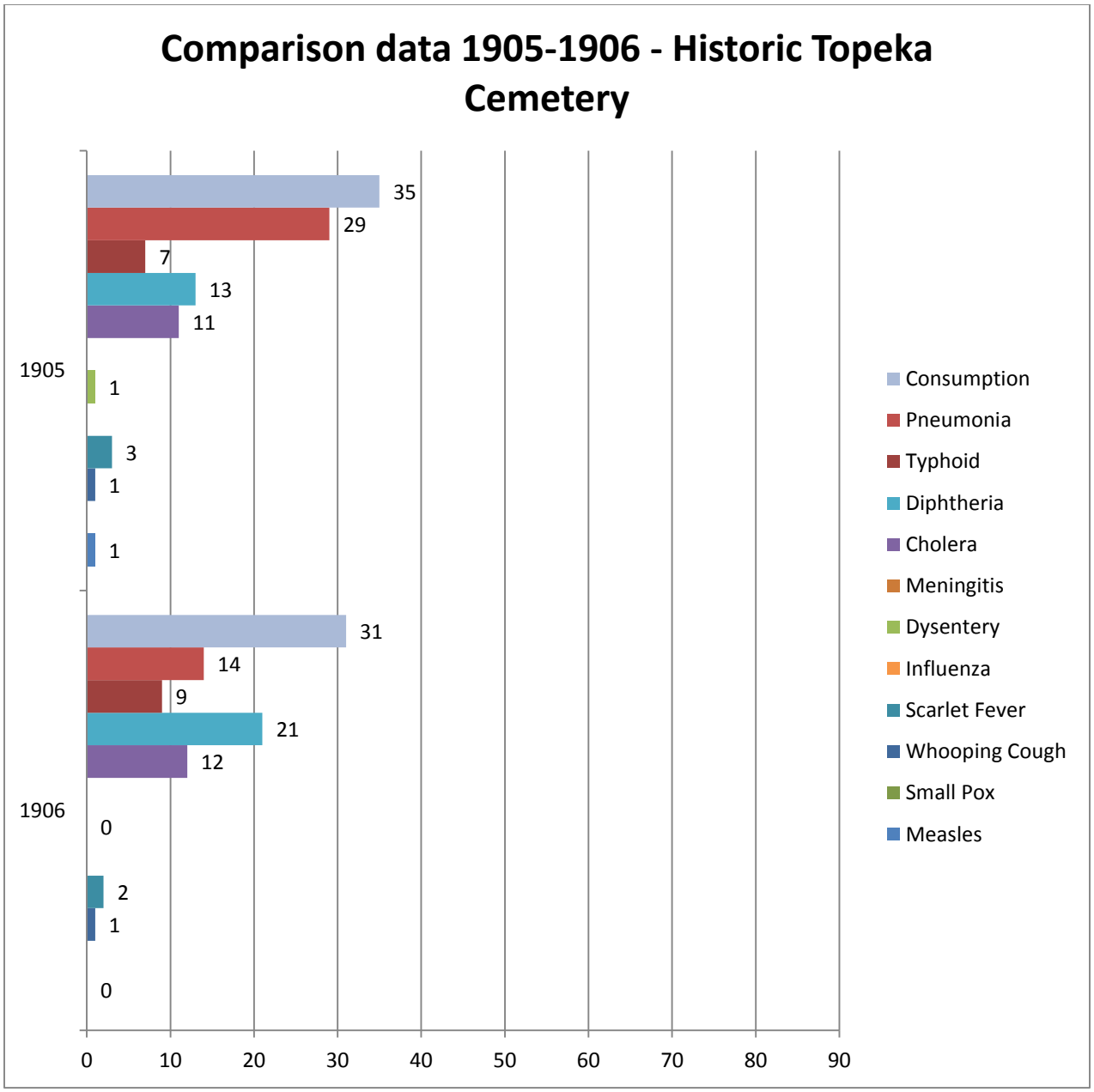


Figure 22. Comparison Data 1905-1906

One of the major differences in disease reporting within Figures 20 and 21, however, is the occurrences of typhoid. Figure 22 illustrates the frequency of death per year related to typhoid. The frequency of typhoid shows a fairly stable rate of increase and decrease from 1896(n=7) up to 1904 (n=13). However, in 1905, there is a dramatic decrease in frequency (n=8)

and then a continuing decreasing trend with a slight peak in 1908 (n=11) and 1916 (n=5) before almost disappearing off the graph in 1920 (n=2).

