

Gold Fever: Death and Disease During the Klondike Gold Rush, 1898-1904.

by

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Abstract

This thesis represents the first anthropological perspective to be offered on the nature of the Klondike Gold Rush population. In order to better understand the experience of the average gold rusher, morbidity and mortality patterns are examined for the residents of the Yukon Territory following the discovery of gold in the region (1898-1904). Infectious diseases such as measles, pneumonia, smallpox and typhoid fever are the primary focus of this study, however local factors such as the severe climate and the seclusion of the gold fields from the outside world also offers an interesting opportunity to examine the consequences of leading a particularly harsh and physically demanding lifestyle in an inhospitable environment.

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Dedication

This is for my husband Collin, without whose patience, support and understanding, this thesis could never have been completed.

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Chapter I: Introduction

While biological anthropologists traditionally answer questions about the health of past and present populations through the collection and analysis of osteological materials or anthropometric data (see for example Hoppa & Garlie 1998, Katzenberg 1996, Saunders 1999, 1997, 1990, Saunders & Katzenberg 1998), there is nevertheless a growing number of scholars working within the sub-discipline of anthropological demography who instead utilize archival materials such as death registers, hospital records, census materials and other historical documents, in order to gain insight into the health status of past populations. It has, in fact, been argued that the use of these data sources is not as different in practice as it may initially appear (Swedlund & Armelagos 1976), since the term 'archive' can arguably be extended beyond its common definition in reference to collections of historical documents, to also describe the skeletal assemblages and anthropometric databases compiled by past anthropologists and preserved for further research (Swedlund & Herring 2003).

The purpose of this research is to examine morbidity and mortality patterns in the Yukon Territory, specifically in Dawson City, during and immediately following the Klondike Gold Rush (1898-1904). Of specific interest here are the consequences that the rapid settlement of a large population in practically virgin territory exerted on the health status of the community. Dawson City offers an exceptional opportunity to probe the issues which had to be resolved by early urban centers in response to burgeoning populations (as was the case for many North American cities which were undergoing rapid urbanization and industrialization around the turn of the last century), because in addition to its unusually high degree of geographical isolation, Dawson City also

underwent urbanization at a rate exponentially greater than most other cities, growing from a haphazard tent-pitching site to a frontier metropolis within just a few weeks time.

A primary goal of this study is thus to investigate how the usual pressures of development exerted on the health of this historical community were amplified by the effects of its booming population in combination with severe environmental conditions and extreme geographical isolation of the townsite, particularly as infrastructure, sanitary provisions and social services struggled to keep pace with the growing needs of the residents. This will be accomplished through a discussion of the nature of the population situated within its extraordinary context of the fervor of the last great gold rush, against the backdrop of the Great White North. The end result will be a richer and more accurate understanding of what life was like for the average gold rusher. The glorified stories of men who instantly struck it rich, of gorgeous dance-hall girls entertaining eccentric gamblers in salons where miners indulged in all the extravagances that money could buy, have been challenged by contemporary researchers as propagating myth rather than fact. Recent investigations have instead focused on uncovering the experiences of the typical gold rusher which was more often than not, laden with hardship, grief and disease. Thus, a secondary purpose of this research will be to contribute to the effort to distinguish between the legend and legacy of the Klondike Gold Rush, as much of the early literature pertaining to the gold rush has recently fallen under heavy criticism for overly romanticizing this celebrated part of Canadian heritage.

Research on the health of historic communities by anthropological demographers typically involves the statistical analysis of morbidity, mortality and vital statistics for the community, and answers a variety of questions about human populations by investigating

the interaction of biology and culture, in consideration of the effects that these events both have for, and exert upon the population in which they are observed. The insights gleaned from such analyses can then be furthered through the use of other historical documents and primary sources, allowing researchers to contextualize findings and make inferences about relationships between qualities of the environment (e.g. geographical, meteorological, social, ideological, and political) and the experiences of individuals residing in the community.

Examples of this type of research include investigations of fertility and reproduction (Burke & Sawchuk 2003, 2001, Madrigal 1997, Temkin-Greener & Swedlund 1978), as well as differential mortality patterns associated with biological sex (Madrigal 1992), seasonality (Madrigal 1994, Malina 1977), infant mortality (Sawchuk et al. 2002), and sociopolitical forces (Sawchuk et al. 2004). Still others working within this field have examined the effect of specific diseases or epidemics on the local population, including episodes of crisis mortality (Herring 1994, Madrigal & Koertvelyessy 2003, Sawchuk 1996, Sawchuk & Burke 2003, 1998, Sawchuk & Herring 1984), as well as mortality rates in populations more generally (Hautaniemi et al. 1999, Meindl 1977, Padiak 2005, Sawchuk & Burke 2000). Finally, other studies have addressed additional demographic influences at work within populations, such as sex ratios, marriage and birth patterns, household composition and family composition (Burke 2007, Madrigal 1996, 1993, Madrigal et al. 2003, Swedlund 1983).

Not only do studies such as these provide a better understanding of what life was like in historical populations, but the potential also exists to apply observations regarding past trends in disease ecology to both current and future situations. Risse (1997: 175) has

noted that “[a]s biological phenomena, diseases are never static...sickness shifts constantly in specific ecological setting” as a consequence of human agency and environmental conditions. As human beings have evolved over time, so too has their relationship with the diseases from which they suffer (Swedlund & Armelagos 1976). Research that examines past trends in prevailing causes of death and experiences of sickness contribute to our understanding of human ecology and the disease environment, which has important implications for future directions, as we must know from where we have come in order to make informed decisions regarding future directions. Omran’s (1971) theory of epidemiological transition outlines the co-dependant evolutionary relationship that exists between humans and their diseases, which has brought about a transformation in the leading causes of mortality among industrialized human populations. Beginning with various forms of pestilence and famine as the primary causes of death, industrialized civilizations were thought to have progressed to a state in which plagues were the primary threat to health. From this point infectious diseases eventually eclipsed all prior causes as the leading factor contributing to mortality incidence. After reaching this stage, societies inevitably progress to the point where chronic and degenerative diseases became the leading health concern for aging populations. This model describes a somewhat linear transformation a population undergoes as it progresses through a series of predetermined stages related to the development of societies. Understanding how this transition has occurred, and why certain local conditions have favored particular causes of death can be gained through analysis of the mortality of historic populations. Infectious disease—a primary focus of this research—typically exerts a substantial influence on the health of populations,

altering both the history and biology of civilizations, as prior to recent medical advances, death was one of the most significant factors acting upon a given population, both limiting population size and altering genetic composition, as members succumbed to illnesses (Inhorn & Brown 1990, Swedlund & Armelagos 1976). Aside from the considerable toll which epidemics exerted on the demographic composition of early urban communities, they were also a significant factor driving local social, economic and political reforms, particularly concerning public health initiatives and the refinement of sanitary infrastructure.

The mortality decline observed in Western countries in the late nineteenth century remains contested, and Omran's theory has come under recent scrutiny as the transition has been argued by some to have been far more complicated than the predicted trend of steadily declining infectious disease mortality and the increasing role of chronic and degenerative diseases in Western societies. Studies at the local level identify variation in the experience of cause-specific mortality that is more apparent both within and between groups than is discernible at the macro level. Explanations must therefore be sought at the community level, so that the interaction of local conditions, human agency, and the cultural dispositions and eccentricities of populations can be factored into the equation.

Following this line of reasoning, the role of features such as improved sanitation and living conditions, better nutrition and advances in medical intervention in reduced mortality from infectious diseases have been raised as challengers to, and/or confounding variables of, the linear progression of prevailing causes of death proposed by the epidemiological transition (Harris 2004, Padiak 2005). Scholars who specialize in the anthropology of infectious disease highlight "the interactions between sociocultural,

biological and ecological variables relating to the etiology and prevalence of infectious disease” (Brown 1981:7). Examinations of disease ecology through a biocultural approach leads to a more comprehensive appreciation of the relationship between humans and the sicknesses from which they suffer, as neither health nor illness are qualities independent of one another. The examination of secular trends of morbidity and mortality, in addition to seemingly static observations based on the health status of a community at a given point in history permits comparisons between these perspectives in order to answer important questions about the consequences that both human and germ populations have exerted on each other. How this relationship has been influenced by external factors such as environmental stressors, public health campaigns, political agendas, social welfare programs, improved sanitary infrastructure and advancing medical interventions can then be explored once these relationships are discerned.

There are a great number of studies undertaken by both historians and anthropologists which pertain to the challenges faced by the growing populations of various North American cities and towns which underwent urbanization and industrialization around the turn of the last century (see for example, Beemer et al 2005, Cheney 1984, Crane 2000, Culter & Miller 2005, Condran & Crimmins-Gardner 1978, Ford 1994, Gaspari & Woolf 1985, Geismar 1993, Koppes & Norris 1985, Leavitt 1980, McCarthy & Ward 2000, Ogle, 1999, O’Kane 1995, Schultx & McShane 1978, and Strottman 2000). The fact that Dawson City offered its residents the same privileges and luxuries of urban living as any other metropolis within only a few years of its founding in a previously undeveloped territory, offers a unique opportunity to observe the health

consequences of these processes at their extreme, and will thus contribute to this ongoing discourse.

Finally, in contrast to the number of studies that describe the effect of local conditions on the health of American communities, there are comparatively fewer studies of a similar nature pertaining to Canadian populations (see for example, Barkin & Gentles 1990, Brace 1995, Gagan 1989, Mercier 2006, and Mercier & Boone 2002). The fact that “knowledge of nineteenth century mortality levels in Canada and Quebec is limited”, has been noted by Pelletier and colleagues (1997), and so the case-study approach to be taken here is ideal for contributing an anthropological perspective and strengthening research on turn-of-the-century Canadian mortality.

This study presents the first anthropological perspective on the topic of the health of the Klondike Gold Rush population, and, adopting a biocultural perspective, compliments the work of historians in this area. While published research on the gold rush provides a rich background on social conditions of the time (Backhouse 1995, Cruikshank 1992, Duncan 2004, Porsild 1998, 1995), there are only a handful of authors who deal specifically with the issue of health and disease. Guest (1982) dedicates one section of his dissertation to ‘Public Health and Hospitals’, however he does not include any statistical analysis of causes of death or disease prevalence. Lux (1989), on the other hand, does engage in some quantitative analysis of health and disease, however she based her study on the Alphabetical Death Register for Dawson City, which by her own admission was largely incomplete, and only included deaths that occurred between 1899-1903. Finally, Willis (1997) concentrates almost entirely on the Native population that resided at the Moosehide reservation several miles from Dawson City, rather than on the

health status of Dawson City itself. This research will also be the first to utilize the Yukon Territory Death Register, as well as the patient register for St. Mary's Hospital, located in Dawson City. The latter records have only recently become available for consultation due to the time lapse imposed by the Freedom of Information and Protection of Privacy Act.

The context in which the gold rushers lived and labored will be established through a brief review of the history of the Klondike and Dawson City in Chapter Two. Following an overview of the materials and methods used in data collection and analysis which comprises the subject matter of Chapter Three, Chapter Four will begin to examine the leading causes of morbidity and mortality during the gold rush, as well as the potential impact that nutritional deprivation had for the susceptibility of individuals to infectious disease. In this chapter, the living and working conditions which may have predisposed this population to succumbing to particular illnesses and causes of death over others will also be explored in order to situate the illness and disease experiences of the gold rushers within the context of the Klondike gold rush. With this deeper appreciation for the health status of the community informing further study of morbidity and mortality, it becomes possible to ask questions about how the gold rushers in general experienced particular threats to their health. Along these lines, the various epidemics that erupted in the Yukon Territory throughout this period of study will be examined in Chapter Five. Chapter Six will delve deeper into the nature of disease in the Klondike by taking a case-study approach to understanding the existence of Typhoid Fever (the leading cause of death throughout this period) in Dawson City, as this was the focal location of both infection and the interventions that eventually eradicated the disease in the region.

Chapter II: Dawson City - Capital of the Klondike Gold Rush

The Klondike Gold Rush probably received the most newspaper coverage of any singular event throughout the nineteenth century (Guest 1982). The reason for this is two-fold. First, the Klondike was able to capture the imagination of the world. While hard times had befallen the Western economy in the late 1800s, the discovery of gold in the Klondike seemed to offer hope to the downtrodden individual (Guest 1985), and the temptation of a lifetime to working-class men and women dissatisfied with their mundane jobs. Many believed the rumors that one could simply walk to the goldfields and pick nuggets up off the ground as easily as collecting seashells on the beach.

The second factor contributing to the widespread coverage of the last great gold rush was that it happened to occur at the same time that the newspaper industry was being revolutionized. As noted by Guest (1985), a new kind of sensationalist journalism, with large, heavy headlines, was just being introduced around the end of the nineteenth century as a means to capture the attention of potential readers. The ability to insert actual photographs into the typeset was a brand new technology. Improved transportation and communication networks allowed for the rapid dissemination of information over vast distances never before possible. These advances allowed newspapers to captivate their audience with tales from afar, and as various syndicates were entangled in circulation wars, each reported more and more intriguing accounts of adventure and fortune to be had for the taking in the Yukon Territory (Guest 1985).

The perceptions regarding life in Dawson City during the Klondike Gold Rush that prevail today are largely an artifact of this widespread media attention. As previously noted, the primary goal of this research is to gain a deeper appreciation of the health

status of the gold rush community during this time, which should contribute to a better understanding of what life was like for the average gold rusher. This is important because, unlike previous gold rushes in the Americas, the Klondike was very much ‘everybody’s’ gold rush. It was “average women and men who left their kitchens, offices, factories and farms to risk it all in the last great gold rush” (Porsild 1998: 17), and while a few extraordinary figures of Klondike lore have been immortalized in notorious legend, very little is known about the experiences of those who participated in the gold rush and made Dawson City their home, particularly those who did not survive to tell their story.

While much has been written about the discovery of gold in the Klondike, the epic journey undertaken by tens of thousands of men and women in order to reach the remote gold fields, and the extraordinary tales of a few souls who became renowned figures of Dawson City, the life of the typical gold rusher has received considerably less attention. As the primary focus of this research is to examine the health of the average gold rusher and the effects that morbidity and mortality had on the community residing at Dawson City, the aforementioned aspects of the last great gold rush will not be dealt with here (for an excellent recount of these events, see Berton 1958).

A Short History of Dawson City

Dawson City was neither the first mining community to spring up in the Yukon Territory, nor was it the last. It was, however, the largest, longest lasting, and most significant community of the Klondike Gold Rush era. The history of the discovery of gold in the Klondike region as well as the birth of Dawson City has perhaps been best chronicled by

Berton (1958), who provides the following details concerning the sequence of events leading up to and following the heyday of the Klondike gold rush.

Soon after George Carmack's discovery of gold on Bonanza Creek in 1896, the factors that would inevitably lead to the unparalleled rise of Dawson City in this frontier territory quickly fell into place. Upon learning of the richness of the strike, Joseph Laude, a grubstaker and supply-man, immediately recognized the potential of the find. While others rushed to the area to stake their claims on the gold beds, Laude had another opportunity in mind. He hurried to the scene with both the stock from his post and the equipment from his sawmill, staked claim to the muddy land where the Yukon and Klondike Rivers meet, and named the place 'Dawson City' after George Mercer Dawson, the government surveyor and geologist who established the Alaskan boundary. The fact that this location was already being used by a group of one thousand Han Natives as a summer fishing camp (who were relocated to Village of Moosehide on the Government Reserve three miles downriver of Dawson City), and was prone to flooding, was overlooked since it lay central to the surrounding goldfields (Guest 1982). From a transportation perspective, the location of the townsite was the only practical choice, since as Guest (1982: 4) has noted, "[t]here were several routes to the Klondike, but only one destination, and the trails all ended at Dawson City".

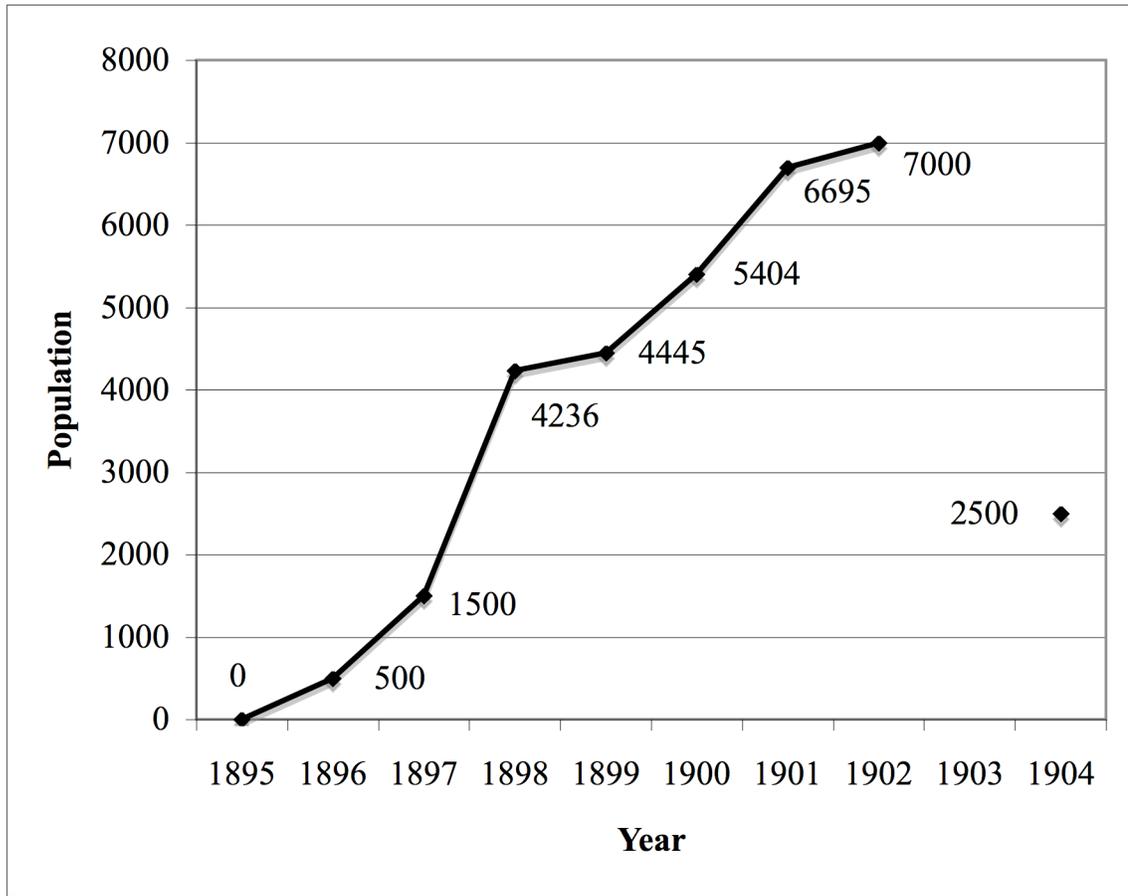
In September of 1896, Dawson City could be recognized as a town only by its legal definition as such. Laude had registered his claim to the townsite with the North West Mounted Police stationed at the Fortymile post, but the area had yet to be cleared or sectioned into plots. The region in which Dawson City was founded is subject to permafrost ranging from a depth of a few inches in the north end of town, to several feet

beneath the surface in the south, with an exposed surface of gravel lying directly on top of a stratum of clay. Following the short growing cycle, the mossy vegetation that grows to a thickness as great as three feet, freezes and is buried for several months beneath the snow. In the spring, the frozen ground is unable to absorb the melting snow and run-off from the hills bordering Dawson City opposite the rivers, and the plant matter begins to decay. The result is that the gravel and clay soil becomes saturated and soggy, while the vegetation rots in a semi-decayed state, transforming the entire area into a bog which sinks to a depth of several feet in some places.

Before winter fell in 1896, Laude had built his warehouse with lumber from his sawmill, which was by then fully operational. He had also managed to clear the townsite and demarcate it into lots, which were selling for as little as five to twenty-five dollars in that first year, and had firmly established Dawson City as the commercial centre of the Klondike.

When winter closed off navigation into the Yukon interior in that first year, the city had a population of approximately five hundred people (Porslid 1998), and continued to grow slowly throughout the remainder of the 1896-97 season (see Figure 2.1). In the spring of 1897, Dawson City experienced its first building boom. The riverfront was built-up at this time as the core commercial centre of the community, though most people were still residing in their tents. During this first whole season in the Klondike, the cost of living has been estimated to have been as high as five to ten dollars per diem, with a meal in a restaurant costing as much as two dollars and fifty cents, an incredible amount in contrast to the going rate of fifteen cents in more southerly cities such as Seattle (Guest 1987). Several hundred more gold rushers trickled into Dawson before the closing of

Figure 2.1: Population of Dawson City Proper (1895-1904).



Source: Sessional Papers of the Dominion of Canada 1898 #15, 1899 #15, 1900 #15, 1903 #15, and 1905 #15; Porsilid 1998: 8; 1901 Census of Canada; Dawson Daily News, April 19, 1900.

navigation again in the fall of 1897. According to the annual report of the North West Mounted Police, there were by this time approximately fifteen hundred people residing in Dawson City proper (Figure 2.1).¹

Throughout the winter of 1897-98 Dawson remained little changed. In comparison, 1898 would transform the town into a frontier metropolis that would be unrecognizable to the gold rushers who had been the first on the scene only two years prior. When the ice went out of the Yukon River in May of 1898, signaling the opening of river navigation for the season, an ice jam flooded the townsite, and Dawson found itself under five feet of water. It was obvious “by this time that Dawson had been built in the wrong place; yet how could it have been built elsewhere? After all, it was built where the gold was” (Berton 1958: 289). No sooner had the water receded, that word came that another flood was imminent; thousands of people who had been waiting upriver with their homemade boats for the ice to clear out of the waterway were now making their way towards Dawson City. The North West Mounted Police were carefully monitoring the situation, ensuring that the vessels which egger stampeders attempted to float down the river were worthy challengers of the rapids that lay ahead. They inspected and registered each craft, offering advice to newcomers and refusing to let unsafe boats be launched; in this way countless lives were certainly saved. While conducting this work, one officer noted that along an eight mile section of the river between Lake Bennett and Dawson City, he counted “over eight hundred boats under full sail; and for forty-five miles at no point were the boats more than 200 yards apart”.²

¹ Sessional Papers of the Dominion of Canada, 1898 #15:307.

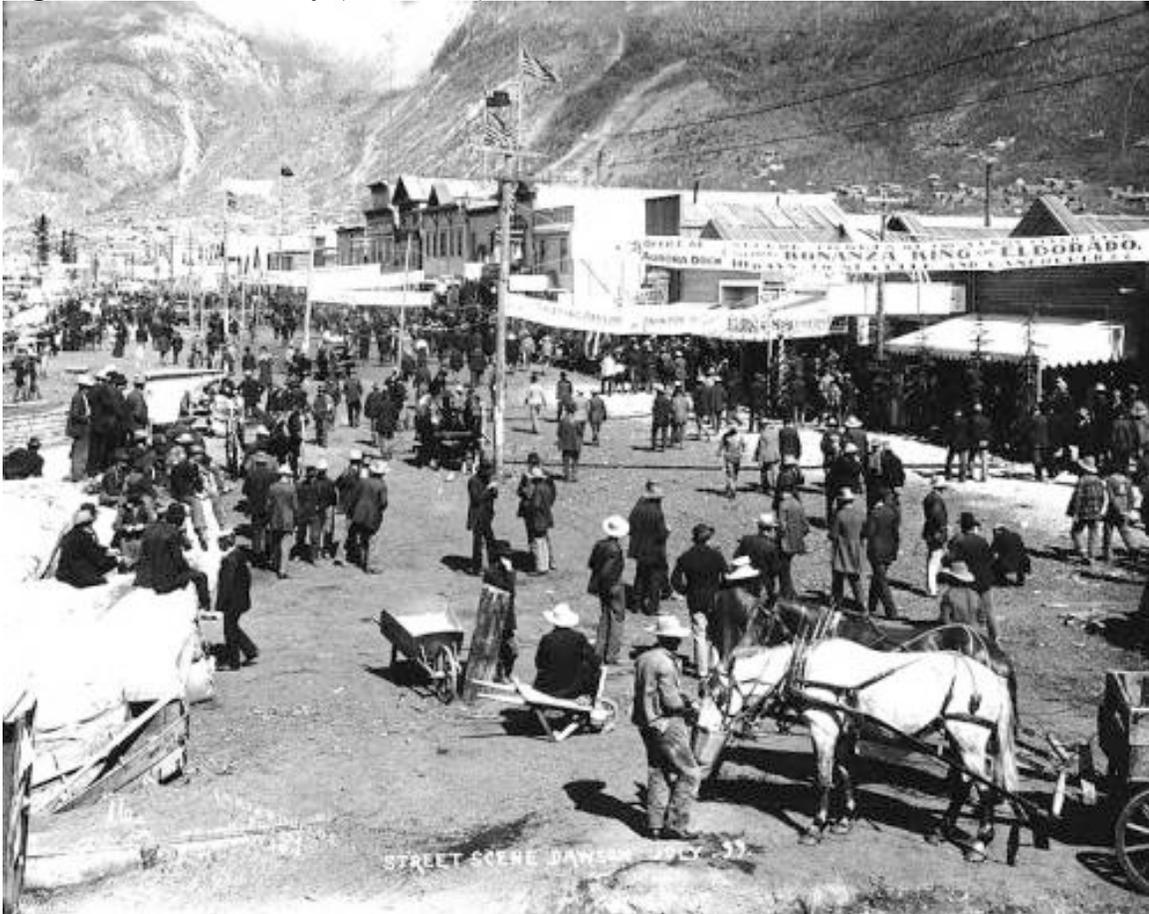
² Sessional Papers of the Dominion of Canada, 1899 #15: 22.

The first of these boats reached Dawson on June 9th, after which time they continued to arrive by the hundreds throughout the remainder of the season (Guest 1982). Dawson was now “crawling with men” (see Figure 2.2), and was the largest city north of Winnipeg (Winnipeg not being much larger), and the largest Canadian city to its west (Berton 1958: 300). In fact, Dawson’s population in the summer of 1898 “was only slightly smaller than the Pacific-northwest cities of Seattle, Tacoma, and Portland, and it dwarfed both Vancouver and Victoria” (Berton 1958: 300). Towards the end of 1898, the North West Mounted Police made “an accurate count” of Dawson’s population, and reported 4236 people residing within in the city limits (Figure 2.1), but noted that there were many “empty cabins and houses of people who [had] gone up on the creeks to their claims, or [were] prospecting” which suggested that another three thousand individuals called Dawson City their home, despite the fact that they were away during the census period.³ The report went on to comment on the tremendous transformation that had occurred in Dawson over the past year, transforming it into a “modern city”,⁴ with two newspaper syndicates, five churches, two banks, as well as telephone, electric light and acetelyn gas service. The footprint of Dawson was also undergoing a dramatic transformation in 1898. Tents were constantly relocated as miners arrived and departed, lots were purchased and sold, and infrastructure sprang up around the haphazard settlement, and men flowed between the various cabins. The likelihood of finding someone in the same location that they had occupied the day before was slim, and, in the absence of street addresses, places could only be referred to by landmark, such as “the cabin with the screen door, or the big tent with two stovepipes” (Berton 1958: 296).

³ Sessional Papers of the Dominion of Canada, 1999 #15: 21.

⁴ Sessional Papers of the Dominion of Canada, 1999 #15: 73.

Figure 2.2: Dawson City (circa 1899).



Source: University of Washington Libraries/Special Collections/Hegg 431.
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University of Washington Libraries Special Collections Division.

At this time, any luxury that was available on the outside could be had in Dawson, if the customer was willing to pay the going rate in gold dust, which was the preferred method of payment during Dawson's heyday. The exorbitant price of goods in Dawson was paralleled in 1898 by the extreme cost accommodations. Town lots were now selling for as much as forty-thousand dollars, and the most affordable place for rent within city limits cost one hundred dollars a month and was a single room perched on the edge of town; a small log cabin could easily fetch a rent of four hundred dollars a month (Berton 1958). This cost was beyond the means of many men who laboured at the going rate of one dollar an hour (although this salary would be fabulous by outside standards), necessitating shared accommodation with several other individuals or continuing to squat in their tent on Crown land. Those who found employment in the mines of more fortunate Klondikers who had managed to stake a producing claim could earn five dollars a day in addition to board, but this arrangement required them to reside on the claim itself where the cost of living was significantly less than within Dawson City.⁵

Although large numbers of hopeful gold rushers continued to stampede their way to Dawson City and the surrounding gold fields each month until the close of river navigation in 1898, there was, nevertheless "a second stampede in 1898, which few people [have] wanted to acknowledge" (Porsild 1998:4). These were the disenchanting hopefuls who had set out on their ten month journey to reach the Klondike in 1897, who, upon finally reaching their destination, either realized that all of the claims had already been staked or had simply had their spirits broken by the hardships endured on the trail. Many of these weary adventurers "spent only a few days in Dawson and did not even

⁵ Sessional Papers of the Dominion of Canada, 1900 #15: 5.

bother to visit the hypnotic creeks that had tugged at them all winter long” (Berton 1958: 301). This exodus began to outpace the number of new arrivals in July of 1898, and by August, the population of Dawson City had been temporarily reduced by one-third of its size as hundreds booked passage out of the territory, while those who could not afford the ticket simply bided their time until early winter and walked out over the ice (Guest 1982).

The year of 1898 was an important year for the Yukon Territory as the explosive growth of its population served to truly open up the North-West, which had remained, until then, the last Canadian frontier. In response to the booming population and the economic and political importance of the gold being taken from the Klondike Valley, the Yukon Territory was made separate from the conglomerated North West Territories, and a Council established to oversee Ottawa’s interests in the area. William Ogilvie was selected to serve as the first Commissioner of the new Territory, and along with six appointees, comprised the Yukon Council.

The presence of government representatives in the region had important implications for the daily life of the gold rushers since, prior to the formation of the Yukon Council, Dawsonites had to solve all of their own problems; a formidable task in the absence of any formal structure. Before this time ordinances to protect the public and the working classes were nonexistent, and any development was both organized and funded through public subscription and philanthropic contribution, including the local hospitals. Once the Yukon Council was established, responsibility for the management of Dawson City, including the development infrastructure, maintenance of roadways, care of the indigent and protection of the public’s health fell to these government representatives. One of Ogilvie’s first actions in his new role of Commissioner of the

Yukon Territory was to set up a board of health and appoint a Medical Health Officer to be stationed in Dawson City. Acting in the dual role of City Engineer, Ogilvie was also responsible for overseeing the grading of streets and the construction of a temporary drainage system for Dawson in 1899. However, with funds habitually running short, the Council often had to “opt for short term solutions to long term problems” (Guest 1982:207-8). For example, the entire budget for sanitation in 1898 was spent installing Dawson City’s only three public toilets, which were located along the waterfront. While symbolizing an attempt to rectify the deplorable state of sanitation in the city, the effort was nevertheless hopelessly inadequate for Dawson’s burgeoning population. It was this unrelenting struggle between insufficient resources and the needs of the rapidly developing community, which fueled public interest in the issue of incorporation for years to come.

Although a prior request for the incorporation of Dawson City had been refused by the North West Mounted Police only a year before (because the petitioners were American, and thus not British subjects), the issue was again raised in 1898 in response to the perceived failure of the local government to act in the best interests of Dawsonites. The request was, however, again rejected, this time by the newly appointed Commissioner who was understandably reluctant to relinquish his newly acquired authority.

The population that had decreased late in 1898 quickly rebounded in the spring of 1899 as Dawson’s populace was bolstered by the second wave of gold rushers arriving in the city. The North West Mounted Police conducted another census, counting 4445 residents in Dawson City (see Figure 2.1), of which 786 were female and 163 were

children. In the official report to Ottawa, the officer in charge again noted that the results, if anything, greatly underestimated the true number of individuals residing within Dawson City's limits as people were constantly moving both between Dawson and their claims on the various creeks, and between cabins within the city.⁶ The increased number of women and children in the Klondike over previous years can be interpreted as evidence of increasing investment in the community by the gold rushers who, having been in the area for a season or longer, sent for their wives and children with the intention of settling down in the area. This trend towards domesticity caught the attention of Superintendent Steele, the legendary figure of North West Mounted Police authority during the gold rush, who commented that unlike most other mining towns, in Dawson, "[a]cts of indecency [were] severely punished and it [could] safely be said that any man, woman or child, [could] walk at any time of the night to any portion of this large camp with as perfect safety from insult as on Sparks Street, Ottawa."⁷

Dawson experienced another wave of emigration late in the season of 1899. This time a new discovery of gold in Nome, Alaska touched off a stampede that saw thousands leaving the Yukon Territory for the Alaskan goldfields, many of whom had called Dawson their home. The richness of the find had, however, been greatly exaggerated in the media, and many of the disgruntled stampeders returned to the Yukon early in 1900.⁸

Dawson's population continued to grow in 1900, as well as change in character as more women (there had been thirteen unmarried women for every single man in Dawson

⁶ Sessional Papers of the Dominion of Canada, 1900 #15: 54.

⁷ Sessional Papers of the Dominion of Canada, 1899 #15: 29.

⁸ Sessional Papers of the Dominion of Canada, 1901 #15: 44-51.

City during 1898)⁹ and children (one hundred and seventy-five as opposed to one hundred and sixty three the year before)¹⁰ than ever before continued to arrive in the community to join their husbands and fathers. Again, the North West Mounted Police conducted a thorough survey of the Territory, and the Dawson Daily News (April 19, 1900) reported the count for Dawson City at 5404 individuals (see Figure 2.1). Since this most recent count of the population had been conducted with a large number of enumerators who completed the task over a short period of time, it was thought to represent the most accurate census of the time.¹¹

Although the Klondike Gold Rush had reached its zenith in 1898, the population of Dawson City continued to grow through the period, reaching 6695 in 1901,¹² and peaking at approximately 7000 people in 1902 (see Figure 2.1).¹³ By then, Dawson City boasted all of the institutions that might be expected of a community its size, even by outside standards:

It had a system of courts, a jail, and a growing civil service. It counted literally hundreds of small business operations, including hotels, saloons, and shops, which depended on a handful of larger transportation and wholesaling companies. Within this growing community, many aspiring professionals established successful careers and found a place for themselves within the newly created administrative structures. (Porsild 1998: 188).

By 1901 nearly half of the residents of Dawson City had resided in the Yukon for three years or longer (see Figure 2.3).¹⁴ As the population continued to

⁹ Porsild 1998: 64

¹⁰ Sessional Papers of the Dominion of Canada, 1900 #15: 54, Sessional Papers of the Dominion of Canada, 1901 #15: 9.

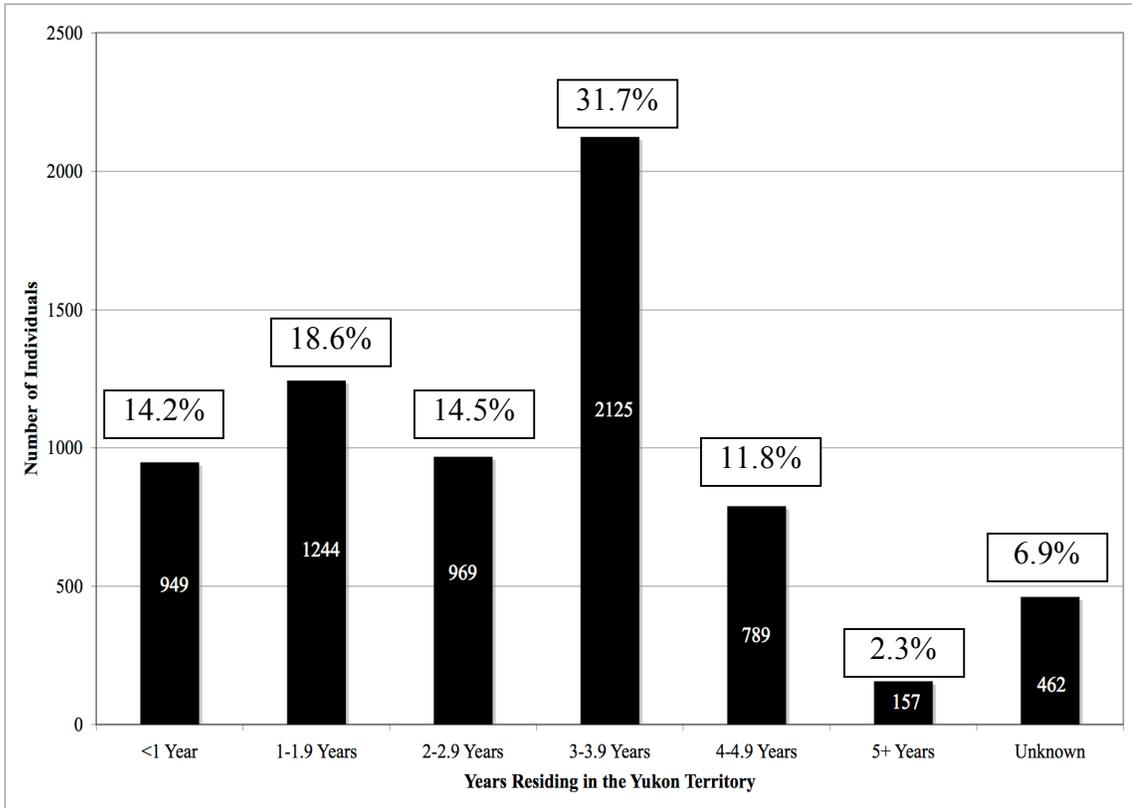
¹¹ Sessional Papers of the Dominion of Canada, 1901 #15: 44.

¹² Dawson City Proper. Data drawn from the 1901 Canada Census

¹³ Sessional Papers of the Dominion of Canada, 1903 #15: 27.

¹⁴ Data drawn from 1901 Canada Census for Dawson City Proper.

Figure 2.3: Number of Years Spent in the Yukon Territory by 1901 Dawsonites.



Source: 1901 Census of Canada.

prosper, and individual investment in the community grew as Dawsonites settled down and began to think of the Klondike as home, the city developed at a rate that far out-paced most other cities to the south which were also experiencing urbanization around the turn of the last century. The incredible pace of development was not lost on contemporaries, who noted:

The improvements in the city of Dawson have been to say the least marvelous, and to day [sic] it presents a metropolitan appearance, which cannot be equaled by any other four year old city throughout the world...Buildings, and residences of imposing and substantial appearance, meet the eye in every direction, the streets are graded, good sidewalks are to be found in every quarter and some of the principal streets have been macadamized. The city possesses first class electric light, water works and telephone systems, the last being brought within the reach of every one as the rates are almost as low as to be found on the outside...it is now a city of homes, and there is a far greater air of prosperity among the inhabitants than...in any outside town (Sessional Papers of the Dominion of Canada, 1903 #15: 27).

The momentous transformation that Dawson City had undergone during its short history is particularly striking when contrasting a series photographs taken over the span of two years (Figures 2.4, 2.5 and 2.6). After years of wavering on the issue, the question of incorporation was again proposed in 1901, and on December 16th, Dawson City was incorporated. A mayor and six aldermen were elected, to whom the Yukon Council transferred responsibility over Dawson City. While many hoped that local responsibility would solve some of Dawson's fiscal problems, financial trouble continued to plague the city.

Yet, as is the nature of every resource boomtown, the population base of Dawson City continued to fluctuate "in accordance with discoveries of gold elsewhere" (Guest 1982: 65). In 1903, gold was discovered near Fairbanks, Alaska and the resulting stampede to the Tanana Gold Fields in the winter of 1903 had a lasting effect on both the

Figure 2.4: Dawson City (1898).



C-063188

Source: Library and Archives Canada/C-063188.

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Figure 2.5: Aerial View of Dawson City (1898).



Source: University of Washington Libraries/Special Collections/Hegg 742.
Written permission to include this image was obtained on January 29, 2008 from the
University of Washington Libraries Special Collections Division.

Figure 2.6: Aerial View of Dawson City (1899).



Source: University of Washington Libraries/Special Collections/Hegg 2205.
Written permission to include this image was obtained on January 29, 2008 from the
University of Washington Libraries Special Collections Division.

population and the economic wellbeing of Dawson City. At first, approximately one thousand hopeful miners rushed off to stake claims,¹⁵ shortly thereafter, however, many more miners, laborers and small merchants followed, leaving Dawson forever (Guest 1982). While the initial reports of the North West Mounted Police reassured Ottawa that the Tanana discovery was nowhere near as rich as some of the poorest in the Klondike, and that many disappointed miners quickly returned to the Yukon, the report submitted the following year which noted that “a large portion” of the population had in fact been lost to the “very glowing reports received from the Tanana country in Alaska”,¹⁶ is more in keeping with the decline observed in the population by 1904 (see Figure 2.1).¹⁷ The decreased population worsened the problem of already insufficient public funds to the point that a plebiscite was held on September 18, 1904, following which the City Charter was revoked and responsibility for Dawson City reverted to the Yukon Council.

However, as noted by Guest (1982), even after the rush had subsided, Dawson City remained the centre of population in the upper Yukon valley. In fact, the community residing at Whitehorse was not even distinguished as such in census counts until 1911. The permanency of the community residing at Dawson City beyond the decline of the gold rush serves as evidence to the contrary that Dawson was nothing more than an impermanent resource boomtown. It also offers evidence to challenge the assumption of more recent researchers who argued that few people intended to stay in Dawson for any significant length of time, and were therefore hesitant to make any substantial investment in the town (Guest 1982). Quite to the contrary, as has been previously noted, Dawsonites

¹⁵ Sessional Papers of the Dominion of Canada ,1904 #15

¹⁶ Sessional Papers of the Dominion of Canada ,1905 #15: 4.

¹⁷ Sessional Papers of the Dominion of Canada, 1904 #15, Sessional Papers of the Dominion of Canada, 19056, #15: 23.

were charitable by nature, continually investing themselves and their money the community, and were, in fact, largely responsible for financing, building up and maintaining Dawson's early infrastructure, social services and public institutions.

The Human Aspect of the Gold Rush

The eclectic nature of the Klondike Gold Rush resulted in a population of Dawsonites that was atypical of more southerly contemporary communities. The fact that it was, for the most part, average individuals with pickaxe and gold pan in hand who ventured to the Klondike (rather than experienced miners who accounted for the majority of the population in earlier gold rushes), lent a certain inevitability to the era. The eccentricities of the population and the incredibility of the event itself interacted, resulting in circumstances so improbable that the Klondike Gold Rush almost certainly could not have unfolded in any other way.

It is essential to remember when conducting and reviewing statistical analyses of morbidity and mortality in historic populations that the 'data' represent the lives of real people, who lived and laboured and died (Figure 2.7). Thus, giving a sense of humanity to this extremely well documented series of events is a primary objective of this research. An example of the peculiarities that reveal a deeply human side to the event (which is otherwise often associated with avarice and debauchery) can be found in the man who imported a boatload of kittens to Dawson in 1898. Despite the ridicule he endured for his choice of merchandise, this entrepreneur made a small fortune, quickly selling off his stock at price of one ounce of gold per cat to the "lonely miners craving the companionship of a pet" (Berton 1958: 291).

Figure 2.7: The Human Element of the Klondike Gold Rush (circa 1897).



Source: Library and Archives Canada/PA-005389.

Written permission to include this image was obtained on August 7, 2007 from the Library and Archives of Canada Copyright Bureau.

The hardships of the trail had exacted a heavy toll on the bodies and minds of the first wave of gold rushers who had to forge their own way into the Klondike prior to the establishment of steamboat routes and railway access to the interior. The founding citizens of Dawson were almost unrecognizable when, at last, they reached their destination.

They had grown tattered beards to protect their faces from the elements, and they had smeared their skin with charcoal to prevent blistering sunburn, and they had fashioned slitted masks of wood to protect their eyes from snow-glare. The stiff new mining costumes in which they had been proudly, if awkwardly, photographed, clung to them like a second skin, worn and faded, and patched neatly in a dozen places by unaccustomed hands. Almost all had lost weight; gaunt and paunchless now, with their coal-black, whiskered faces and their primitive eye shields, they presented a weird and fearsome sight (Berton 1958: 270).

Once settled in Dawson City, this pioneer populace quickly reclaimed their civilized persona and set about establishing themselves within community. The most reliable information regarding the demographic profile of the residents of Dawson City at any specific point in time is represented by the 1901 Census of Canada. While previous researchers have analyzed the data contained therein to glean insight into the constitution of the gold rush population (Porsild 1998), these studies have examined the population captured within the Dawson District, which included many of the surrounding creek settlements, rather than focusing specifically on Dawson City proper.

As is evident in table 2.1, the majority of the population residing within Dawson City limits were unmarried (62.5%), between fifteen and forty-four years of age (79.6%) (representing the reproductive life-stage), and men accounted for the majority of the population (81.2%). This finding conforms to the traditional

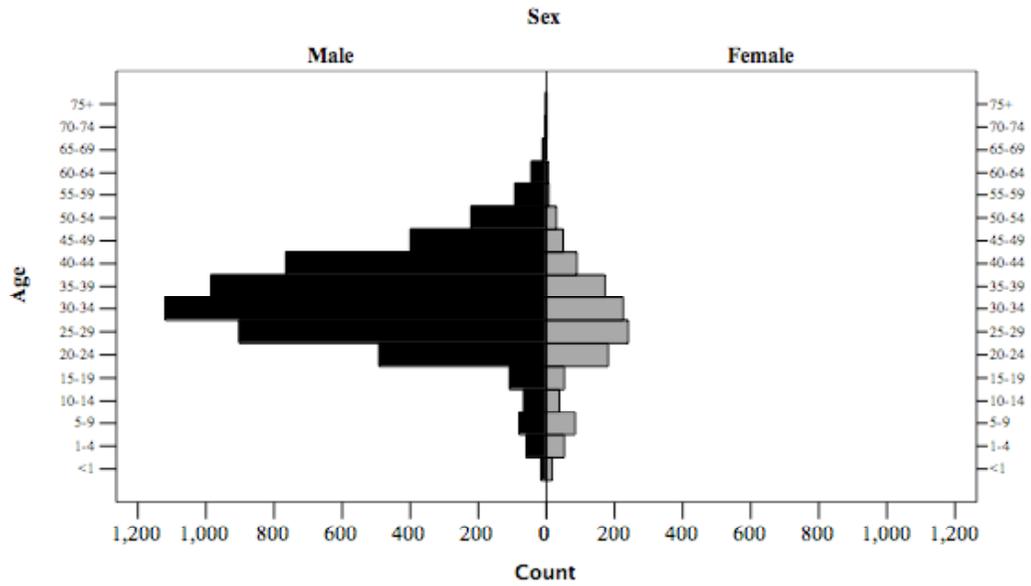
Table 2.1: Population Descriptives for Dawson City Proper (1901).
Source: 1901 Census of Canada.