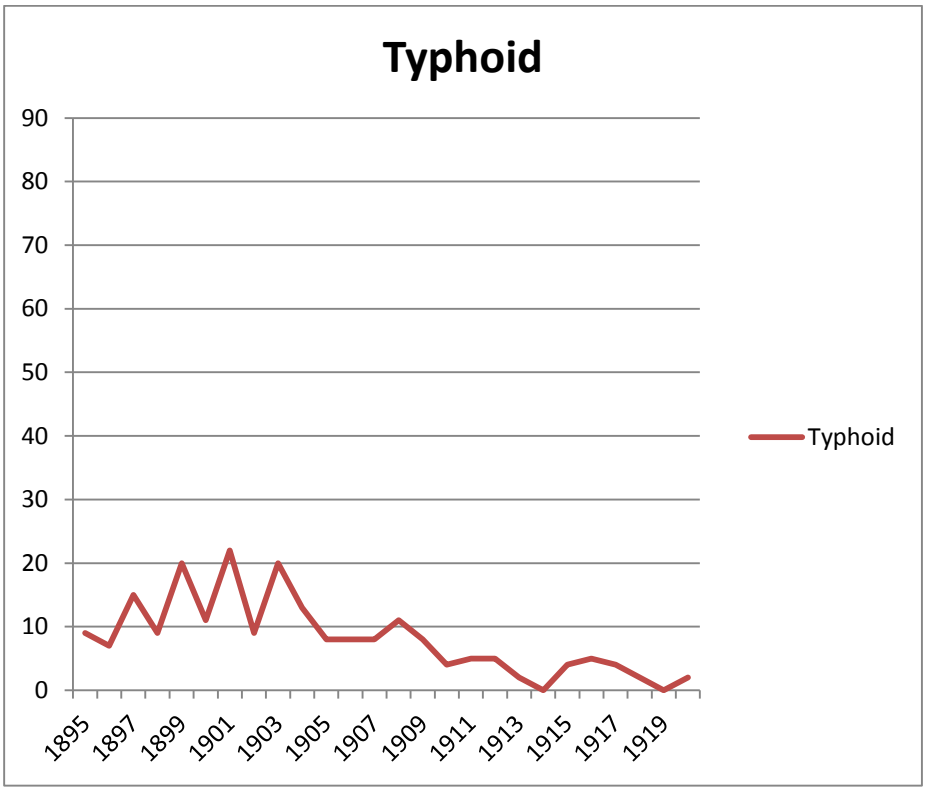


Figure 23. Rates of Typhoid 1895-1920

Chapter 5

DISCUSSION

The objective of this thesis is to illustrate the importance of historic data while providing demographic information on a skeletal population. This research determines that historic records could provide information and illustrate patterns between dates of death and historically recorded disease events within the immediate geographical area of the sub-population represented in this cemetery. This information could then enhance the demographic representation and fill in the gaps left by other means.

Death Reporting and Symptomatic Diagnosis

There are several observations related to the research presented. Most importantly, the death reporting of individual medical staff, doctors, nurses, medical examiners, and even funeral home directors can become problematic when attempting to obtain information about certain diseases. Each medical professional can look at a decedent and report the death in many different ways. One could report the death symptomatically, such as edema (swelling), heart congestion, or summer complaints. Another could lump all of the symptoms into one blanket diagnosis, such as pneumonia or cancer. But if a researcher is looking for specifics, this would be problematic. When cataloging the information, each cause of death was charted and assigned a percentage as to the range of that particular disease in contrast to the total of deaths that year. There were 31 causes of death used in the analysis of the Historic Topeka Cemetery. However, in each year, this only accounted for roughly 50% of total deaths that year, leading to the conclusion that many of the deaths being reporting were either specifically event related and the protocol was not able to include them in the total number or, more often so, the terms so specialized that the terms were not recognized.

Disease Analysis

When examining the age groups over the 1918 epidemic, particular age groups (31-50) were affected more than those of the other age categories. In the period between 1917 and 1918, there was a decrease of .2% in overall deaths in the age range of 0-2, a .5% increase in ages 3-15, a 5.3% increase in ages 16-30, a 2.5% increase in ages 31-50, a .4% increase in ages 51-80, and a decrease of 1.1% in ages over 81. However, when referring to death within the influenza epidemic of 1918, ages 0-2 recorded 9.9% of the influenza deaths in 1918, ages 3-15 recorded 4.8%, ages 16-30 recorded 17.8%, ages 31-50 recorded 19.8%, ages 51-80 recorded 39.5%, and ages over 81 recorded 8.2%. Figure 7 further represents these percentages of influenza deaths through illustration for the year 1918.

When examining the reported census data of influenza within the state (State Census Data, 1920), the results do not initially look like they correspond with the trend. However, in Topeka during this period of time (1895-1920), there were two active cemeteries. The Historic Topeka cemetery and Rochester cemetery. If a person lived north of the Kansas river, they were buried in the Rochester cemetery. If a person lived south of the Kansas river, they were buried at the Historic Topeka Cemetery.