Descriptive	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Age	<i>0-14 Years</i> 411 (6.1)	<i>15-44 Years</i> 5332 (79.6)	<i>45+ Years</i> 865 (12.9)	<i>Unknown</i> 87 (1.3)		
Sex	<i>Male</i> 5436 (81.2)	<i>Female</i> 1253 (18.7)	<i>Unknnonwn</i> 6 (0.1)			
Marital Status	<i>Single</i> 4185 (62.5)	<i>Married</i> 2263 (33.8)	<i>Widowed</i> 154 (2.3)	<i>Divorced</i> 23 (0.3)		
Birth Place	<i>Canada</i> 1853 (27.7)	<i>USA</i> 2700 (40.3)	<i>Europe</i> 1737 (25.9)	<i>Other</i> 157 (2.3)		
Nationality	<i>Canadian</i> 1949 (29.1)	<i>American</i> 3398 (50.8)	<i>British</i> 672 (10.0)	<i>Other/Unknown</i> 676 (10.1)		
Relgion	<i>Christian</i> 3417 (51.0)	<i>Roman Catholic</i> 1492 (22.3)	<i>Other/Unknown</i> 1295 (19.3)	<i>None</i> 491 (7.3)		
Occupation	<i>Miner/Prospector</i> 2035 (30.4)	<i>Unskilled Labour</i> 1018 (15.2)	<i>Skilled Labour</i> 901 (13.5)	<i>Professional</i> 966 (14.4)	<i>Hospitality</i> 607 (9.1)	<i>Unknown</i> 1168 (17.4)

view that men were the primary participants in the Klondike Gold Rush, and that it was individuals in the prime of their lives, and thus able to withstand the physical rigors of the journey who comprised the majority of the gold rushers. Porsild (1998) has argued that there were always a significant number of women and children in the Klondike region, however few women (18.7% of the total population) and children (individuals under the age of 15 accounted for only 6.1% of Dawson's population) resided within city limits around the turn of the last century. It is possible that more were clustered in the creek settlements. The asymmetry of the sex distribution of the population, as well as the predominance of individuals in their reproductive life-stage is immediately apparent when viewing the population pyramid constructed for 1901 Dawson City (Figure 2.8). Although this pyramid is unusual, the distribution of the population is not surprising given the fact that Dawson City was only five years old at the time of the census, with individuals only beginning to permanently settle in the area and raise families in the community which was initially established as a supply centre for the young to middle aged gold rushers who flocked to the area around the turn of the last century.

Porsild (1998: 18) has also argued that Dawson's population "had a distinctively international flavour". This sentiment is supported by the data for Dawson City proper (table 2.1), which revealed 72.3% of the population was born beyond Canada's borders, while 70.9% of Dawsonites reported nationalities other than Canadian. The cosmopolitan character of Dawson City is reflected in the recollections of gold rushers who found themselves among a diverse group of

Figure 2.8: Population Pyramid for Dawson City Proper (1901).



Source: 1901 Census of Canada.

companions, some met along the trail as they shared the journey to the goldfields.

One such example is the case of

[t]he surveyor who raced from Russia climbed the Chilkoot Pass in company with a British mining expert from South Africa, a Swedish engineer, and old California hunter, a New York steamfitter, a Vermont farmer and an Anglo Irish lord (Guest 1985: 13).

While Porsild (1998) countered popular opinion in arguing that Dawson City was not a primarily American community on Canadian soil, the 1901 census found that just over half (50.8%) of the residents were, in fact, American citizens.

It is perhaps not surprising that Christians (51.0%) and Roman Catholics (22.3%) formed the largest religious groups in Dawson City given the early establishment and pivotal role occupied in the community by these respective institutions (each founded and operated one of Dawson's two public hospitals). An unexpected finding, however, was that 491 Dawsonites reported themselves as being 'atheist', a 'non-believer' or simply having no religion, accounting for 7.3% of the general population. This lack of religiosity in Canadian communities has been observed by Marks (2007) who found a similar trend in her study of turn-of-the century British Columbia. "There was a common late-nineteenth-century saying that men left their religion behind them when they crossed the Rocky Mountains (Marks 2007: 372), and this adage seems to hold true for a sizeable number of the Klondike gold rushers. The accepted explanation for this phenomenon by the Church was that the passion of young men seeking their fortune in Western resource towns overshadowed their interest in their own spirituality (Marks 2007). The fact that many of these men were far from their homes, families and church communities was further believed to have weakened

both their adherence to religious ideology, and their resolve to participate in worship ceremonies (Marks 2007).

Finally, although the gold rush had peaked in 1898, 30.4% of Dawsonites in 1901 continued to report themselves as miners and prospectors, while the rest of the population was fairly evenly distributed among unskilled and skilled laborers, professionals and those employed within the hospitality industry. While 17.4% of the population's occupation is unknown, the majority of these individuals include women and children who either did not work outside of the home, or whose labour did not fall within the Victorian definition of gainful employment. Thus the population of Dawson City in 1901 conforms, for the most part, to earlier accounts of the gold rush community.

With an appreciation of the development of Dawson City, and a basic understanding of the nature of the population residing therein, an examination of the health status of the community is possible. The following chapter will review the methods and materials used in data collection and analysis, followed by a discussion of leading causes of morbidity and mortality in the Klondike throughout the period of study. The discussion will also address the availability and use of health care resources, and the impact that various epidemics had on the gold rushers.

Chapter III: Materials and Methods

A case-study approach will be used to explore the health experiences of the population residing at Dawson City between 1898-1904, while illnesses and disease in general will be explored from a bio-social perspective in order to situate these experiences within the context of the Klondike Gold Rush and the environment of the Yukon Territory.

Numerous scholars seeking to better understand the health and disease process at work within historic populations have acknowledged the applicability of mortality statistics (and by extension, morbidity data) for this purpose. Woods and Shelton (2000), for example, showed how particular causes of death could be used as indicators for certain threats to the health of individuals living within various disease environments. In this way, the recorded causes of death (and sickness) can be taken to represent mortality (and morbidity) as a consequence of the local conditions, particularly in the case of infectious diseases which happen to be particularly sensitive to sanitary circumstances. Due to the frequently scant data available regarding the earliest communities in Canada, this approach promises to provide valuable insights regarding the development of urban populations in the absence of other documentation. For example, in his study of childhood mortality in 1901 Toronto, Mercier (2006:129) observed that “[e]nvironmental conditions, especially the level of sanitation services, and the quality and condition of housing, greatly influenced urban mortality rates.

The case study approach is often employed in anthropological research because it enables the researcher take a holistic approach to studying a community by contextualizing observations within local environmental, socio-economic, political and cultural circumstances. The main strength of the bio-social approach to studies of

community health is that it situates the community both within the milieu of the lived experiences of its members as well as taking into account external factors that influence the existence, prevalence and virulence of a disease within the population. Infectious diseases, for example, tend to occur when conditions are right to accommodate the transfer of pathogens from a disease reservoir to susceptible members of the population. Without this necessary condition being fulfilled, infection could not occur, and thus the underlying factors present, which allow infection to occur in the first place, must be understood in order to satisfactorily explain the existence and experience of disease in a community.

The primary consideration when conducting analyses of the health of past populations is to “avoid grand generalizations, [while] instinctively accepting the need for historical demography to be historical: that is, to be attentive to particulars of time, place, and circumstance” (Alter & Carmichael 1999:123). Statistical data cannot, however, be used to answer questions about cause and effect, as the analyses are only capable of providing information about relationships among the variables. Thus, in order to yield meaningful inferences, and answer more complex questions about the health of individuals as well as factors influencing illness and disease at work within the community, qualitative data is essential. Thus, this kind of research “demands that there be reciprocity between the interpretation of quantitative and non-quantitative evidence” (Luckin & Mooney 1997:51). That is, qualitative information is essential to interpreting quantitative data, but qualitative sources can also inform research questions, and direct the researcher to ask appropriate questions about the population. The quantitative data for this study was gathered from three primary sources: the Death Register for the Yukon

Territory, the Patient Register for St. Mary's Hospital in Dawson City, and the manuscript census rolls for Dawson City Proper from the 1901 Canada Census. The data contained within each of these sources, as well as the advantages and shortcomings of each, will be discussed in detail below.

Quantitative Materials

The availability of individual-level population, hospital and mortality records for the Klondike Gold Rush provides “the opportunity to examine cause-specific mortality...[in regards to] environmentally related etiology” (Hautaniemi et al 1999:1). These sources of data are often relied upon by anthropological demographers studying the health of historic populations, who contextualize the quantitative data retrieved from these materials by drawing on qualitative information available from a variety of sources such as archives, published reviews, memoirs and newspapers. Not only does contextualization of statistical analyses give deeper meaning to the relationships thus revealed, but it also allows for inferences to be made pertaining to cause and effect relationships between the variables and local conditions which are not possible based on qualitative analysis alone.

Writing more than two decades ago Guest (1892:xxi) argued that statistical analysis of the Klondike gold rush population was impossible because “[t]he birth, marriage and death records [were] inadequate for fruitful study”. He also stated that the records of St. Mary's Hospital housed in the collection of the Yukon Archives “are classified as confidential and restricted and thus may not be cited”, and went on to comment that “[c]ensus data also leave much to be desired”, as the 1901 manuscript

census had not yet been made available to for study and the published volumes did not contain sufficient data for an investigation of this nature (1982: xi). While it is true that there are indeed gaps in the records dating to this period, the designated one-hundred-year cutoff for accessing these materials has only recently expired, and thus in the same way that individual census data has only lately been released, the territorial death records and the patient register for St. Mary's Hospital may now also be consulted, under research agreement. It is likely that Guest's conclusions were based on the quality of the data contained within the Alphabetical Death Register for Dawson City (ADR), which was also the basis for Lux's (1898) review of mortality in Dawson City during the gold rush, and not the Yukon Territory Death Register (YTDR), which was the official record of mortality for the region at that time. By Lux's own admission, the ADR is largely incomplete, and only contains deaths recorded between 1899-1903. A comparison of these two sources of mortality data reveals that the YTDR entries provide much more detailed information for each individual entry, as well as being more complete in that more deaths were registered in this record than in the ADR throughout the years in which they overlap.

The fact that deaths from the earliest years of the gold rush were sometimes recorded two or three years later and appear out of chronological order, interspersed amongst latter deaths, also indicates that the YTDR provides an accurate account of mortality in the region, since although it may have taken several months or longer for a witness to report a death, it is evident that at least the death was eventually recorded. While it could be argued that the lapse of time between the occurrence of the death and the time at which it was reported to authorities may increase the likelihood of incomplete

or inaccurate details, it must be remembered that if an individual was out prospecting or mining in the creeks, it may have been several months before they traveled to Dawson City. In the craze of the quest for gold, it was commonplace for a person to simply report such deaths the next time they traveled to Dawson, rather than abandoning their claim and undertaking a long journey in a harsh environment to make the report. The YTDR also covers the entire period of study, as well as encompassing the entire Yukon Territory rather than being limited to Dawson City, making it the ideal source of mortality data for an analysis of deaths during the Klondike Gold Rush. There was only one reason that any significant non-Aboriginal population was present in the Yukon Territory at this time—to search for gold—and thus mortality data for the entire gold rush population is desirable for analysis. The choice of these years (1898-1904) for studying the population of the Klondike Gold Rush allows for the opportunity to draw data regarding the population from the 1901 Canada Census, which promises to provide a great deal of relatively contemporary information about the nature of the population which experienced health, illness and death. The categories of data contained within these three primary sources of quantitative data that were extracted for analysis are summarized in Table 3.1, which also presents the percentage of cases for which data is complete. The chart also details what information was available for study, and outlines the kinds of comparisons and analyses that are possible when these materials are utilized as indicators of the morbidity and mortality experiences of the population, as well as the population at risk of getting sick or dying during this period.

Table 3.1: Completeness of Information Collected From Primary Data Sources

Sources: Death Register for the Yukon Territory, Patient Register for St. Mary's Hospital and 1901 Census of Canada.

	Death Register for the Yukon Territory	St. Mary's Hospital Patient Register	Canada Census for Dawson City Proper
Years Covered	1898-1904	1900-1904	1901
Number of Cases	754	1258	6695
Name	*	*	*
Biological Sex	100.0%	-	99.9%
Age	78.2%	70.6%	98.7%
Marrital Status	-	70.0%	98.9%
Skin Color	-	-	98.8%
Place of Birth	73.60%	72.90%	96.5%
Nationality	-	67.1%	95.2%
Ethnicity	-	-	88.3%
Year of Arrival in Canada	-	-	71.1%
Years Spent in the Yukon	-	-	93.1%
Rank/Profession/Vocation	52.7%	65.70%	86.2%
Relationship to Head of Household	-	-	76.3%
PreciseDate of Death	98.4%	-	-
Cause of Death	97.6%	-	-
Diagnosis	-	90.0%	-
Physician Attending	100.0%	96.4%	-
Religion	58.40%	88.0%	92.0%
Paying/Indigent Patient	-	87.4%	-
Precise Date of Admission	-	99.5%	-
Precise Date of Discharge	-	97.1%	-
Days in Hospital	-	95.3%	-
Condition Upon Discharge	-	93.3%	-

* This data was not transcribed in order to protect individual identities and privacy.

The Death Register for the Yukon Territory (1898-1904)

For the purposes of this study, a database was constructed for statistical analysis, including all deaths that occurred in the Yukon Territory drawn from the individual entries recorded in the YTDR for the years 1898-1904. It was not possible to separate out deaths that occurred in Dawson City, or in other areas of the Yukon Territory as location was not specified in the YTDR. Thus the entire gold rush population is captured for analyses of mortality, which is, in fact more desirable than focusing on the deaths which occurred in a single community, as there was a great deal of movement between Dawson City and the nearby creeks settlements where the mining claims were located. Further, there was only one reason that more than an handful of non-Aboriginal individuals were present in the Yukon Territory at this time, and that was because they were partaking in the last great gold rush. Although more than one hundred years has passed since the latest recorded death occurred, and it is thus unlikely that any harm would be incurred by surviving descendants through this kind of analysis, individual names and personal identifiers will not be used, both out of respect for families, and to ensure absolute protection of privacy.

A total of 754 deaths (excluding stillbirths, of which there were five) were transcribed, all of which included information regarding the biological sex of the individual, as well as whether or not a doctor had been attending the person prior to their death. In most cases, the precise age of the individual at the time of their death was known (78.2%), as well as place of birth (73.6%), religion (58.4%), and their rank/profession (52.7%). From this latter category, occupation groupings were created, which classified individuals as miners/prospectors, unskilled laborers, skilled laborers,

white collar, or employed within the hospitality sector. As is often the case with turn of the century documents, an occupation was rarely recorded for women. When an occupation was entered, 'housewife' was often the label applied. Cultural assumptions regarding the role of women in the society in which they lived influenced the way in which the registrar construed their position, both within the family and as participants in the local economy. Around the turn of the last century, women's roles as wife and mother were almost always the social identity assigned to them in vital statistic records, regardless of whether or not they worked outside the home, or produced goods to be sold or traded with other families (Inwood & Reid 2001). Women's association within the home was also reinforced by the lack of recognition accorded for unpaid labour as a legitimate form of work. Women who worked part-time, or assisted in running the family businesses or continued their husband's trade after his death often had no occupation recorded in official documents (Herr 1995). In the Klondike, if they had any label applied to their labour at all, women who worked claims alongside their fathers, husbands and sons, lodged employees and cooked meals, or prepared goods to be sold to neighboring miners often fell into the generic category of 'housekeeper', regardless of whether they were wives or employees of the men they lived with. This bias holds true for the YTDR data, as only fifteen of the 142 (10.6%) females (including all age groups) who died during this period have a corresponding occupation recorded. For this reason, whenever occupation is used as an indicator of socioeconomic status in this study, it is restricted to males who were fifteen years of age or over at the time that the record was created. When this bias is thus corrected for, occupational data is available for a much larger portion of

the sample population (88.8%), which enables inquiries to be made regarding relationships between socioeconomic status and cause-specific mortality.

The year of death is known for all individuals. In all but one case (99.9%), the month of death is also known, which provides the data necessary in order to classify deaths by the season in which they occurred, thereby enabling analyses of variation in the seasonal distribution of specific causes of death. The specific date of deaths is known for all but twelve individuals (98.4%), and specific cause of death for all but eighteen individuals (97.6%), which is a surprising level of completeness for such information given the period of study and context in which the population was situated. From the original categories that comprised the YTDR, several other classifications were created. As was noted above seasonality was extrapolated from the month in which the death occurred. It was also possible to determine the ethnicity for all individuals based on the data recorded under the rank/profession category, which identified all Aboriginal individuals as “Native” or “Eskimo”. It is likely that these distinctions were recorded under this column as the aboriginal population in the Yukon Territory was rarely engaged in paid labour during this period, particularly the occupations which were recognized by the registrar. Thus, in the same way that occupation can be used to indicate the socioeconomic status of the gold rushers, the identification of aboriginals as such reflects to the traditional lifestyle still adhered to by the majority of these individuals. Similarly, the age of individuals at their death was used to create two new classifications: one which grouped individuals by their age into five year cohorts, and the other which categorized individuals into one of three groups based on their presumed life-stage at the time of their death; pre-reproductive (aged 0-14.9 years), reproductive (15-49.9 years of age), and

post-reproductive (45 years of age and over). Based on the place of birth, another category was also created which grouped individuals based on nativity as being either American, Canadian, European or 'other'. The only other information recorded in the YTDR that was not utilized in the present study includes the informant's name and the date that the death was registered, as well as a column for remarks regarding the death, which was rarely utilized by the registrar.

There is a high degree of confidence that the YTDR provides an accurate representation of the population being studied, as all deaths that occurred in the Yukon Territory were required to be registered with the North West Mounted Police, who were responsible for maintaining the YTDR. Stationed in Dawson City, the register was the official responsibility of the officer in charge of the division, however entries were usually made by one of his subordinates who acted as registrar. In 1898, Superintendent Steele ordered that whenever a death was recorded, as much information as possible should be collected so that the deceased's estate could be settled in the Yukon Territory and the next of kin notified in due order. Steele also required that a medical certificate be acquired whenever possible,¹⁸ and when the circumstances surrounding the death warranted investigation, a senior officer served as coroner and an inquest was held. In many instances a doctor had been attending the individual prior to their death (69.5%) and served as informant of the death. In many of the remaining cases, the local undertaker, J.A. Greene served as witness to the death since the body was usually turned over to his possession to prepare for burial or shipment to relatives on the outside. That there was a doctor attending the majority of individuals prior to their death strengthens

¹⁸ Sessional Papers of the Dominion of Canada, 1899 #15: 22.

the degree of confidence in the accuracy of the recorded cause of death, since the physician was able to observe symptoms and make a diagnosis while the patient was living, rather than relying on post-mortem observations. This high degree of physician involvement in the creation of mortality documents was a product of the changing times, as turn of the century doctors had begun to insist that their practical experience made them the most qualified profession to accurately pin-point cause of death in the deceased (Alter & Carmichael 1999). Not only did this provide an opportunity for many doctors to supplement their incomes, but it also set a precedent of doctors acting as consultants for government authorities rather than just treating patients, and providing services such as epidemic control, sanitary planning and setting public health protocols. In doing this, doctors “assumed the responsibility for the truth of their causal assessment and tied their professional interest to the growing power of the bureaucratic state to intrude into their lives (Alter & Carmichael 1999: 129). This reliance on physicians in isolating the cause of death also placed upon doctors, surgeons and university medical professors the burden of determining

what death is, what a cause of death is, and how death may be explained...But even when educated practitioners were involved, nosology and diagnosis represented two different levels of medical thought. Any specified cause of death reflects the result of a negotiation among a number of social agents who can be, and usually are, involved in defining death and its causes, rather than a direct expression of any contemporary medical nosology...it is difficult to imagine that any medical expression of cause of death can be fully understood outside of its relevant representational (or historic) framework...[particularly since] the conceptual framework of present-day medicine is increasingly [being] challenged by new [understandings] of diseases (Arrizabalaga 1999: 242-252).

Thus, common problems encountered in this type of analysis when using historic medical records include out-dated nosology, vague or superficial diagnoses, and ill-

defined diseases (Padiak 2004, D'Amico et al 1999, Hardy 1994). Alter & Carmichael (1999:16) have commented on this, noting that “as medical science developed, basic ideas about the nature of disease itself were revised”. This poses problems when retrospectively trying to establish the meaning of a given cause of death in historic sources. Even if a disease appears to imply a modern diagnosis, the social construction of the disease and its meaning in past times may have been very different from the way in which it is presently understood. It is thus imperative to appreciate the diagnosis from both a social as well as a medical perspective contemporary to the time at which it was made (Risse & Warner 1992).

Nosology, or the classification of diseases, not only arranges illnesses by similarities and differences in their etiology, symptomology and prognosis, but also functions as a list of all currently known diseases (Hardy 1994), and must therefore be receptive to new discoveries as well as reinterpretations of previously conceived of diseases. Prior to the acceptance of germ theory, for example, the experience of infectious diseases was radically different than today, as the belief in miasmatic vapors and the moral quality of individuals was believed to be responsible for ill-health, rather than an invading microorganism which can be overcome with an antibiotic prescription. Another example is the recent realization that some infectious diseases can lead to chronic conditions, as is the case with repeated exposures to human papilloma virus and the development of cervical cancer in women. This flexibility is necessary because both “[m]odern science and medicine are human constructs. Thus, they constitute a system of thought and representation of reality, not reality itself” (Arrizabalaga 1999: 241). A complicating factor of changing nosology is the corresponding evolution of medical

terminology that reflects trends in research and practice; for example the replacement of 'diarrhea' with 'enteritis' as a 'fashionable label' around the turn of the last century can confuse the analysis if the researcher is unaware of these peculiarities of the data (Hardy 1994).

Examples of vague or ill-defined causes of death include symptoms such as 'diarrhea' or 'fever' being recorded as the cause of death despite the fact that these are symptoms, not diseases in and of themselves. In some cases 'old age', 'debility' or 'teething' have also been reported as the cause of death, although we would not consider these to be legitimate causes of death by modern definitions. Additionally, in the case of chronic and degenerative diseases, the cause of death is rarely attributable to a single factor, and thus the recorded cause of death does not necessarily provide an accurate reflection of the circumstances surrounding the death of the individual. While it is tempting to try to impose retrospective interpretations on historic causes of death, doing so is problematic (Padiak 2004, Hardy 1994), because it ignores both the ideological context both in which the disease occurred, and in which the doctor who determined the official cause of death practiced. In order to preserve a meaningful framework (Risse & Warner 1992), all original cause of death labels were preserved during the transcription process and entered directly into the database. From this point, the aforementioned issues were addressed, as is common practice among anthropological demographers, by logically grouping causes of death with varying levels of specificity into larger categories based on their etiological and physiological similarities (Padiak 2004, Hardy 1994).

The 754 deaths (excluding stillbirths) recorded in the YTDR were classified into thirteen distinct categories: homicide/suicide, cardio-/cerebral-vascular disease, typhoid

fever, respiratory diseases, tuberculosis, accidental deaths, kidney & liver disorders, gastrointestinal disorders, neoplasms, other infectious diseases, ill-defined causes of death, other causes of death, and unknown cause of death. Based on these classifications, further distinctions are possible, such as: infectious versus non-infectious causes of death.

When utilizing vital statistics it is also important to be aware of the motives of those who were responsible for collecting mortality information in the first place. Around the turn of the last century the reason for maintaining death registers was often to measure the burden of infectious diseases on the health of the community, in order to respond to particularly threatening diseases present in the population or to prevent epidemics from reoccurring (Alter & Carmichael 1999). Only recently have these documents been appreciated by contemporary medical researchers, who are able to employ the data contained therein in statistical analyses in support of their arguments for advantages of new technologies such as vaccination, as was the case around the turn of the last century. This appears to have been the one of the underlying motivations for data collection during the Klondike Gold Rush, as the federal government was keenly interested in the health of region, requiring weekly reports infectious disease incidence to be submitted to Ottawa officials by the Medical Health Officer. The federal government's interest undoubtedly had something to do with the financial impact that the gold rush was having on the Canadian economy, however it was also likely due to the fact that Dawson City was designated as an in-land Canadian port, and due to the great number of people flowing in and out of the country from this location, the importation of disease was most certainly of utmost concern in the era of extremely virulent smallpox, scarlet fever and

measles. Thus, one can expect that careful attention had been given to the accurate recording of deaths from infectious cases of mortality.

Once the database was established, the data contained within each category was assigned an arbitrary numerical code so that relationships between the variables could be analyzed with the SPSS statistical software suite. While small sample size is often a concern when populations are studied in this manner, the gold rush population was both small enough that no sampling was necessary, while at the same time being large enough that having too few cases to conduct meaningful analyses was not a concern. All deaths that occurred throughout 1898-1904 were thus included for analysis, thereby eliminating any potential sampling biases or errors that would make the sample unrepresentative of the entire population.

The Patient Register for St. Mary's Hospital (1900-1904)

Risse & Warner (1992) have commented that “[e]ven if only patient registers – not true case books – for hospitals and dispensaries survive, historians can obtain from them statistical information about patients, diseases and therapeutic procedures.” Following this, a separate database was constructed with data transcribed and coded for analysis in SPSS from the patient register for St. Mary’s Hospital (SMH), which is housed in the collection of the Yukon Archives. A separate analysis of both mortality and morbidity is essential in order to capture a true picture of the health experience of the population, since “causes of death are not always important causes of sickness and vice versa” (Alter & Carmichael 1996: 44). Unfortunately, the data contained in the patient register is somewhat limited for the purposes of this study, as no entries pre-date 1900. These are,

however, the only known patient records pertaining to the Klondike Gold Rush which are available for consultation, and thus the database nevertheless contains valuable information on patients admitted to SMH in Dawson City between the years 1900-1904. Again, the names of individual patients and information that could be used to identify individuals were omitted from the database in order to protect the privacy of any surviving descendants.

A total of 1258 individual admission records were transcribed from the SMH patient register for the years 1900-1904. While it is likely that some individuals were captured more than once, having been admitted to the hospital on more than one occasion, this does not necessarily pose a methodological problem, as the purpose of analyzing this data is to gain an insight into sickness among the gold rush population, not to track the health experiences of individual Klondikers. If this source were to be used as an indicator of health status of Dawson City, rather than for the entire gold rush population residing in the Yukon Territory, then the potential problem of the hospital acting as a magnet, drawing the injured and sick to the area would have to be addressed, as it would give the impression that the community was far more sickly than it actually was. This issue becomes moot, however, since for the purposes of this study the patient register for SMH is interpreted as being representative of the morbidity of the entire gold rush population (encompassing all of the Yukon Territory). Although SMH was located in Dawson City, it was only one of two public hospitals in Dawson, and no patient records remain from the Good Samaritan Hospital. Since not all of the morbidity experienced in Dawson City is being captured in this analysis (since there is only data available for one hospital), and since the bulk of the population of the Yukon Territory

resided in the general vicinity of the Klondike valley during this period, this seems to be the most amenable solution, while also avoiding the aforementioned problem of the location hospital acting as a biasing influence.

While the biological sex of admitted patients was unfortunately not recorded in the patient register for SMH, and could not be assumed from the names of patients as these were omitted from the database, making any comparisons of cause-specific morbidity by sex is impossible. There was nevertheless a high degree of completeness within the categories of data that were recorded. The financial status of the patient, that is, whether they were able to pay for the care they received while hospitalized, or if their account was billed to the government for providing care to an indigent patient, was present for 87.4% of entries. Age at the time of admission was recorded for 70.6% of patients, from which two additional categories were generated in the same manner as the death records, one grouping by five-year cohorts, and another categorizing by presumed life stage.

The marital status of patients was available for 70.0% of entries, and in 72.9% of cases, place of birth was created, from which an additional classification was recorded, labeling individuals as having been born within Canada, the United States, Europe or elsewhere. The nationality of individuals was also noted in the register for 67.1% of patients, while an occupation was documented for 65.7% of patients. When taking into account that many of these patients would have been women, and thus, as was the case with the YTDR, would not have had an occupation reported in most cases, this is a satisfactory degree of completeness. As was the case with the professions reported in the YTDR, the occupations noted in the patient register were assigned to groups based on

similarities in the training and skill required for each job, as well as the resulting lifestyle such a position afforded the individual. The availability of occupational data allows for a comparison of cause-specific morbidity to be made based on differential status, which has the potential to reveal biases in the health care experience of individuals based on their socioeconomic status.

In the same way that causes of death were grouped in the YTDR database into larger, more inclusive categories in order to correct for varying levels of specificity, nine groups were created to classify the diagnoses reported in the patient register for SMH: typhoid fever, rheumatism/pains, injuries, operation/amputation, respiratory troubles, colds (which are understood to have been less serious in nature than the illnesses considered to be respiratory troubles) ill-defined conditions, complaints associated with major organs (kidney, liver, heart, stomach), and other/unknown illnesses.

The precise date of admission is available in all but six cases (99.5%), while the year is known for all but one admission to SMH (99.9%). The latter is also true for the month of admission, which allows for the creation of a ‘season of hospitalization’ category that can be used to conduct analyses based on any observed seasonal distributions of cause-specific morbidity. The precise date of discharge was recorded for 97.1% of patients, while the month of discharge is known for a slightly larger portion of cases (97.6%). The length of time spent in hospital for each patient is also provided in the register under the category of “days in hospital”, which provides data for 95.3% of individuals.

As with the YTDR, the physician attending the individual while hospitalized was recorded in the SMH patient register and included for 96.4% of patients treated at the

facility. Many of the doctors working at the hospital also treated patients outside of the institution, so a comparison of the types of illnesses attended to by the Klondike doctors both within, and beyond the hospital walls may provide interesting insights regarding care seeking behavior and beliefs regarding what kinds of illnesses were curable and which were presumed to be fatal. This can be accomplished by comparing the deaths that occurred in hospital in contrast to all other deaths in the Territory, as well as comparing differences between hospital deaths and recoveries.

The patient register for SMH also contains a category in which the condition of the patient upon discharge from the hospital was recorded. This information is available for 93.3% of individuals and provides important insights concerning the utility and effectiveness of the medical care offered by the medical staff, as well as potentially providing data about the recovery rates for specific illnesses and injuries. It is likely that this high percentage of data available regarding the time of entry into the institution, as well as the length of time each patient spent in hospital, is a product of the purpose for which these records were maintained in the first place. As was often the case with hospitals that were run as charitable organizations and received government grants, rather than as a corporate enterprise, a patient register was essential in order to receive government funding, particularly in the case of Dawson City where the hospital received a subsidy per patient as well as receiving payouts from the government account which financed the for the care of indigents in the facility.¹⁹ The options for reporting the condition of a patient upon their discharge appears to have been standardized by the physicians making the report, as all cases were noted as either cured/well,

¹⁹ Yukon Archives, St. Mary's Hospital (Dawson City) fonds.

benefited/improved, dead or same/fair. These categories apparently to have been rigidly adhered to by the registrar of the institution, as continued government monetary support undoubtedly relied upon the institution being able to prove its utility to the Klondike population. These records cast a very favorable light upon the service record of the hospital as the choice of prognoses presented the work of the doctors and nurses in the best possible image. Aside from the few patients who died in hospital, who were presumably beyond the point where anything could be done, no patient's condition is reported to have worsened while receiving treatment at the facility. At worst, such patients were noted as being discharged in the same condition they arrived in, and in the majority of cases people left the hospital in a better state than they had been in prior to entering the institution. Finally, in 88.0% of entries, the patient register also reports the religion of the patient, while the section for personal remarks was rarely used, as was likewise the case with the YTDR.

Canada Census for Dawson City Proper (1901)

The composition of the Klondike population at risk of getting sick or dying during the gold rush was established through the creation of a third database transcribed from the 1901 Canada Census, from which data was collected for individuals residing within the limits of Dawson City proper. The population of Dawson City was selected for three reasons. Firstly, because the size of the population residing throughout the Yukon Territory was too large (over 20,000 in most years throughout the period) to transcribe in its entirety for the purposes of this study, and would otherwise have to have been sampled in some other way in order to inform analyses of morbidity and mortality based on data

from the whole Territory. Secondly, the population residing in Dawson City was large enough to be considered representative of the greater gold rush population residing throughout the Yukon Territory, as Dawson was the primary transportation and supply centre for the region at this time, and thus should serve as a reliable indicator for the general population. Thirdly, by focusing the sample on Dawson City proper, the data can serve the dual purpose of enabling a micro-level analysis of the cosmopolitan nature of Dawsonites to inform the case-study approach taken to typhoid fever in Chapter sevenSix, enabling more detailed questions to be asked about the population residing at Dawson City in order to answer minute questions about the impact of local conditions on the health of the community.

Information for a total of 6695 individuals was transcribed from the 1901 Canada manuscript census rolls for Dawson City proper for analysis with SPSS. While previous studies have reported a larger resident population than is noted here, they are instead focused on the Dawson District (which included individuals residing in the surrounding creeks), or alternatively counted the populations of Lousetown, Dawson South and/or Klondike City, which while sharing a close proximity to Dawson City, were nevertheless separate entities. The basis for excluding these neighboring communities that bordered the limits of Dawson City proper, is the fact that they were not subject to Dawson City bylaws, policing or public services. For example, when the North West Mounted Police ordered the prostitute community out of Dawson City, the women simply relocated across the river, where their trade was tolerated and their Dawsonite customers could simply walk across the bridge to partake in their services without harassment from the local officials (Porsild 1998).

The census data offers a greater amount of personal information than either the YTDR or the patient register for SMH. The data also tends to be much more complete within each category. As the census was an official undertaking of the federal government, the primary objective of the enumerators was to ensure that the information was complete and correct to the best of their knowledge. Additionally, the data contained within this source was presumably collected by directly questioning each individual or household head, who would have the intimate knowledge necessary to satisfactorily answer the questions of the enumerator, as opposed to the data collected for the YTDR and to an extent the patient register, which relied upon the recollections of distant family members, newly acquainted friends or other secondary informants who may not have been privy to all the information needed to answer the registrar's inquiries.

Names were again omitted from the database, however biological sex was recorded for 99.9% of Dawsonites, while an age was recorded for 98.7%, marital status for 98.9%, occupation for 86.2%, and religion 92.0% of the population residing within the city limits. The census data is unique in that it specified four separate categories by which individuals could be classified by their ethnic background. This may indicate a bias in the interest of the federal government at a time when immigration was at an all-time high in Canada. The skin 'color' category is complete for 98.8% of individuals, while the place of birth is recorded for 96.5% of people, and nationality and 'race' are available for 95.2% and 88.3% of the population respectively.

Also interesting for a study of a frontier boom community such as the Klondike Gold Rush population is the column of the census that reports the number of years spent both in Canada and within the Yukon Territory specifically by each individual, which are

71.1% and 93.1% complete respectively. Data contained within the manuscript census but not used for the purposes of this study included information regarding the employment position of each individual and their salary, as well as the value of their real estate, mining claims, personal property, horses, dogs and cows. The ability of each individual to read, write and speak English and French, as well as their mother tongue was also available but not used for the purposes of this research.

As with the YTDR and the patient register for SMH, the census data is not without its own potential biases and shortcomings. While certain personal details for many women are often missing (such as occupation), there are also several peripheral segments of the population which were likewise at a greater risk than mainstream members of the society to be overlooked or given less attention by the enumerator resulting in lost information. These groups include non-property owners, the very young or highly mobile, individuals of lower socioeconomic status and/or members of ethnic minority groups (Inhorn & Reid 2001). Anthropological demographers seeking to better understand the structure of the population being studied nevertheless often call upon census data for this purpose. Aside from defining the population at risk in studies of community health, census materials can also be used to “[e]valuate gender roles, ethnicity, class and allied concepts...[thus c]ensus data are integral for obtaining an understanding of demographic processes at a particular point in time and examining trends through time” (Fliess 2000:67), which are the central tenets of anthropological theory. Understanding the population being studied is essential to being able to explain the processes at work within it. Without an appreciation of

population structure (such as age and sex distribution) and population characteristics (such as ethnicity, place of birth, and occupation) and

without some knowledge of migration, mortality, and fertility, explaining social, economic and political processes [which influence health and disease] is almost impossible (Fliess 2000:68).

To this end, the primary advantage of census data is that for the majority of cases, a great deal of individual level data is available per person. Thus at least something is known about each individual in the community, and the experiences of “ordinary people leaving ordinary lives” can be uncovered (Fliess 2000:83). This is not possible when questions about the population are approached with macro-level data or through reliance of local history alone, which often focuses on the mosaic rather than the individual pieces that contribute to the bigger picture.

Chapter IV: Morbidity, Mortality and the Klondike Way of Life

The peculiarities of the Klondike experience often had unforeseen influences on the lives of those who rushed to the newly discovered gold fields during the final years of the nineteenth century. It is unlikely that in the midst of the pandemonium instilled by the process of quitting their job, purchasing an outfit, saying goodbye to their families, and setting off in search of gold, that it ever crossed the minds of the stampedeers, that their dream of fortune would be brought to an abrupt end through an unforeseen accident, illness or death. In fact, far from the glamorous lifestyle portrayed in romantic renditions of the stampede, life as a gold rusher in the Yukon Territory was hard, the work of extracting gold was far more strenuous than most had imagined, and the living conditions were severe, particularly in the early years when Dawson City was just beginning to emerge from the Northern wilderness (see Figure 4.1). Under these circumstances, Klondikers “died as they did because of the way they lived” (Zanjani 1990: 47), and so in order to interpret the experience of illness and death within this population, it is first essential to understand what it meant to live and labour in the Klondike during the last great gold rush.

Causes of Death in the Klondike

The number of deaths reported in the YTDR throughout this period remains relatively stable from year to year, despite the fluctuations in population growth and decline discussed in Chapter Two, except for 1899 when there were more than 60% fewer deaths reported than in either the year preceding or following it (Figure 4.2). While this peculiarity of the data is immediately obvious when 1899 deaths are compared to those

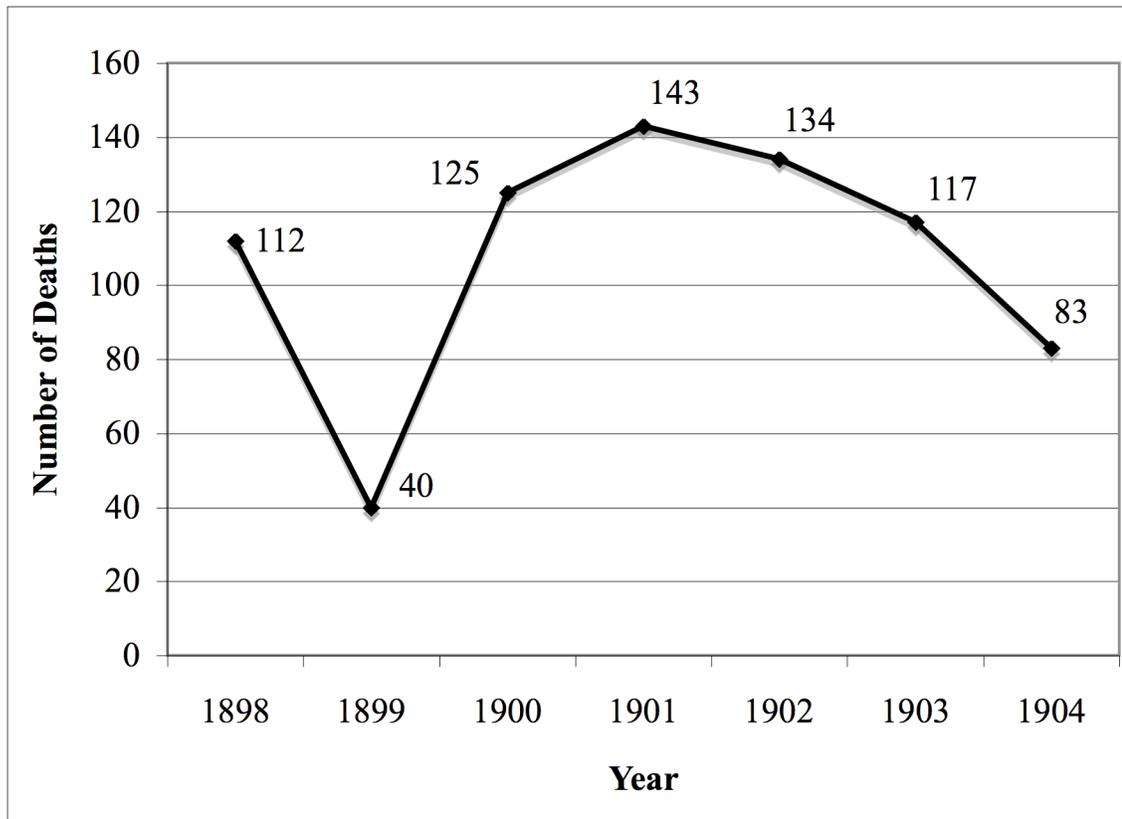
Figure 4.1: Life in the Klondike Gold Fields (circa 1898).



Source: Library and Archives of Canada/PA-022512.

Written permission to include this image was obtained on August 20, 2007 from the Library and Archives of Canada Copyright Bureau.

Figure 4.2: Number of Deaths in the Yukon Territory Annually (1898-1904).



Source: Death Register for the Yukon Territory.

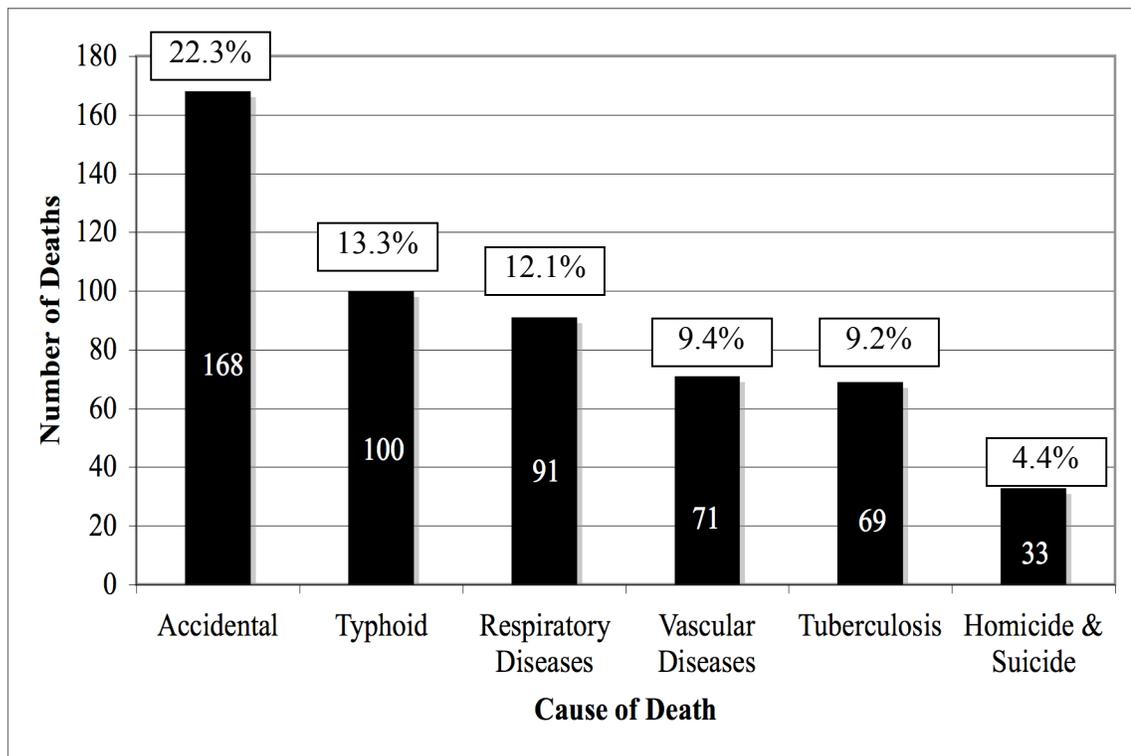
that occurred in all other years, it should not be interpreted as a flaw in the data set. As previously mentioned, an exodus of disenchanting gold rushers occurred late in the year both in 1898 and in 1899. With transportation into the Klondike closed until river navigation resumed in the spring, the population of the region was substantially reduced for several months of the fall, winter and spring and most deaths in the Yukon Territory (1898-1904) occurred during these seasons. It is therefore not surprising that substantially fewer deaths should be observed for 1899, when the population was greatly reduced in all but the summer months.