That being said, the results from the Historic Topeka Cemetery (24%) only include roughly half of the total number of cases of influenza in the city at this time according to the records retrieved from the cemetery association. When adding the Rochester cemetery records (22%), it illustrates roughly 50% of the deaths during the 1918 epidemic were due to influenza or similarly reported causes of death. This is in comparison to 52% of the State Census Data of 1918.

When comparing the death rate of influenza during the epidemic of 1918, it can be further illustrated when examining the total death rate within the time period of 1895-1920 within the records of the Historic Topeka Cemetery. The spike due to increase of interments are exactly where one would expect to see them; the epidemic of 1918. Spanish Flu and La Grippe were only expressed during the 1918 epidemic and therefore can only be attributed to the influenza outbreak.

Typhoid

Typhoid was one of the nation's deadliest diseases in the early 20th century. To combat this illness, in 1855 a publicly funded well was excavated on the corner of Third Street and Kansas Avenue, which provided water to the citizens of Topeka for over 25 years. This was a first for Topeka, as running water was not available as a convenience within houses or businesses. Ownership of Topeka's first water system changed three times over the next several years until 1905 when the treatment facilities and distribution system were purchased by the city of Topeka for $620,000. The main action was to reduce water borne diseases and provide clean drinking water to the city of Topeka (Topeka Public Works, 2012). Nationally, the recorded deaths due to typhoid in 1910 were 12,673 (CDC Mortality Statistics, 1910). In response to the city's water treatment plan, the death rates in Topeka were low, with the Historic Topeka Cemetery recording only four deaths in 1910. Before 1905, the Historic Topeka Cemetery had typhoid deaths averaging 14 a year. Between 1905-1912, the average deaths linked to typhoid in Topeka was seven. Chlorination was then added to the water treatment processes in Topeka in 1912 which further reduced the average yearly typhoid deaths to three between the years 1912-1920.

Public awareness was also at a high to combat instances of typhoid due to lack of hygienic water and corrupted wells. Local campaigns and flyers were in full effect.

Tuberculosis/consumption

Due to the clinical nature of the term tuberculosis, it replaced the term consumption and its social connotations in the beginning of the 20th century. The city of Topeka was no different, and the replacement of terms is illustrated in the records after 1908. The first success in immunizing against tuberculosis was developed from attenuated bovine-strain tuberculosis by Albert Calmette and Camille Guérin in 1906 by a vaccine called "BCG" (Bacille Calmette-Guérin). The BCG vaccine was first used on humans in 1921 in France but it was not until after World War II that BCG received widespread acceptance in the United States, Great Britain, and Germany (Styblo, 1976), 25 years after this study's time period. Although the illustration (Figure 17) shows the dramatic increase of tuberculosis cases after 1908, the cause isn't a decline in incident, but rather a reclassification of terms.

However, records from the Historic Topeka Cemetery do illustrate a slight drop in frequency after 1908. This is contributed to the Topeka Water Treatment Plant, chlorination of drinking water, and public education regarding contagious diseases, due to campaigns by Samuel J. Crumbine, secretary of Health in Kansas from 1904-1911. These campaigns included forbidding public sharing of water, encouraging the expulsion of disease carrying insects, and outlawing the practice of public spitting (Kansas State Historical Society, 2014).

Chapter 6

CONCLUSION

The goal of this thesis was to determine the usefulness of historic records within a demographic study. The Historical Topeka Cemetery was selected, in part, because of the scope of their records and the rich details within them. By combining the vault records with the records from other recording agencies within the city and state, patterns could be visualized and the non-invasive approach could be examined.

Throughout this research, the application of comparative methods to the historic population within the Historic Topeka cemetery illustrated it was possible to use these documents to determine disease frequency and disease regressions when examining the disease patterns of 1895-1920. By comparing the state and national rates of typhoid, tuberculosis, and influenza, it was possible to illustrate the viability of these historic records when utilizing them with known studies and reports of the region.

The resulting demographic patterns that these interments provide demonstrate many arrays within the cemetery that can be used in other regions and with other cemeteries. It was possible to successfully illustrate patterns of disease within the time period of 1895-1920, with increases and decreases in death patterns where known epidemics and medical interventions were historically documented. Because of the clarity of the results, this data could be used in future studies to compare known biological data with other recorded historic cemetery data in proximal regional cemeteries.

The information acquired from the Historic Topeka Cemetery has the potential for expansion to include familial connections, social and political standings, and marriage patterns

within a larger population sample to illustrate migration and household information. This research also provides a protocol for other cemetery studies and opens up the possibility for future research to understand not only multiple regional progressions, but national progressions as well.

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