The crude death rate (n deaths/1000 living) calculated for the Yukon Territory in 1901 was 6.19 for males, 5.56 for females, and 5.25 overall when male and female deaths were calculated together. This difference in mortality by sex is characteristic of differences in the kinds of work that men and women were engaged in at this time. Although the 1901 census of Canada recorded an occupation far more frequently for men than women (only 46.3% of female Dawsonites over the age of fifteen had an occupation recorded as opposed to 96.5% of men of the same age), women were nevertheless significantly more likely than men to be engaged in unskilled labour or the hospitality industry, while men were significantly more likely to be working as miners or prospectors ($\chi^2=429.624$, $df=4$, $p<.001$).²⁰

Figure 4.3 shows the six leading causes of mortality in the Yukon Territory between 1898-1904 which, when taken together, account for 72.3% of all deaths throughout this period. The fact that vascular (cerebrovascular and cardiovascular)

²⁰ According to data collected from the 1901 Census of Canada for Dawson City which is assumed to be representative of the greater population residing in the Yukon Territory at this time.

Figure 4.3: Leading Causes of Death in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory.

Note that percentages reflect proportion of all deaths 1898-1904.

diseases were the fourth most important causes of death in the Yukon Territory is unexpected given the youthfulness of the population and the era in which this study is situated. Together with deaths from homicide and suicide, which comprise the sixth leading cause of mortality in the region, these causes of death require further analysis in order to determine why they wielded such an important influence over the health and longevity of the Klondikers. This is, however beyond the scope of the current project, and will therefore be the topic of future investigation. That the life of a gold rusher was a particularly dangerous one is highlighted by the fact that accidental deaths were the leading cause of mortality in the Yukon throughout this period. One hundred and sixty-eight deaths fell under this category, accounting for 22.3% of all mortality throughout the period.

The Life of a Gold Rusher: Accidental Deaths

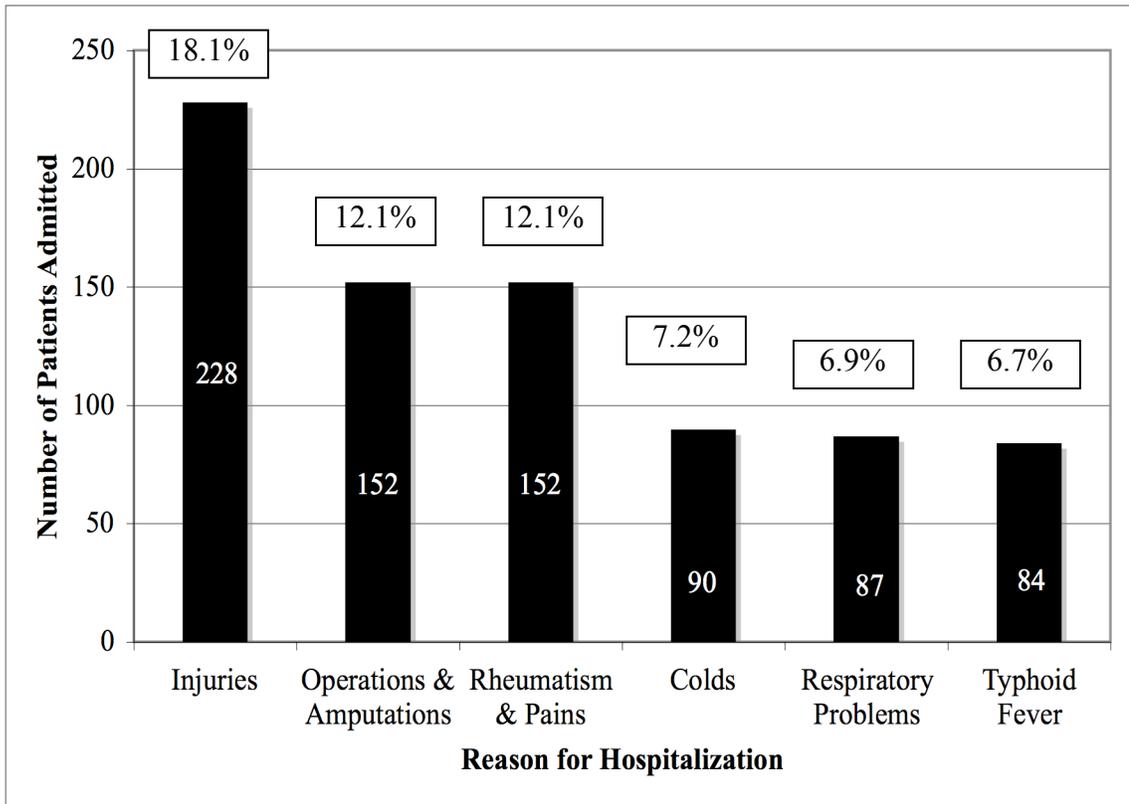
When accidental deaths are examined, there is no significant relationship between the sex or age of the individual who succumbed to their injuries, nor the year in which the accidental death occurred which might otherwise have suggested a trend towards improved safety standards in the region. There is however a strong correlation between the season in which a death occurred and the nature of the accident that resulted in the death of the individual. Significantly more mining accidents occurred in the springtime, while accidental drownings were significantly more likely to occur in the summer months ($\chi^2=28.564$, $df=6$, $p<.001$). The preponderance of mining related accidents resulting in death during the springtime is in keeping with the nature of seasonal mining in the Klondike. As the period of underground work neared its completion towards the warmer

spring months, work in the mines became increasingly hazardous as the ground warmed and runoff water softened the walls of the shafts and drifts (Berton 1958). Under these circumstances, earth which had been frozen solid throughout the winter months was under greater stress as the hollowed out mine had to withstand the burden of supporting its own weight, as well as the increased weight of the water-saturated soil above, and often collapsed, burying miners underground.²¹ This is in keeping with the observation that miners as an occupational group were significantly more likely to die in a mining accident than from any other accidental cause ($\chi^2=31.539$, $df=8$, $p<.001$), and that there was no significant relationship between the age at death and whether or not the victim of accident died from a mining related cause or some other mishap. The preponderance of accidental deaths during this period is mirrored in the reasons for admission of patients to St. Mary's Hospital between 1900-1904 (see Figure 4.4), the top three reasons being: injuries, operations and amputations, and rheumatism and pains, which can all be ascribed to the rigors of mining and the treatment of injuries incurred in this line of work.

An unexpected finding was the large number of accidental deaths due to drowning which occurred in the Yukon Territory throughout this period. Forty-seven drownings were reported in the YTDR between 1898-1904, accounting for 37.9% of all accidental causes of death. While this seems to be an inordinately high number of such deaths for an inland community which owed its existence to its mining industry, it is perhaps not all that surprising in light of the fact that the primary method of travel to the Klondike was via the Yukon River (Berton 1958). This is in keeping with the finding that accidental drownings were significantly more likely to occur in the summertime than at any other

²¹ There are numerous accounts of accidents of this nature reported in the Dawson Daily News throughout this period.

Figure 4.4: Leading Causes of Morbidity in the Yukon Territory (1900-1904).



Source: Patient Register for St. Mary's Hospital.

Note that percentages reflect proportion of reason given for admission of patients to St. Mary's Hospital 1900-1904. Also note that 'colds' were differentially identified from other respiratory illnesses in the patient register, with the implication that these were mild viral infections as opposed to more serious conditions such as pneumonia or bronchitis.

time of year in comparison to all other accidental causes of death ($\chi^2=28.564$, $df=6$, $p<.001$). The seasonality of death due to drowning is likely due to the fact that transportation by waterways was only possible for a limited portion of the year, with travel by this means peaking between June and August.

Living the Klondike Life: Respiratory Diseases

After arriving in Dawson City, the typical newcomer continued to live in his tent, which was pitched either on the waterfront, Crown land or hillside bordering Dawson City, while he searched for a place to rent, or purchased a plot on which he could build a cabin (Porsild 1998). Some recent arrivals prospected for a claim of their own until realizing as the majority inevitably did, that all the sites worth staking had been long since claimed, while others immediately sought paid employment. The cost of living in the Klondike was high, forcing many to sell off the year's supply of food, tools and other essentials contained in the outfit that they had been required to carry along with them on their journey to the goldfields in order to make ends meet or procure enough money for return passage (Berton 1958). Once a gold rusher had established himself, either on a creek claim or in some other position within Dawson City, he typically invested in a log cabin, which was erected in favour of the familiar tent that had provided shelter to many of the early Klondikers for the better part of a year as they voyaged to the Yukon interior. The ambition of the gold rushers to find their fortune in the Klondike, either in the creek beds or in the pockets of more successful miners, was reflected in the quality of their new residences. It was obvious that these men and women "were more interested in collecting

gold than in building fine houses and their cabins...[served as] physical expressions of their priorities” (Guest 1985: 227).

The average cabin measured twelve feet by fourteen feet with six-foot high walls and eight-foot gables.²² The slab roofs were covered with moss and then topped with approximately one foot of earth, which provided insulation in the winter and absorbed some of the rainwater in the summertime (Guest 1985). Glass windows were an expensive and rare commodity when log cabins were first being built, and so greased canvas or glass bottles chinked with moss were used in the place of windowpanes to let light into the cabin’s interior. Many of Dawson’s permanent structures also had double floors, to further insulate the occupants against the harsh Yukon winter.²³ However, while the cabins may have “held heat well and were comfortably warm during the Yukon winter, especially when banked with snow”, they were very poorly ventilated, and humidity was a problem in both the summer and winter months (Guest 1985: 229). In the summer, once the sod roof became saturated with rain, it leaked dirty water into the cabin’s interior,²⁴ while in the winter the walls were prone to sweating (Guest 1985). Klondike or Yukon stoves, as they were popularly known, served the dual purpose of providing the only source of heat in these structures as well as a hot surface on which to prepare cooked meals. The stoves burned wood and due to improper venting, tended to fill the cabin’s interior with smoke which lingered indefinitely as there were no windows through which it might escape, particularly in the winter months when any draft was tightly sealed up to conserve heat (Guest 1985). Furniture was sparse, utilitarian, and

²² Sessional Papers of the Dominion of Canada #15, 1896.

²³ Sessional Papers of the Dominion of Canada #15, 1898.

²⁴ Sessional Papers of the Dominion of Canada #15, 1897.

typically fashioned from whatever was on hand (Guest 1985). Cabins such as this were the most common dwelling during the height of the gold rush (Guest 1985), with between two and four men sharing the space which they used for eating, sleeping, socializing and other tasks, rarely leaving the confines in the winter months except to work on their claims (see Figure 4.5).²⁵ Within a few years' time, spruce frame buildings became the primary structures in Dawson City, with plaster slowly replacing the interior canvas walls, and glass windowpanes making an appearance around the turn of the century (Guest 1982).

When these pioneer gold rushers emerged from their cabins in the winter months it was usually to work their claims. As summer drew to an end in Dawson City, the endless flood of newcomers ceased, social functions become fewer and further between, and trade slowed as no new stock would arrive in the city until the ice went out of the river in the spring (Berton 1958). The first few winters endured in the Klondike were toiled away sinking prospect holes, thawing the ground, digging shafts and removing endless buckets of gold laced gravel to be separated in the spring cleanup. In addition to this work, wood had to be collected and chopped for both mining purposes and for the stove in the cabin. Miners were also faced with the job of building any equipment they required. This was no small task in addition to household chores, which included laundering their clothes, procuring water for domestic purposes, and preparing meals from highly preserved foodstuffs with only the most basic utensils at their disposal (see Figure 4.6).

²⁵ Sessional Papers of the Dominion of Canada #15, 1896.

Figure 4.5: Interior of a Klondike Cabin (circa 1898).



Source: University of Washington Libraries/Special Collections/Hegg 3089.
Written permission to include this image was obtained on January 29, 2008 from the
University of Washington Libraries Special Collections Division.

Figure 4.6: A Klondike Meal (circa 1898).



Source: University of Washington Libraries/Special Collections/Hegg 3090.
Written permission to include this image was obtained on January 29, 2008 from the
University of Washington Libraries Special Collections Division.

Wintertime work in the mines was both physically demanding and tedious. Shafts had to be sunk on the bank of creeks, as there were no pumps available in the early years, and the creek could not be diverted without infringing on adjacent claims (Berton 1958). While the permafrost meant that the ground had to be thawed in order to dig, this inconvenience worked to the advantage of the miners as it resulted in far sturdier shaft walls than would have been the case if they were not frozen solid. In order to thaw the earth, a fire was lit and the ground beneath it shoveled away once it burnt out. Then another fire would be lit on the same spot to heat the newly exposed surface below. In this fashion, shafts could be sunk in the dead of winter at a rate of eight inches to one foot per day (Berton 1958). The task was extremely time consuming, sometimes taking the entire season to reach the paystreak, which often lay fifty feet beneath the surface (Berton 1958).

The shafts measured two-feet by four-feet and required a greater investment of labour the deeper they sank, as buckets had to be filled, raised to the surface, emptied and returned the floor of the mine either by windlass or simply climbing up and down a ladder. For this reason, partnerships were popular, with one man working in the mine, another lifting the buckets and perhaps another emptying the diggings onto the nearby dump (Berton 1958). Once the miners hit the paystreak, drifts were tunneled horizontally in the same manner as the shafts were sunk (Berton 1958). This work continued throughout the winter, but ceased in the springtime when melting snow flooded the drifts stalling further work on the claim until the water had receded, since pumps were unavailable to Klondikers in the early years of the gold rush (Berton 1958). Following the importation of steam powered pumps to the Yukon Territory around the turn of the last

century, work on the gold bearing creeks became far less seasonally segregated, and miners were able to work their claims year round.²⁶

After underground work ceased in the springtime (sometimes as early as March), the miners refocused their efforts on separating the gold from the gravel that they had removed from the mine over the previous season. While waiting for the gravel dumps to sufficiently thaw, they first set to work constructing the sluice boxes and rockers that they would require (Berton 1958). Sluicing used the water from the spring runoff to wash the gold from the gravel, while rocking was a more labour intensive method, requiring one person to shake the gravel while another doused the paydirt with water. The latter method allowed for the conservation of water (Berton 1958), which was an appealing benefit as there was frequently not enough water to go around.²⁷ The ‘clean up’ (the process of separating the gold from the gravel piled in massive dumps) was usually complete by the end of May or June, after which little progress could be made on the claim until the frost once again set in (Berton 1958). Throughout the summer months miners worked for wages, prospected for better claims, engaged in other business ventures, or traveled to the outside for supplies or to visit with their family (Berton 1958).

By 1900 steam power was introduced to region, allowing the work of thawing to proceed at a much more rapid pace, as well as providing for the small-scale mechanization of claims thereby reducing the manpower requirements (while substantially increasing the capital invested) in lifting and separating gold from gravel.²⁸ The boilers ranged from ten to fifty horsepower, which transmitted steam at a pressure of

²⁶ Sessional Papers of the Dominion of Canada #15, 1900.

²⁷ Disputes over water rights appear frequently in spring and summer issues of the Dawson Daily News throughout this period.

²⁸ Berton 1958; Guest 1985; Sessional Papers of the Dominion of Canada #15, 1900.

twenty to forty pounds through a hose tipped with an iron point that was inserted into the ground. In this fashion the earth could be thawed to a depth of four feet, allowing the miners to remove approximately a cubic yard of softened gravel at a time as opposed to scraping away a couple inches with the fire-method.²⁹ By 1904 there were literally hundreds of boilers in operation in the Klondike valley. The NWMP reported 37 in use on Sulphur Creek, 275 on the Eldorado and Bonanza creeks, as well as 203 on Hunker Creek and its tributaries.³⁰

Under these living and working conditions it is understandable how respiratory diseases came to be the third leading cause of mortality in the Yukon Territory throughout this period. In the winter months men practically hibernated in their congested, smoky cabins which they shared with one or more roommates. When they did emerge from these structures, it was to “move from their fetid cabins by night into murky, constricted mine shafts by day” (Berton 1958: 20, see Figure 4.7). Under these conditions, respiratory ailments prevailed without discriminating as to either age or ethnicity of victims. Deaths from respiratory illnesses were significantly more likely to occur in the winter and spring months than at any other time of year in relation to all other causes of death ($\chi^2=22.236$, $df=3$, $p<.001$) Not surprisingly, men were also significantly more likely than women to die from a respiratory illness than from any other cause of death ($\chi^2=5.412$, $df=1$, $p=.020$). These findings are in keeping with the lifestyle of the male gold rusher who shared crowded living and working spaces. This habitual close proximity to others and constraint in environments with reduced airflow facilitated the transmission of infectious respiratory diseases, while also subjecting miners to poor

²⁹ Sessional Papers of the Dominion of Canada #15, 1901.

³⁰ Sessional Papers of the Dominion of Canada #15, 1904.

Figure 4.7: Working in an Underground Mine (circa 1898).



Source: University of Washington Libraries/Special Collections/Hegg 777.
Written permission to include this image was obtained on January 29, 2008 from the
University of Washington Libraries Special Collections Division.

quality air which was contaminated by the smoke from both poorly ventilated stoves and fires in the shafts. At St. Mary's Hospital, respiratory complaints represented the fifth most common reason for admission, which speaks to the burden this category of illness had on the gold rush population: not only were people getting sick from their living and working environments, but in many causes, the Klondike way of life was killing them.

Catching Gold Fever: Infectious Diseases in the Klondike

When considered together, mortality from infectious diseases accounted for 38.5% of all deaths in the Yukon Territory between 1898-1904. This includes deaths from typhoid fever (the second leading cause of death), respiratory diseases, tuberculosis, and the category of 'other infectious diseases' transcribed from the YTDR. As infectious causes of death are the subject matter of Chapters Five and Six, the nature of specific diseases will not be discussed here, however it is important to note that infectious diseases had a significant impact on the health of the Klondike population; three categories (typhoid fever, respiratory, and tuberculosis) accounted for three of the top six leading causes of death during this period.

The toll that infectious diseases had on the health status of the Klondike population can be seen, for example, in the indiscriminate manner in which these diseases afflicted members of the community; with no statistically significant relationship existing between the likelihood of an individual having died from an infectious cause of death rather than any other cause, and their age, profession or religion. The findings suggest that the risk of death from infectious diseases was shared fairly equally across all socioeconomic strata in this frontier population. This would seem to imply that either the

diseases were of unusually high virulence, or that the normal protections afforded by elevated socioeconomic status (see for example Farmer 2001, 2004) did not provide effective barriers to exposure or survival in the Klondike. Porsild (1998) has argued that there were rigid social divisions segregating the population of Dawson City, which would suggest that the normal socioeconomic divisions should have functioned to segregate diseases of poverty from those of the upper classes. The constant flow of people in and out of the area, however, facilitated the importation and transmission of new diseases into the population. Every time a steamship docked on Dawson's pier, virtually any disease that had stowed away on the vessel met with a fresh population of susceptibles. Thus any given infectious disease need to be particularly virulent to establish itself in the Klondike since the cosmopolitan nature of the gold rushers and the great distances traveled by each individual in order to reach the goldfields facilitated the spread of a wide range of diseases. As the gold rush reached its climax in 1898, Yukoners were significantly more likely to die from an infectious disease than any other cause of death ($\chi^2=58.208$, $df=6$, $p<.001$). Yet the number of individuals succumbing to infectious diseases gradually decreased in the Yukon Territory, and by 1901 Klondikers were more likely to die from a non-infectious cause than they were to succumb to an infectious disease ($\chi^2=58.208$, $df=6$, $p<.001$).

The fact that infectious disease seems to have had a relatively restrained impact on the mortality of Yukon infants is curious given the substantial impact that it had on the health of the adult population. In the case of typhoid fever for example, no deaths ever occurred among infants or children, despite the fact that this which was the second leading cause of mortality between 1898-1904 and thus the single most important

infectious disease threatening the health of Klondikers. In fact, the youngest person to succumb to typhoid fever was twenty years of age. The reasons for the unequal exposure of certain individuals to typhoid fever will be explored in Chapter Six, however the important point to be made here is that no statistically significant relationship existed in the Yukon Territory between the age of an individual and their likelihood of dying from an infectious disease as opposed to a non-infectious condition at this time. This discrepancy in the expected and observed burden of infectious disease on the mortality experience of the gold rush youth population disappears, however when the focus is expanded to include the distribution of all causes of death across each segment of the population (aged 0-14.9 years, 15-44.9 years of age, and 45 years of age and older). When examined in this manner, the youngest members of the population (under fifteen years of age) are found to be significantly more likely to die from an infectious disease other than typhoid fever, tuberculosis or a respiratory infection, than the remainder of the population ($\chi^2=207.474$, $df=22$, $p<.001$). An explanation for why typhoid fever, tuberculosis and respiratory infections exerted such a substantial influence on the health of adult gold rushers that it would mask the burden of all other infectious diseases on the youngest segment of the population must be explored through situating the population in the context of the Klondike Gold Rush. These infectious diseases reached epidemic proportions in the Yukon Territory during this period because of the social and environmental conditions in which the gold rushers lived and laboured. The factors that permitted these diseases to flourish will be examined in Chapter Five.

The Miners' Diet: Nutrition in the Klondike

Epidemiologists and health researchers acknowledge the reciprocal relationship between nutritional status and infectious disease susceptibility, although the precise nature of the relationship remains difficult to define (Harris 2004). Individuals most susceptible to diseases of poverty, for example, are also more likely to suffer from malnourishment or nutritionally deficient diets (Harris 2004). As well, bodily infections can suppress the appetite or restrict the body's ability to process the food that is consumed, thus it can be difficult to determine which factor was the cause, and which was the effect (Harris 2004). While nutrition may not have a significant effect on outcome when the virulence of a particular disease is extremely high, a malnourished individual is less able to resist infection when exposed to more moderate contagions, while also being more likely to remain sick for a longer period of time, suffering long term complications of the disease, or die from its effects, than their adequately nourished counterparts (Harris 2004).

Along these lines, an important distinction which must be made when considering the impact of nutrition on the health of a community is the difference between diet, or "the amount and quality of the food consumed", and nutritional status, which "refers to the balance between the food consumed...and the claims made upon it" (Harris 2004: 380). In the case of the Klondikers, these distinctions can be seen in the consequence that poor quality and monotonous diets had on the health of the early gold rushers, versus the balance between the quantity of food consumed in relation to the physical demands of mining and prospecting. In the early years of the gold rush, scarcity and expensive food resources restricted the quantity of food consumed, while the labour-intensive nature of mining placed huge demands on the bodily energy reserves, thereby predisposing early

Klondikers to a host of health complications. At the same time, food choices limited by availability and accessibility led to diets deficient in vitamin C resulted in scurvy. Thus in the early days of the Klondike gold rush, “[h]unger’s companion was scurvy” (Berton 1958: 198), a familiar foe of the unprepared gold rusher (Archibald 1981).

Scurvy has been associated with mining communities during the California gold rush (Bauer 1949). While it may seem to be an odd association since the disease is traditionally associated with sailors and soldiers, this nutritional deficiency can strike whenever and wherever access to vitamin C rich foods is restricted or improper cooking destroys the nutritional value of the foods. Qualitative data sources pertaining to the Klondike are rife with references to rampant scurvy that ravaged the gold rushers bodies. Berton (1958: 195) for example, told the story of a young man named Millet who developed scurvy following his discovery of gold on Cheechako Hill:

Now the discoverer worked like a man possessed. He was already suffering from scurvy brought on by meager rations and overstrain, but he had no time to consider treatment...On he worked, his legs turning black and scabrous, until he had twenty thousand in gold. Then, almost dead from scurvy, his claim still unsurveyed and unregistered, he headed downhill for Grand Forks to get some raw potatoes to arrest his disease.

The Dawson Daily News printed the recollection of a Sourdough³¹ who suffered from scurvy during one of his first winters in the Klondike.

My stock of grub became so low and so deficient in variety that the scurvy seized on me. If ever a man was in a frightful condition I was. My body and my limbs turned black, my hair fell out, and I could have pulled any of my teeth from my mouth with my fingers with scarcely any effort. Sores covered my body like Job in his great affliction. Pain filled and racked me from head to foot. Luckily I was not alone. Other boys in the camp came to my assistance. I was sure it was not scurvy which plagued me. I declared it only rheumatism. But when my body became so frightful

³¹ An affectionate term applied to ‘old-timers’ of the Klondike who proven themselves by having spent at least an entire year in the Yukon.

in appearance, and the pain all but killed me, I had to yield... Then I permitted the boys to give me a little of the sourdough's medicine. They went to the woods, cut spruce and cottonwood twigs and made me tea... The effect was marvelous. A short treatment and my wasting tissue took on new life. The diseases dissipated so in a few weeks that I was able to hobble about the creek with two sticks... I must have looked like a vision of Rip Van Winkle as I strode among the squatty little cabins on that simple remote creek, cut off from the civilized world by thousands of miles of intervening wilderness... The food we had that winter was a fright. Were some of it disposed to miners here in these days there would be a riot. I had a poor lot of flour, and some musty beans. The provision had run short and I had attempted to get through mostly on this simple fare. Fruit and other enemies of scurvy were unknown. The flour was part of several hundred sacks which had been brought up the Yukon in a steamer which sprang a leak. It was full of lumps, and not wholesome. The traders and the Indians mash it with mortar and pestle, but that did not make it wholesome...(December 3, 1902).

Despite testimonies such as these to the existence of scurvy in the Yukon Territory, the above excerpt from the Dawson Daily News was one of only seven references to scurvy that could be found in all the available editions of the periodical between 1898-1904. Further, there were only ten deaths from scurvy reported in the YTDR between 1898-1904, and only four admissions to St. Mary's Hospital of patients seeking treatment for scurvy between 1900-1904. Similarly the reports of the NWMP imply that scurvy was extremely prevalent in the Yukon, however only three cases were treated at the Barracks Hospital by the NWMP Assistant Surgeon stationed in Dawson City throughout this period,³² despite claims that in December of 1898 more than one hundred cases had been brought to the attention of the police surgeon.³³ The quantitative evidence for scurvy seems contrary to the multitude of first hand accounts that insist that this disease was rife in the Yukon Territory in the gold rush era. Even the anxiety expressed by the NWMP over the nutritional crisis they perceived to be raging out of control in the gold fields

³² Sessional Papers of the Dominion of Canada #15, 1899-1905.

³³ Sessional Papers of the Dominion of Canada #15, 1899.

appears at first glance to have been extreme. In 1898, the NWMP recommended to the local government that no one be allowed entry to the Yukon Territory without a year's supply of rations, and by the spring officers were enforcing this new law at the borders of the Chilkoot and White Passes (Guest 1985).

It is likely, however, that the impact of scurvy on the health of the early gold rushers in the Klondike is instead greatly under-represented in the quantitative data. The very reason that gold rushers developed scurvy in the first place—their obsession with Klondike gold—is precisely the reason that they would have been reluctant to seek medical attention for their condition. The NWMP noted early on that gold rushers tended to become

indolent and careless, only eating those things which are most easily cooked or prepared. During the busy time...they work hard and for long hours, sparing little time for eating and much less for cooking. This manner of living [was] quite common amongst beginner and soon...[led] to scurvy (Sessional Papers of the Dominion of Canada #15, 1896: 18).

Thus, falling victim to scurvy was a common fate of the inexperienced stampedeers who comprised the overwhelming majority of the Klondike population. Not only did they neglect their diets due to their appetite for gold, but they were also quite often unprepared for frontier life where fresh fruits and vegetables were a rare and prohibitively expensive commodity. Those miners who had been willing to “risk all in the hopes of making a fortune quickly”,³⁴ by skimping on the size and quality of the outfit they packed along with them in order to reach the gold fields faster (before the restrictions were imposed on entering the Territory), were looked upon with scorn by more experienced prospectors who had “learned from experience to value [their] health more than gold...[and to] spare

³⁴ Sessional Papers of the Dominion of Canada #15, 1898: 24

no expense in procuring the best and most varied outfit of food that [could] be obtained”.³⁵ Although vitamin C rich foods familiar to many of the Klondikers were difficult to procure in the Yukon, there were nevertheless wild berries that would have been effective in preventing the disease from taking hold, however the men were simply “too busy mining to pick them”.³⁶

A likely explanation for the discrepancy in the multitude of first-hand accounts of burden of scurvy in the Klondike and the low level of mortality from this cause of death reported in the YTDR, is that it simply did not exert a high mortality rate for this population low mortality, but high morbidity. Further, if recognition of the disease was high within the population and effective treatments known amongst more experienced gold rushers, successful management of this condition at home would have been highly successful, thus explaining the apparently low admission rate observed based on the patient register for St. Mary’s Hospital. Further support for this position is found in the fact that scurvy is treatable with the potential of a full recovery in all but its latest stages through simple dietary interventions (Archibald 1981). Dr. Thompson of the NWMP recommended, for example, the inclusion of pickles, lime juice or tomatoes in meals for those suffering from the effects of scurvy,³⁷ while Berton (1958) recalled that scurvy was commonly combated in the Yukon through the consumption of spruce bark tea.

Outside of the personal responsibility on the part of the miners for neglecting their diets, the primary reason that scurvy existed in the Yukon Territory was because of the nature of the food market in the Klondike. Just as dried or evaporated fruits and

³⁵ Sessional Papers of the Dominion of Canada #15, 1896: 18.

³⁶ Sessional Papers of the Dominion of Canada #15, 1896: 18.

³⁷ Sessional Papers of the Dominion of Canada #15, 1900.

vegetables were often excluded from the outfits of inexperienced gold rushers because they were heavy and prone to spoiling, for these reasons they were likewise the most expensive foodstuffs to import into the region, particularly in their fresh state (Archibald 1981).

The documented presence of scurvy in the Yukon Territory during the gold rush is evidence that the many Klondikers were suffering from diets that were nutritionally deficient in at least one essential vitamin. The scarcity of certain foods at several points throughout the year, in addition to the high cost of grocery items in Dawson City (Archibald 1981), suggests that vitamin C was not the only aspect of the miners' diet that was inadequate.

Berton (1958: 196) chastised the gold-hungry Klondikers for having “wolfed their food, half cooked and cold” due to their reluctance to waste valuable time preparing and consuming food that could otherwise be spent searching for the paystreak. This seems to have been a common practice of miners in the Klondike who had to rely on their own culinary skills since they majority had left their wives, mothers and daughters behind in their quest for gold. Testimony to the tribulations of these men in their kitchens comes from a headline of the Dawson Daily News on July 24, 1900 that announced that Dawson bachelors could finally get along without a cook, thanks to the ingenuity of a local grocer who was selling packaged meals that were “ready for the table and tempting to the appetite”. The plight of the Klondike men when faced with the task of preparing nutritious meals with the “evaporated, concentrated, desiccated, compressed, liquefied, crystallized and granulated” (Archibald 1981: 17) foods packed into outfits was recognized by the Territorial Health officer, Dr. J.W. Good. “If more women came north”

he reasoned, “their talents could be turned to raising vegetables, chickens and cows. The positive influence of family life in Dawson would put an end to scurvy once and for all” (Archibald 1981: 79).

While the pioneer gold rushers of the Klondike have been accused of cutting corners when it came to food selection and preparation, they were nevertheless limited in supplementing their staple diets of beans, bacon, flour and coffee, since “[w]hile there were, of course, more interesting foods on the market in Dawson, the creek worker could afford neither the time nor the money to procure them (Archibald 1981: 78, Berton 1958). Even when residing within Dawson City, Klondikers often had difficulty in procuring staple goods such as potatoes or beef, as foodstuffs were extremely sensitive to the laws of supply and demand, which frequently drove the price of these commodities beyond the reach of average individuals (Archibald 1981).

The poor and unvaried diets of the Klondike gold rushers had a noticeable effect on their health, yet it is likely that more subtle influences were also taking their toll on the bodies of these frontiersmen. While the precise nature of the relationship between nutrition and susceptibility to infectious diseases remains contentious, the fact that malnourished individuals are less resilient to infections, at a disadvantage in combating their illness, and more likely to succumb to the disease than their adequately nourished counterparts, is generally agreed upon, and is of particular importance when considering the impact of infectious diseases on the health of a historic population clearly nutritionally deficient. The infectious diseases of epidemic proportions that found a foothold at one time or another in the Yukon Territory during the gold rush are the topic of the following chapter. The most significant epidemics will thus be explored from the

perspective that onerous living and working conditions and nutritional stressors were already acting upon the health status of this population, predisposing or otherwise influencing both exposure and susceptibility to these diseases.

Chapter V: Epidemics During the Klondike Gold Rush

As infectious as gold fever may have been during the Klondike Gold Rush, there were several diseases of epidemic proportions which presented a far more tangible threat to the health of the gold rushers than ‘Klondicitis’ (as the aberrant lust for gold was dubbed by several contemporary newspapers) (Berton 1958). While the constant arrival of new people to the Klondike gold fields served as a steady vector in the importation of new diseases, it also fulfilled the dual propose of “maintaining a pablum of inhabitants lacking immunological protection against infections” (Luckin & Mooney 1997:51). The lure of instant fortune drew people from all corners of the world, thus facilitating the widespread transmission of diseases that most individuals would not otherwise naturally encounter. An example of this was unlikely presence of malaria in the Yukon Territory, during the gold rush. This peculiarity was a relic of the cosmopolitan nature of the gold rush population, and contemporaries thus interpreted the disease on those terms; the cases had been imported to the sub-arctic clime by stampeders who had become infected in a more hospitable climate prior to setting off for the gold fields.¹ This example points to the importance of contextualizing studies of morbidity and mortality within the circumstances under which they prevailed. While malaria was part of the health experience of the Klondike population, it was nevertheless not a consequence of the local living, working or environmental conditions, and thus an explanation for its presence in the community must be sought outside of the confines of local sources of illness and contagion. Many of the common diseases experienced in other urban centers cropped up from time to time in the Klondike population, however the impact that they had on the

¹ Sessional Papers of the Dominion of Canada #15, 1900: 77.

health status of the community varied due to the unique nature of the Klondike environment, social conditions and constitution of the population.

Measles

Measles erupted in the community residing at Dawson City towards the end of April in 1902. Since the disease has no reservoir outside of the human body (Kim-Farley 1993), the infectious agent had to be brought into the community from the outside. While the DDN (April 30, 1902) identified the source of contagion as the daughter of a local family who was ‘taken down’ with the disease on April 29th, it is likely, given the season in which she contracted the disease, that she was exposed to the pathogen through contact with a recent newcomer since the transportation season typically commenced in the early springtime.

From this initial outbreak, numerous cases began to crop up among Dawson’s children, and as late as May 10th measles continued “to run their annoying round among the people of Dawson” (DDN, May 10, 1902), with school attendance falling by an estimated ten percent as a result of the disease. Not all of those children were suffering from the disease, however many were not attending school because other members of the household had contracted the disease (DDN, May 10, 1902).

Interestingly though, it was not just the children of Dawson succumbing to the symptoms of this illness. Principally a disease of childhood (Kim-Farley 1993), measles seems to have exerted a greater toll on the adult members of the community, despite the fact that the 1901 Census of Canada identified a sizeable population (N=411) of children aged between 0-14 years residing within the limits of Dawson City proper. All five

admissions to St. Mary's Hospital for measles throughout the period of study (1900-1904), were made between May 18-June 18, 1902. While one admission was not associated with an age, the remaining four patients ranged in age from twenty-three to thirty-three years, representing a cohort well above the range usually ascribed to childhood illness.

The average measles patient at St. Mary's spent 7.6 days in hospital, and all five cases were reported as either 'cured' or 'well' upon discharge. The 1902 outbreak of measles seems to have affected people from all walks of life, as the DDN reported on May 23rd that a female singer had recently recovered from an attack of measles, while a male gold office employee was said to be back on the job on May 26th following his bout with the disease (DDN, May 23, 1902; DDN, May 26, 1902).

While isolated populations such as Dawson City are typically incapable of supporting measles at an endemic level, eruptions of the disease tend occur in cycles, affecting those age groups born since the last outbreak (Kim-Farley 1993). Following this model, a second occurrence of the disease surfaced in Dawson in May of 1904. In contrast with the mild presentation of the disease two years prior, the two cases that surfaced within the same family were severe. The mother of the afflicted children worked as a laundress out of the family's place of residence (DDN, May 4, 1904), and although the newspaper reported that the origin of the disease was unknown, the source of contagion was likely soiled garments which are known to serve as a vector of indirect transmission for this highly contagious disease (Kim-Farley 1993). The mother's occupation thus posed a significant treat to the health of the community should the disease have spread among her clientele, and thus drastic actions were taken to ensure the

disease would not escape the confines of the household. All clothes were confiscated with the implication that they were unlikely to be returned to the patrons who had left them to be laundered, and the residence put under strict quarantine (DDN May 4, 1904). These actions proved sufficient, as the potential epidemic was warded off, and no further mention of the disease in the vicinity of the Klondike gold fields was made throughout the period.

Pneumonia

A single epidemic of pneumonia occurred in the Yukon Territory during the period of study (1898-1904), with mortality peaking over the winter of 1900 and spring of 1901 (see Figure 5.1). There were thirty pneumonia deaths from this cause recorded in the YTDR for 1901, while the illness claimed the lives of twenty-four individuals the following year. The burden exerted on the mortality experience of the population is reflected in the fact that 30% of all pneumonia deaths that were recorded in 1900, occurred in the month of December, which represents the peak of the epidemic in the community. In January of 1901 eight deaths occurred as a result of pneumonia, accounting for 33.3% of the annual mortality from this disease that year. In the following months mortality declined sharply, with incidence returning to pre-epidemic levels and lingering at that threshold throughout the remainder of the period of study.

When compared with the number of pneumonia deaths that occurred in all other years during the period of study (the average being 6.6 per year), the impact that this epidemic had on the health of the gold rush population was noticeably great (see Figure 5.2). In fact, when pneumonia deaths are isolated from all other causes of death in the

Figure 5.1: Pneumonia Mortality in the Yukon Territory (1898-1904).

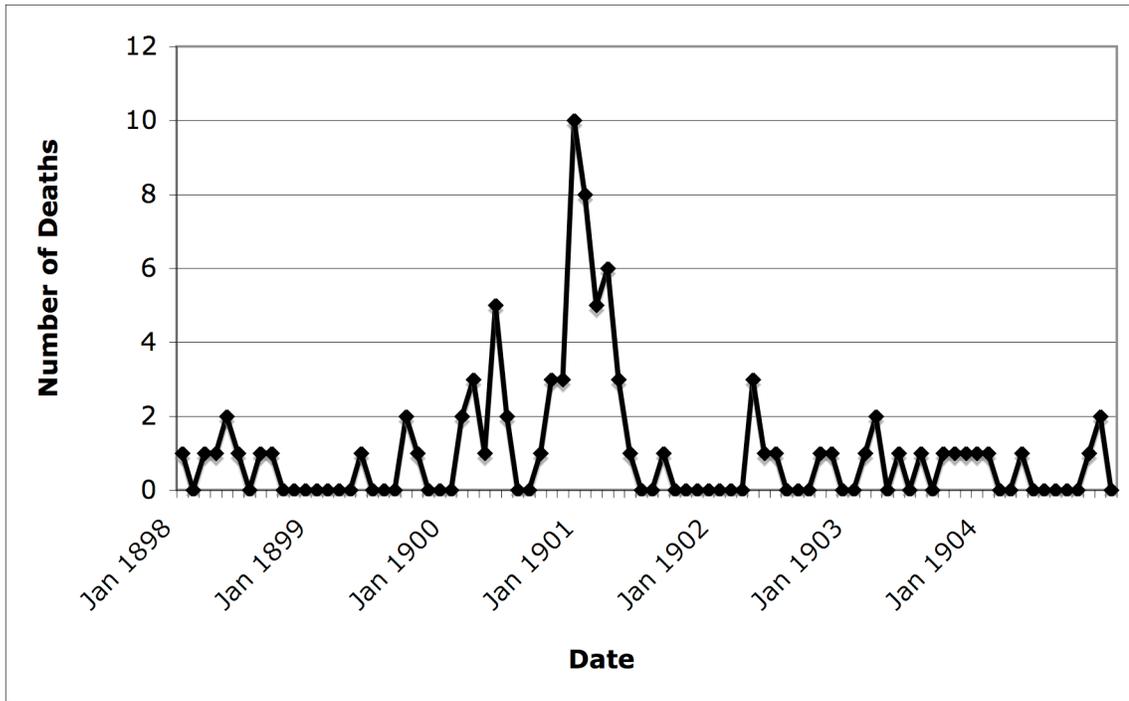
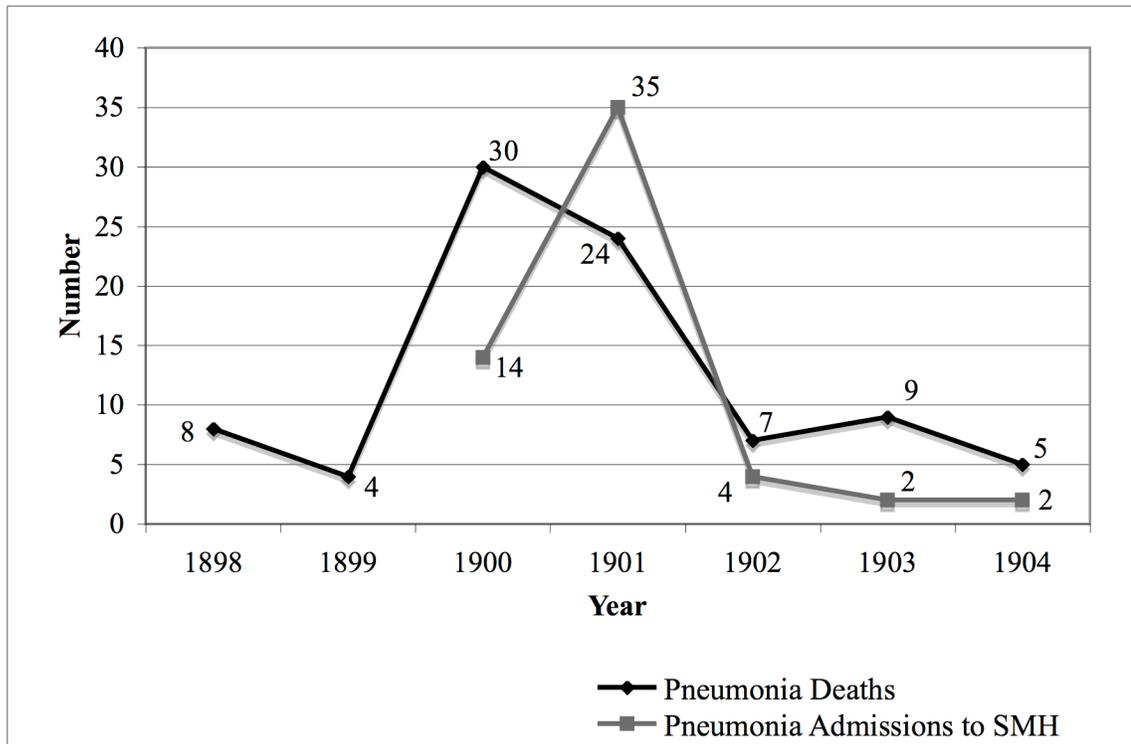


Figure 5.2: Annual Pneumonia Morbidity and Mortality in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory; Patient Register for St. Mary's Hospital. Note that data for St. Mary's Hospital is limited to 1900-1904.

YTDR it was found that individuals who died in both 1900 or 1901 were significantly more likely to have died from pneumonia than any other cause of death ($\chi^2 = 35.708$, $df=6$, $p<.001$).

Admissions to St. Mary's Hospital for patients suffering from pneumonia show a similar peak in both 1900 and 1901, with significantly more patients seeking medical care for pneumonia than any other illness in these years ($\chi^2 = 32.765$, $df=4$, $p<.001$), while pneumonia admissions fell dramatically in the years following the epidemic to an average of only 2.6 patients admitted annually (see Figure 5.2).

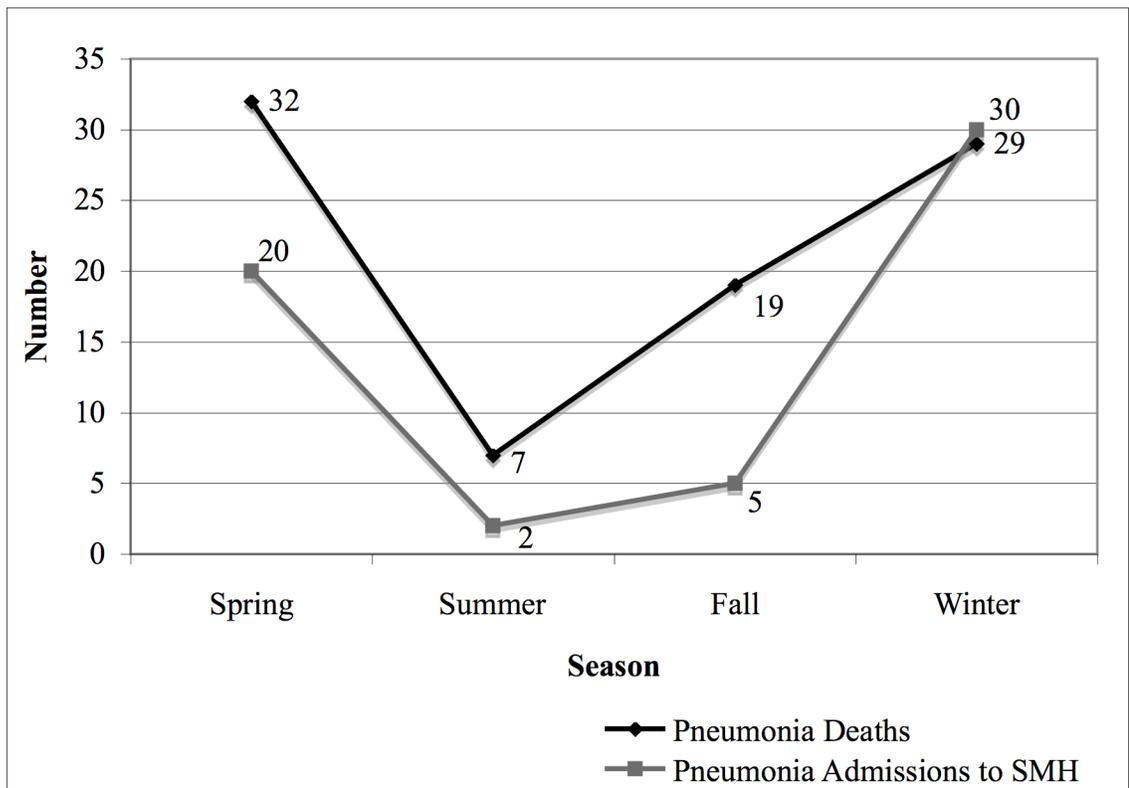
The majority (70.1%) of pneumonia patients ($N = 57$) at St. Mary's were hospitalized for fewer than 3 weeks, and while their outcome was not necessarily bleak, since 69.6% improved or recovered by the time they were discharged from the institution, individuals were significantly more likely to die in hospital if they were suffering from pneumonia than any other illness ($\chi^2 = 60.234$, $df=3$, $p<.001$). While no significant relationship existed between the age of an individual and their likelihood of dying from pneumonia rather than some other cause, patients in their post-reproductive years (forty-five years of age or older) were significantly more likely to have been admitted to St. Mary's Hospital for pneumonia than all other illness combined ($\chi^2 = 20.934$, $df=2$, $p<.001$). Socioeconomic status (as defined by occupation) did not appear to impact the likelihood of males over the age of fifteen succumbing to pneumonia over any other cause of death. Similarly, whether or not patients were an indigent or able to pay for their treatment did not influence their likelihood of being admitted to St. Mary's Hospital for pneumonia rather than any other illness.

Pneumonia morbidity and mortality did, however, display a strong seasonal distribution (see Figure 5.3), with significantly more deaths occurring in both the winter and spring months than during any other time of year, in contrast to the seasonal distribution of all other causes of death ($\chi^2 = 20.981$, $df=3$, $p<.001$). This relationship was mirrored in the admissions to St. Mary's Hospital, in that significantly more patients were hospitalized for pneumonia in both the winter and spring seasons than at any other time of year ($\chi^2 = 36.977$, $df=3$, $p<.001$). In fact 70.1% of pneumonia mortality and 87.7% of pneumonia morbidity occurred during the winter and spring. While no data is available in the patient register for St. Mary's Hospital regarding the sex of patients, the YTDR reveals that males were significantly more likely than females to die from pneumonia than any other cause of death ($\chi^2 = 7.128$, $df=1$, $p=.008$), and were in fact more than eleven times as likely than females to succumb to the effects of pneumonia throughout the period of study, perhaps as a result of their increased likelihood of working outdoors in inclement weather (see Figure 5.4).

Contemporary observers blamed both environmental and working conditions for the 1900-01 pneumonia epidemic, both of which are accepted etiological factors contributing to the presentation of the disease by modern medical standards (Duffin 1993). The NWMP noted, for example, that the weather was extremely cold in December of 1900, while in January and February of 1901 a "dense fog [hung] around the town" which the officer in charge of the Dawson detachment believed "gave rise to [the] sharp epidemic of pneumonia".² The rise in the incidence of pneumonia was also attributed to miners working in smoky and damp underground mines and then emerging dripping with

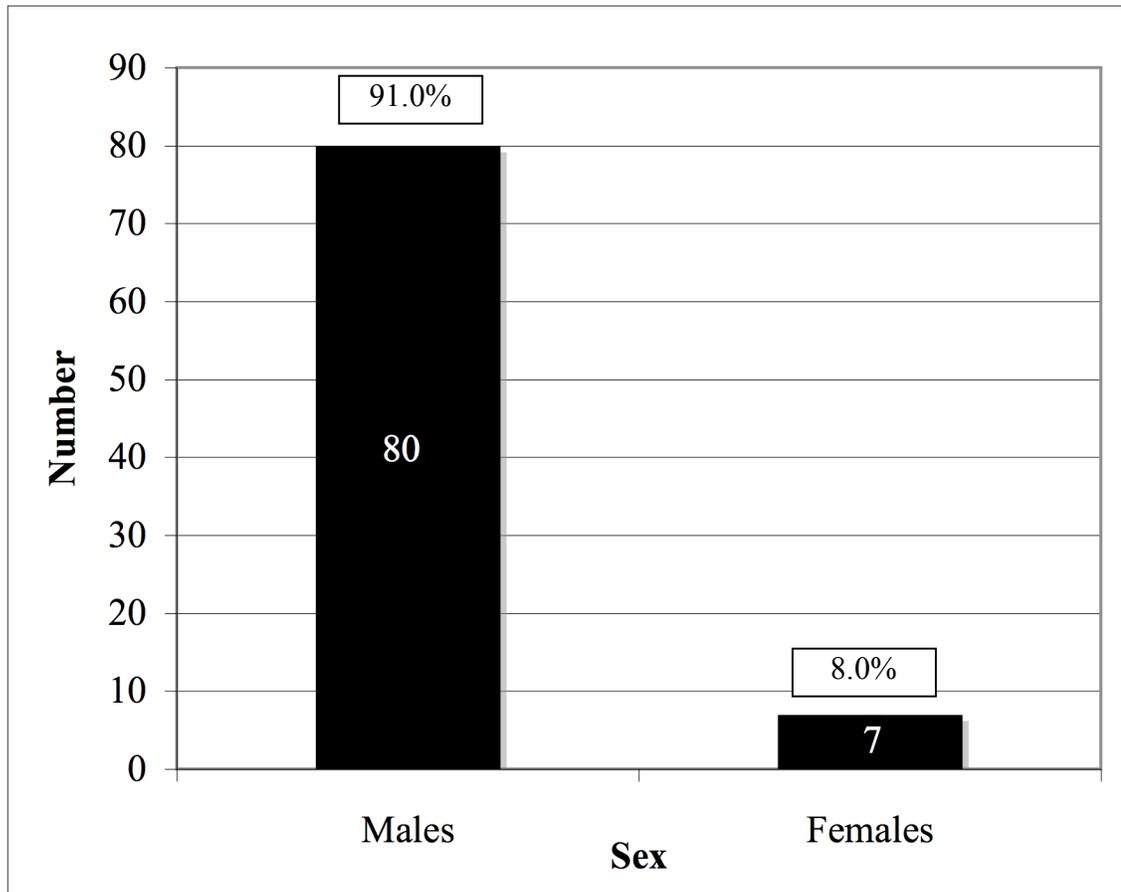
² Sessional Papers of the Dominion of Canada #15, 1902: 78.

Figure 5.3: Seasonality of Pneumonia Morbidity and Mortality in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory; Patient Register for St. Mary's Hospital. Note that data for St. Mary's Hospital is limited to 1900-1904.

Figure 5.4: Sex-Specific Pneumonia Mortality in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory.

perspiration into freezing temperatures (Guest 1985). Another likely contributing factor was the extensive use of steam for thawing purposes, which greatly increased humidity in the mineshafts (Guest 1985). It is perhaps no coincidence that the introduction of steam technology coincided with the emergence of the epidemic. The seasonality of both pneumonia illness and deaths also corresponds to the time of year when work was being done in underground mines, with incidence falling off in the summertime after miners had emerged from underground for the season.

Whatever the underlying factors, Duffin (1993: 838) has commented that although a wide range of pneumonia pathogens exist, the disease is only able to become established when certain “host or environmental conditions are met”. While the disease can occur in otherwise healthy individuals, it is usually associated with a disruption in bodily defense mechanisms (Duffin 1993). A deprived nutritional state can be sufficient to allow the disease to breach the immune system, as can “prior viral infection of the upper airway, such as bronchitis or a cold” (Duffin 1993). Both of these conditions prevailed in the Klondike during the gold rush era. ‘Colds’ were the fourth leading condition for which patients sought treatment at St. Mary’s Hospital.³ Additionally, as was discussed in Chapter Four, food shortages and a lack of food variety in the of miners’ diets led to scurvy in extreme cases, but dietary deficiencies and malnourishment to varying degrees undoubtedly prevailed to a lesser extent throughout the population.

Guest (1985: 13) has noted that “[p]neumonia reached almost epidemic proportions on Bonanza and Eldorado in 1902”, yet the YTDR recorded only seven deaths from this cause in 1902, while the patient register for St. Mary’s Hospital shows

³ When discreet categories are considered, omitting categories of ‘ill-defined’ and ‘other’ causes of morbidity.

only four hospitalizations for this condition that year. This speaks to the likely under-representation of pneumonia morbidity in the Yukon during the Klondike gold rush when observations are limited to the records of St. Mary's Hospital, as these miners apparently either recovered without medical intervention, or secured the assistance of a private doctor who visited the various residences on creek settlements.

The Use of Newspapers as a Quantitative Data Source

Adelman and Verebrugge explored the utilization of archived newspapers as information sources for the prevalence of diseases in a community, and concluded that “[n]ewspaper articles about diseases provide windows on their social histories and barometers of their contemporary social impact” (2000: 363). The goal of the Adelman and Verbrugge (2000) study was thus to examine how the experience of a disease is reflected in the news coverage it receives within a community. In their analysis they found that trends in the number of articles published pertaining to specific illnesses were positively correlated with the incidence and mortality rates of diseases (Adelman & Verebrugge 2000). As a result, newspapers may serve as a reliable indicator of the degree to which a disease has impacted a community based on the amount of coverage it receives. This is because “[i]ssues in medicine, politics, science and advocacy prompt journalists to write articles, and in turn those articles generate knowledge and opinions among readers. Thus, articles stem from public interest and also influence it” (Adelman & Verbrugge 2000: 363).

Content analysis of articles published in the DDN between 1899-1904 reveals that public interest in health matters was evidently high in the Klondike during the gold rush. For this purpose, all available issues of the newspaper were reviewed, and a tally taken of

each mention of a health-related subject.⁴ During the period in question, 740 individual articles were identified pertaining to health issues including both instances of illness, death, and discussions of diseases in general, and of specific diseases such as measles, infectious respiratory disorders, smallpox, and typhoid fever.

While Adelman and Verbrugge's (2000) study focused on chronic and degenerative conditions, the methodology can be extended to the study of infectious disease, and is perhaps ideally suited to the investigation of the impact of epidemics. Epidemics pose a significant and sudden threat to the health of the community, and thus should receive a great deal of public attention when outbreaks occur, with articles regarding incidence, virulence, sources of contagion and the cause of the outbreak competing for media attention. In periods prior to and following an epidemic, few mentions of the disease should thus be expected, with peaks in coverage occurring in local newspapers in correlation with the appearance, rise and decline of the disease in the community. This trend is indeed observed, for example, in the case of smallpox, coverage of which corresponds to periods of outbreak of the disease in the gold rush community. Mention of the disease first appears in the DDN in July of 1900, at the same time that an epidemic of smallpox erupted in Dawson City. Then, in 1902, an article discussing vaccination towards the end of April was followed by another which noted a single case of smallpox in May, and then twelve more articles published in June editions, corresponding to the second epidemic of the disease that year. Aside from these mentions, and a single comment regarding the existence of the disease in Alaska in June

⁴ The first issue of the DDN was published August 5, 1899. Issues reviewed were regular except for a period between September 1900–April 16, 1902 where no issues were available for analysis.

of 1904, the subject of smallpox was not raised in any editions of the DDN throughout this period.

A similar pattern of increased discourse pertaining to the eruption of epidemic disease can be found in the official communications of the local government and NWMP. Due to the management of smallpox cases at the Isolation hospital rather than at either of the local hospitals, and as a consequence of the non-fatal nature of the disease in this instance, which resulted in no deaths being recorded in the YTDR, official correspondence and newspaper articles offer the only substantial data regarding smallpox in the Klondike during the gold rush. Thus, while the validity of data drawn from newspaper sources has been questioned due to both its potential biases and selectivity, were these qualitative sources not consulted, the existence of smallpox during the Klondike Gold Rush would have been imperceptible. It can further be argued that no data is free of errors, and

there is no *a priori* reason to believe that data collected from newspapers would be less valid than other commonly used sources...the type of bias likely to occur in mass media consists more of silence and emphasis rather than outright false information...By using the press as a source of historical data, therefore, we risk collecting insufficient, rather than faulty information (Franzosi 1987:7).

In light of the fact that without the data gathered from the DDN and the correspondence of Territorial officials there would be no evidence of the existence of smallpox in the Yukon at all during this period, any perceived cost of relying upon these qualitative sources would thus seem to be negated.

Smallpox Epidemics During the Klondike Gold Rush

In the nineteenth and twentieth centuries, the more severe strains classified as *Variola major* tended to receive the most attention due to the brutality of symptoms and high mortality rate; the more moderate strains (*V. minor*) which carried a death rate of 1% or less, are largely under represented in the historical record of the disease (English 1993). Since no deaths occurred from smallpox in the Yukon Territory throughout the period (1898-1904), it can be assumed that the pathogens were the less virulent form of the disease, since *V. major* has historically been associated with a death rate in the range of 25-30% (English 1993). This assumption is supported by the observation that all cases in Dawson City were described as being mild in nature during the height of the 1900 epidemic discussed in detail below.⁵ The Klondike population thus offers the unusual opportunity to explore the experience of the *V. minor* form of smallpox.

There are only two possible outcomes for smallpox infection, either individuals recovers and typically enjoys lifetime immunity from the disease, or they die (English 1993). Since the disease has no natural reservoir outside of the human body it is only able to exist in a population as an active, acute infection (English 1993). Once all susceptible individuals in a community had been exposed to the virus, the disease disappears from the population unless a constant flow of new individuals lacking immunity enters the population through either immigration or childbirth (English 1993). While the Klondike Gold Rush was certainly associated with the relocation of a large number of individuals, the flow of people in and out of the Klondike occurred in successive waves rather than as

⁵ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

a steady stream, which can explain why smallpox existed as a series of epidemics rather than as an endemic disease.

When smallpox cases in the Yukon Territory are scrutinized, they are found to conform to the expected pattern of “rolling waves of infection” (English 1993: 1009), with epidemics habitually occurring around the time that river navigation opened for the season in the springtime and corresponding to the peak period of population movement between the Klondike and the outside. Three outbreaks of smallpox occurred in the Yukon Territory between 1898-1904, and, as predicted, an associated peak in public awareness and discourse regarding the disease can be found in the DDN.

The 1900 Smallpox Epidemic

The first appearance of smallpox in the Yukon Territory occurred in Dawson City on June 3rd of 1900. With this initial eruption came the anticipation of additional cases, and the Commissioner of the Yukon Council, William Ogilvie, was thus petitioned to hire a doctor to care for the expected patients,⁶ since they could not be admitted to either of the local hospitals due to the contagious nature of the disease. Transmission of smallpox usually occurs via the inhalation of airborne droplets, which gain access to the body in the upper respiratory tract after traveling only a few meters in distance from infected to susceptible individuals (English 1993). For this reason, quarantine is especially effective in preventing the spread of the disease, provided it is strictly applied (English 1993). For the purpose of isolating smallpox patients, the Yukon Council established a quarantine station with pesthouse where individuals were supported through

⁶ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

their illness by nurses (either layman or professionals when they were available for hire), or doctors if the outbreak proved sufficient to warrant such expenditure. The quarantine station was located on Dog Island, about two and a half miles down river from Dawson City,⁷ and provided not only for the complete isolation of patients, but also the potential to dock quarantined steamer ships at that location should an outbreak be detected aboard. The original pesthouse was little more than a canvas tent (see Figure 5.5) although additional tents and cabins were later added to accommodate large numbers of quarantined people.

In the years preceding this first case, there had never been any mention of smallpox in the DDN, yet once the disease was diagnosed, public awareness of the disease rose dramatically in relation to the number of cases reported in the Territory (see Figure 5.6).

A second case of smallpox was soon discovered in Dawson City, resulting in a public meeting being called on July 6th to discuss how to ‘stamp out’ the disease. The citizens and medical men who attended determined that a quarantine should be imposed at the White Pass boundary, with no person being granted access to the Yukon Territory prior to inspection by a Medical Health Officer appointed to the post.⁸ This precaution could not, however, be imposed since the White Pass was technically located in British Columbia, so a compromise was struck which saw travelers subject to inspection at the first NWMP detachment they passed upon entering the Yukon Territory. The plan

⁷ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

⁸ Ibid.

Figure 5.5: The Smallpox Quarantine Station Near Dawson City.

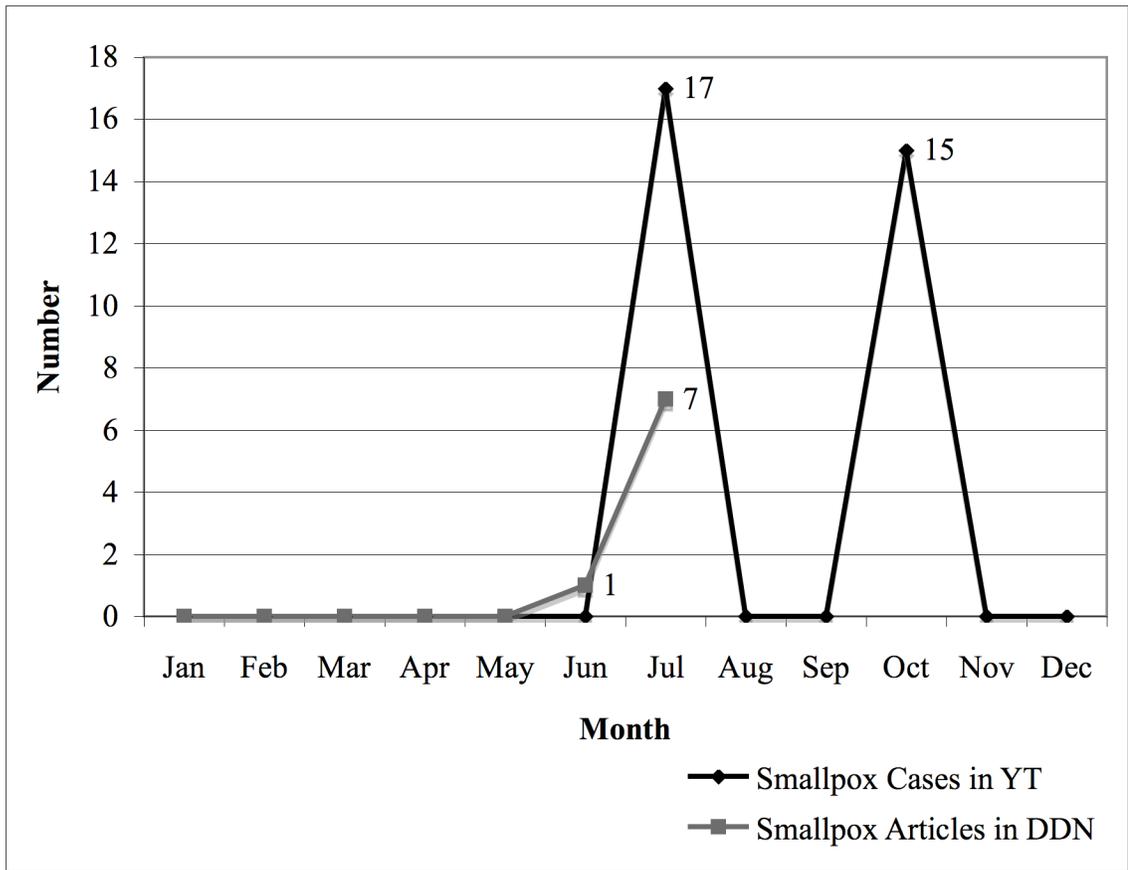


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Source: Library and Archives Canada/PA-022500.

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Figure 5.6: Incidence of Smallpox and Frequency of Newspaper Articles Pertaining to Smallpox in the Yukon Territory (1900).



Source: The Dawson Daily News.

became effective the twelfth of the July.⁹ These protections were effective in guarding against new sources of infection entering the region, yet the local source of contagion proved more difficult to contain; despite patients having been removed to the quarantine station immediately following the detection of the disease, another case appeared in Dawson around the time that the quarantine was put into action.¹⁰ The quarantine precautions originally recommended by the NWMP included regular checks to be conducted at points downriver, and to this end all steamers were required to be inspected and granted clean bills of health before being permitted to land passengers on Dawson's docks. This was normally the responsibility of the Medical Health Officer, however in the peak transportation season other local doctors often assisted and were paid at a rate of twenty-five dollars per vessel.¹¹ While the advantage of screening new arrivals for signs of the dreaded disease was clear, governing bodies were reluctant to claim responsibility for the financial cost of protecting public health in this manner. Dr. Barrett conducted numerous inspections of arriving steamers and had great difficulty in receiving payment for his services; various governing bodies bickered over who should foot the bill for this type of expenditure for months after the issue had been raised.¹² This disagreement eventually resulted in the designation of Dawson City as an inland port, and thus the financial responsibility of guarding against the importation of infectious disease fell to

⁹ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

¹⁰ Ibid.

¹¹ Ibid.

¹² Ibid.

the federal government, and the Klondike doctors were eventually paid for their services rendered.¹³

When a fourth case of smallpox erupted on July 17th and reports reached Dawson that people attempting to flee a virulent smallpox epidemic raging at Nome were headed for Dawson, fear of a full-blown epidemic incited the implementation of a strict quarantine on navigation along the lower river.¹⁴ At this time the NWMP surgeon, Dr. Pare, called for the immediate vaccination of all officers and the procurement of an emergency supply of vaccine points to be distributed throughout the Territory at once.¹⁵

Despite strict regulations prohibiting individuals or steamers from departing Nome while the American community was being ravaged by smallpox, numerous vessels managed to pass, and were subsequently subject to isolation at Dog Island following their detection at the various river checkpoints. In this manner, eight cases of smallpox had been discovered aboard the *Ohio* alone, with another three found on the *Pennsylvania* (DDN, July 28, 1900).

While these stringent measures may have prevented a virulent strain of the disease from becoming established in the Klondike population, six cases of smallpox had nevertheless broken out among the Dawsonites by the end of July. With all of those cases effectively isolated, Dawson remained free of the disease into the second week of September.¹⁶ Yet just as the community emerged from the threat of smallpox, ‘a number’

¹³ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

of sufferers began to trickle into the isolation hospital from the creeks over a two week period in late September.¹⁷

This most recent eruption in the vicinity of the Klondike had been reportedly caused by an outbreak of the disease at Grand Forks. While the assistance of the Medical Health Officer (MHO) had been requested, the doctor found himself powerless to combat the disease beyond Dawson City, as the MHO's jurisdiction was limited to a radius of two and a half miles from the Dawson City courthouse, and as a result he could not impose quarantines or require individuals to be isolated,¹⁸ and the residents were evidentially unwilling to do so voluntarily. In response to the threat posed to the greater population if the disease was allowed to progress unchecked at Grand Forks, Commissioner Ogilvie ordered a general quarantine of that population on September 29th, and granted the MHO the authority to rent cabins in which to isolate patients until a pesthouse could be erected there.¹⁹

Whatever the cause of the eruption of the disease at Grand Forks, it positively existed within that population at the time that the quarantine was imposed, and while the action of the Commissioner was sufficient to prevent the wide scale spread of smallpox throughout the Yukon Interior, the policy was unable 'stamp it out' in its entirety.

A man who had been suffering from the disease at Grand Forks on September 22nd, for example, had managed to make his way to Goldrun Creek where he took up work on claim number sixteen.²⁰ On October 16th a complaint was made to the NWMP

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

that several men on the claim were sick and although a Dr. Willis had supposedly diagnosed the sickness as German Measles, the men displayed the telltale rash of smallpox.²¹ The failure of Dr. Willis to correctly diagnose the disease in light of the attention it was then receiving in both lay and professional circles in the Territory is perplexing. The Ordinance Respecting Public Health passed in 1899 required any doctor who found a patient to be suffering from smallpox to notify the MHO within a twenty-four hour period. Given the economic burden a diagnosis of smallpox could have on a mining operation during the height of the gold rush due to the imposition of quarantine and isolation, it is possible that the doctor had been persuaded to misdiagnose the disease so that business on the site could go about as usual. Two days following the complaint, however, Dr. Richardson was dispatched to the claim and found four active cases of the disease among the men.²² With the cooperation of the claim's managers, the men were isolated in a cabin, their old clothes burnt, and a thorough fumigation was followed by the vaccination of everyone else on the claim.²³

An additional twelve men at Cheechako Hill were exposed to smallpox between the time that complaint was lodged against the sick men at Goldrun and their isolation imposed, although the source of contagion was not commented upon. In this case the MHO imposed a sixteen-day quarantine on the men, although they were presumably permitted to continue about their work on the claim.²⁴

²¹ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 8, Part 1.

²² Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

²³ Ibid.

²⁴ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 8, Part 1.

Around the 25th of October, several more men were found to be suffering from smallpox on a Hunker Creek claim. In this case Dr. Clendennan visited the claim, vaccinating all who had contact with the men at a rate of five dollars per person. Dr. Bonnar was then called upon by the Medical Health Officer—who was yet to be granted jurisdiction beyond the city limits—upon whose recommendation, the Doctor intervened to retain one hundred dollars of the pay of each man as insurance that they would not break the fourteen day quarantine imposed upon them.²⁵

Immediately following the quarantine of Grand Forks, Dr. Edwards requested that an exception be made for people who had been vaccinated, noting that the quarantine was inflicting an undue hardship upon the community.²⁶ The Doctor argued that since the disease had already been detected in areas outside of Grand Forks, that there was no point in singling out his community for quarantine. In support of this position, he cited the case of a man who had arrived from the outside on September 8th, and resided in Dawson for an undisclosed period of time until the rash broke out on his face and he vacated the city. From there he was said to have roamed the creek settlements until he reached Bonanza Creek on September 29th, the same day that the quarantine was imposed on the area. It was not until the evening of October 1st that he was discovered to have the disease, at which time he was residing on claim number ten-below-discovery on Bonanza.²⁷ Dr. Edward's opinion that the source of the contagion was once again located within Dawson City was seconded by the NWMP who pointed to the final case of the disease to erupt in

²⁵ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

²⁶ Ibid.

²⁷ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

1900; a man living on Cheechako Hill who had recently left Dawson and was, at the end of October, being nursed in his residence on the Hillside by his wife. Thus, the police agreed that the source of infection must have been deliberately concealed in Dawson,²⁸ yet this accusation received no further attention.

In response to the very real threat of the spread of smallpox from where it had been cropping up the gold fields and creek settlements in September and October, the Yukon Council drafted the Ordinance Respecting Vaccination (#39 of 1900). Upon its passing on October 26th the bylaw made vaccination compulsory in the Territory for all persons not successful vaccinated within the past seven years. Violations of this new legislation carried a \$250 fine plus the costs of prosecution or a three-month prison term in lieu of payment. For failing to report oneself to a doctor or member of the NWMP when suffering from a ‘skin eruption’, or violating the orders of quarantine, an individual could be fined as much as \$500. Given the resistance voiced when similar compulsory vaccination laws were instituted elsewhere in Canada around the turn of the last century (see, for example, Arnup 1992, Bator 1983, Craig 1983) it is surprising that the residents of the did not raise the usual objections to compulsory vaccination, with no mention of resistance to the law evident in either the DDN or the communiqués of the local officials. In fact, the only indication of the public’s reception of the new law was a comment made in the annual report of the NWMP that noted, to the contrary, that the “people made very little complaint against it”.²⁹

²⁸ Ibid.

²⁹ Sessional Papers of the Dominion of Canada #15, 1902:64.

Dr. MacArthur, the MHO at this time, was a strong believer in the utility of vaccination, the benefits of which he praised as a voluntary measure which Klondikers could take to protect their health:

Owing to the greater protection from infection with smallpox which re-vaccination affords, as shown by statistics compiled in Germany, I would strongly impress upon the inhabitant of the Yukon territory, particularly those occupying public positions, the advisability, under existing conditions, of having such re-vaccination performed by their medical attendants without delay (DDN July 28, 1900).

It was decided by those in charge of the situation, that as soon as the vaccine points (which had to be ordered from drug supply companies on the Outside) arrived, that seven vaccination stations would be established on major thoroughfares throughout the Yukon Territory, while house to house visitations would be conducted on the creeks to ensure that no unvaccinated individual was overlooked. It was further decided that effective January 1st of 1901, the ordinance would be enforced with immunizations provided free of charge to all who presented themselves to a public vaccinator.³⁰ Doctors were strictly prohibited from charging their patients for these compulsory vaccinations, and were required, instead, to present the Board of Health with a bill for services rendered. The doctors retained to staff the vaccination stations were paid a flat rate of twenty-five dollars per day, rather than per vaccination, both because it would be less costly for the

³⁰ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7., Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 8, Part 1.

territorial government, and because it was expected to prevent problems arising from a desire to increase the volume of immunizations and thus salaries of the vaccinators.³¹

Figure 5.6 depicts the relationship between the emergence, peak and decline of smallpox in the Yukon Territory in 1900 and the amount of coverage the disease received in the DDN, which can be taken as an indicator of public attention and awareness of this particular threat to health. At the same time that a sharp increase in the number of cases occurred in the Territory in July, a similar burst in public attention is evident in the number of articles published that month in the DDN. As previously noted, prior to the first appearance of smallpox in the Yukon, no mention of smallpox had ever been made in the local newspaper, and as expected, once the threat of infection seemed to pass, the public's awareness of the disease reverted to a negligible level. Unfortunately, no copies of the DDN were available for analysis when the second wave of infection hit the Yukon population in October of 1900, and thus there is no complementary peak in articles pertaining to smallpox evident in the graph, however it is likely that a rise in public awareness would have been found had these newspapers been available.

The 1901 Smallpox Epidemic

Early in May of 1901 an epidemic of smallpox broke out at Sitka, Alaska with at least one hundred and ten individuals reportedly suffering from the disease at that port.³²

While Yukon officials had already taken a preventative stance against the importation of

³¹ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7., Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 8, Part 1.

³² Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

the disease by enforcing the vaccination ordinance effective January 1st of that year, the threat was nevertheless perceived as a significant one. All vessels were ordered to submit to health inspections before landing, and were expressly forbidden to allow passengers to disembark at intermediate points without showing both a certificate of good health and proof of successful vaccination.³³ Further, a plan was formulated in which Skagway would serve a buffer between the American epidemic and the Canadian population, whereby, upon arrival in the transportation hub, travelers would be required to submit to an examination at which time they would be provided with a certificate of good health, a prerequisite that must then be presented in order to book further passage.³⁴ In the interest of international relations, the officials at Skagway were said to have “fully realize [d] their responsibility in” the matter of preventing the spread of smallpox from American centers to Canadian soil.³⁵ It was also hoped that these stringent measures would negate the need to institute expensive quarantines, and would place the responsibility for preventing the transmission of smallpox via infected passengers on the shoulders of the transportation companies, where it was popularly believed to belong.³⁶

Despite high hopes that the precautionary measures adopted since the fall of 1900 would prevent smallpox from reaching the Yukon interior, a pronounced case of the disease was shortly discovered aboard the steamer *Whitehorse* upon its arrival in Dawson.³⁷ The case was immediately isolated, and reports of the existence of the disease silenced by the local government who held a meeting with resident newspaper

³³ Ibid.

³⁴ Ibid.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

correspondents requesting that they omit the news from their report to outside newspapers.³⁸ The impact which smallpox could exert on the local economy was significant, even if the disease was only rumored to exist in the vicinity (see for Craig 1984, 1983, Spaulding 1984). Since springtime was the peak season of commerce in the Klondike, news that the region had once again come under the threat of a smallpox epidemic would have had serious repercussions for local business and trade. Since the infected individual had just come from outside the community, and the source of contagion was thus not in Dawson, the Yukon Council felt it to be all the more important that the community not suffer the consequences in being viewed from the outside as the epicenter of the threat.

On June 13th, 1901 three cases of smallpox were reported at Skagway, and the contingency plan respecting the inspection of all travelers was put into action. While the local government would seem to have been highly effective in preventing news of the existence of smallpox in the Klondike from reaching the outside; professing that only a single case in a newcomer had been found, the annual report of the NWMP paints a different picture.

The Skagway quarantine was officially lifted on July 15th after the three cases detected there had recovered, but by that time the disease had reached Nome. By the time that news of the disease having entered another American transportation hub reached the NWMP stationed in Dawson City, it was too late to stop the disease from spreading.³⁹ Before the officials had even learned of the new threat, a case was discovered in Dawson City on July 3rd, after passengers had been allowed to land and mix with the Klondike

³⁸ Ibid.

³⁹ Sessional Papers of the Dominion of Canada #15, 1902

population. Between the detection of the first case and November 30th, seven more individuals were found to be suffering from smallpox within Dawson City, in addition to at least thirty-three cases scattered along the creeks at distances as far as fifty miles from Dawson.⁴⁰ The disease was still active in the Yukon at the end of November, with the final case of the year being reported on Gold Run Creek.⁴¹

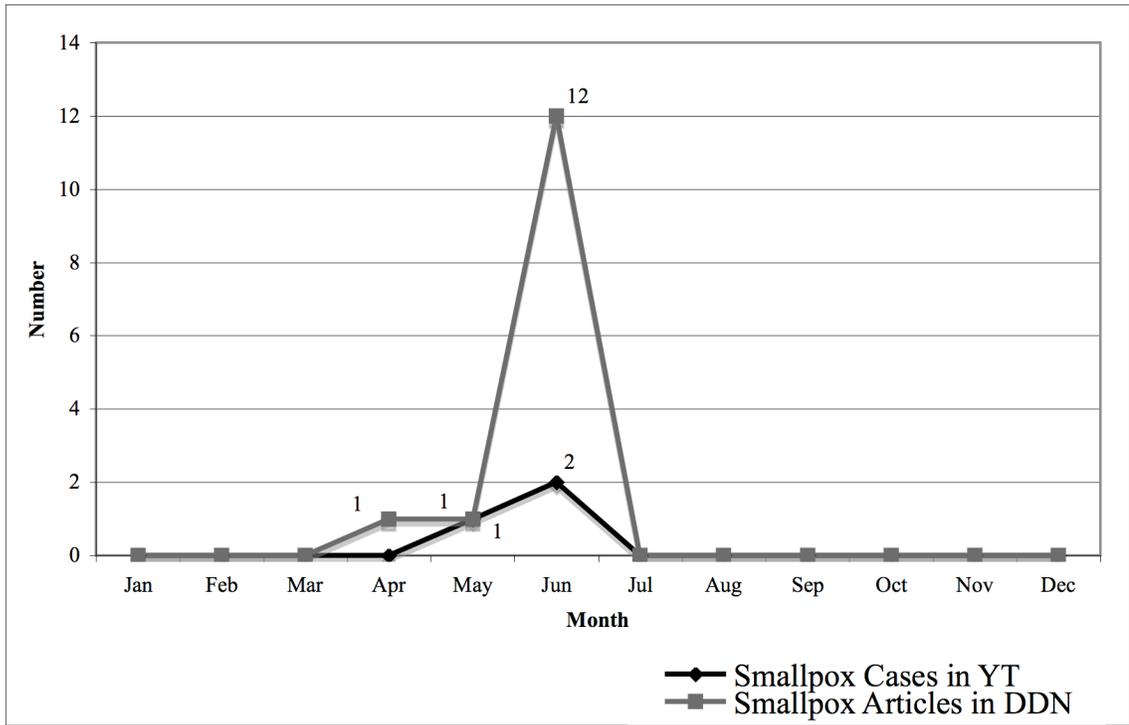
The 1902 Smallpox Threat

On May 22nd, 1902 it was revealed in the DDN that one case of smallpox had been discovered, and that the individual had been quarantined at the pesthouse on Dog Island for a period of fifteen days. The existence of the disease in the vicinity of Dawson City was only brought to the public's attention when the person hired to nurse the patient presented a bill for services rendered at a meeting of the Yukon Council, the intricacies of which were regularly reported in the newspaper. This evidence that the Yukon Council actively worked to conceal the presence of smallpox in the Yukon Territory suggests that the existence, and thus threat, of the disease to public health was likely under-represented in the available data sources. As is evident in Figure 5.7, there was very little media attention given to the disease in the DDN prior to the revelation of this first case of the year. The subsequent increase in public interest in smallpox was the result of the controversial quarantine of the steamer *Whitehorse*. Although only one case was found aboard, there were nevertheless twelve articles devoted to this topic in June of 1902. Following the raising of quarantine, public interest returned to minimal levels with no further mention of the disease being made throughout the period of study (ending in

⁴⁰ Sessional Papers of the Dominion of Canada #15, 1901

⁴¹ Ibid.

Figure 5.7: Incidence of Smallpox and Frequency of Newspaper Articles Pertaining to Smallpox in the Yukon Territory (1902).



Source: The Dawson Daily News.

Note that data for St. Mary's Hospital is limited to 1900-1904.

December of 1904) aside from a brief, single sentence mentioning the existence of a few cases in Alaska (DDN, June 20, 1904).

The *Whitehorse* was again enmeshed in a controversy surrounding the importation of smallpox to the Klondike when a man showing signs of the rash having been allowed to board the vessel in Skagway in the spring of 1902. When the steamer docked in Dawson City on June 2nd, the French-Canadian man who had contracted the disease in Seattle was immediately recognized as suffering from smallpox and removed to the pesthouse, while the ship, along with its crew and remaining one hundred and fifty passengers were ordered into quarantine for a period of two weeks at Dog Island by the MHO.⁴² The controversy surrounding the quarantine erupted almost immediately, as a petition was submitted to the Governor of the Yukon Territory only a day after the isolation order had been imposed.⁴³ The passengers were requesting a fresh supply of water for drinking and cooking purposes as they had already resorted to using the filthy river water which carried Dawson's refuse and sewerage. They further requested that the area on shore allotted for their exercise and recreation be increased, as under the current circumstances they found themselves "more closely confined as to space than convicts in a jail"⁴⁴, a less than ideal condition given the contagious nature of smallpox.

The complaint of the unjust treatment of the detainees was soon given a voice by the DDN, which launched serious allegations against the conduct of the MHO in the matter. The editorial claimed that not only had the MHO denied the request for pure

⁴² The Dawson Daily News, June 3, 1902., Sessional Papers of the Dominion of Canada #15, 1903.

⁴³ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

⁴⁴ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7.

drinking water, having told the passengers that the Yukon River water was good enough for them to drink despite the location of Dawson's garbage dump upriver from the island, but that he had also tried to immunize the detainees with expired lots of vaccine (DDN June 9, 1902).

When the man who had shared his stateroom with the sick man developed a high fever on the night of June 12th and was taken to the pesthouse, the remaining quarantined individuals were segregated into groups of ten, removed from the steamer and placed in tents and cabins scattered on the Island. At this point the steamer was released for fumigation and returned to duty (June 13, 1902). The discreet groups were isolated in this way with the intention that some groups could be released within a few days time, even if the disease erupted in other groups.⁴⁵ On June 18th, the quarantine was lifted with the passengers finally arriving on Dawson's pier at noon.

It was the most solemn and impressive landing in the history of the port until one member pushed his way forward, and then everyone burst into laughter and applause, and the crowds that surged on the wharf and the people who lined the docks joined in the merriment (DDN, June 18, 1902).

The DDN then declared "the annual smallpox scare which visit[ed] Dawson regularly may now be said to have happily ended" (The DDN, June 19, 1902).

Following the debacle with the *Whitehorse*, the Yukon Territory was on high guard against smallpox for the remainder of the transport season, with officials at all Canadian (as well as some American) ports requiring clean bills of health either before passengers or steamers were permitted to disembark (DDN June 13, 1902). Yet despite these precautions, the steamer *Victorian* managed to land in Dawson without submitting

⁴⁵ Ibid.

to an inspection, and, consequently, a man infected with smallpox was thus permitted to mix with the general population before the MHO became aware of the situation and removed him to the pesthouse (DDN June 30, 1902).

While the DDN absolved the officials outside of Dawson City of any responsibility for this breach, noting that the signature rash did not reveal itself until after the man had arrived in Dawson City (and thus Police surgeon Dr. Madore who had presented the vessel with a clean bill of health when it passed Selkirk could not have know of the danger aboard), the newspaper cited the importance of ensuring that checks were made once vessels arrived in Dawson. The paper raised the argument that not only did every case which slipped by the MHO pose a significant threat to the public's health, but that the community must then bear the expense of isolating and caring for "sick people who never should have been permitted to start, and [certainly] never should have been allowed to land" (DDN June 30, 1902).

The cost associated with smallpox in the Yukon Territory was indeed great—a receipt details the charge to the Yukon Government to have been over eight thousand dollars just to keep the *Whitehorse* in quarantine for seventeen days, while doctors received twenty-five dollars per day and nurses ten dollars per day for their services at the quarantine facility.⁴⁶ Cost was thus a primary factor in consideration of the radically different stance taken by the MHO in the matter of the *Victorian* relative to his approach to the of the *Whitehorse* less than a month earlier. Dr. MacArthur's announcement that the rest of the *Victorian's* passengers would not be tracked down was printed in the DDN,

⁴⁶ Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 7., Library and Archives of Canada, Yukon Territory Records sous-fonds, Subject files, R216-179-X-E, R.G. 91, Vol. 67, File 8, Part 1., The Dawson Daily News, May 22, 1900.

along with his sentiment that “The people in the camp were pretty generally vaccinated a year ago...[so i]f anyone [got] it in this way it is his own fault for failing to be vaccinated” (June 30, 1902).

While not wielding a significant impact on the mortality rate of the Klondike community, smallpox nevertheless left its mark on the sickness experience of the gold rushers, and perhaps inspired more fear than was reasonable in response to the amount of damage the disease actually inflicted upon the Yukon residents. Yet fear is a powerful motivator, and smallpox was thus capable of exerting its influence to both inspire and transform local political thought and policy. The impact of smallpox in the Yukon Territory had much less to do with pock-marked bodies and cemetery markers, as was often the legacy left in the wake of the disease. Instead, the presence of the disease in the gold rush community was witnessed by the designation of Dawson City as an inland port by the Federal Government, the expansion of the jurisdiction of the MHO beyond the two and a half mile radius of the local courthouse, and the creation and implementation of legislation regarding compulsory immunization. It is quite remarkable that the perception of treat posed by a microscopic enemy proved great enough to inspire political policy, shift legal boundaries and locate civic duty within the bodies of vaccinated gold rushers.

Chapter VI: Typhoid Fever In Dawson City – A Case Study

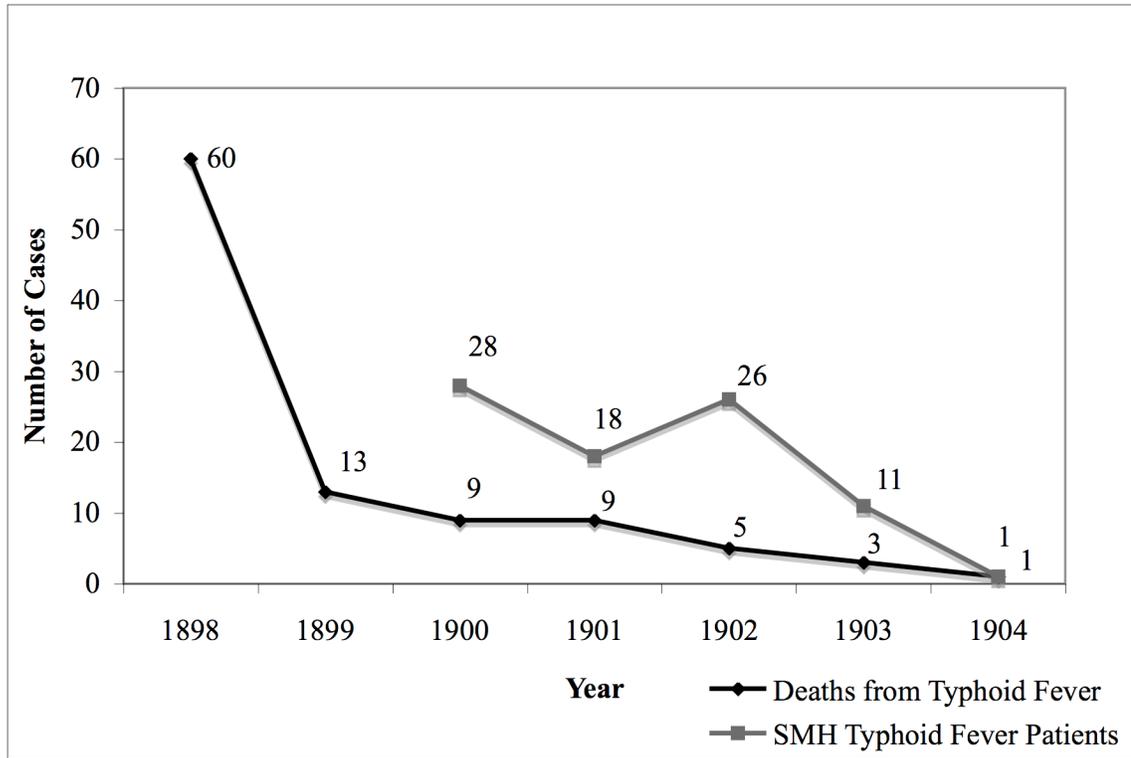
Typhoid fever is an infectious disease, caused by the bacteria *Salmonellae typhi* and spread via the fecal-oral route, most often through the ingestion of contaminated water. The fact that these bacteria are only able to colonize the human gastrointestinal tract not only makes *S. typhi* exceptional in that no animal vectors are ever involved in its transmission, but also implies that it is entirely controllable through the implementation of effective public health defenses (LeBaron & Taylor 1993). In populations that experience sporadic epidemics of typhoid fever, outbreaks generally correspond to localized breaches in the sanitary infrastructure, which normally provides an effective barrier to the disease. In contrast, typhoid tends to be endemic in communities with habitually poor sanitation, and outbreaks of the disease occur in predictable intervals producing annual patterns of both morbidity and mortality (LeBaron & Taylor 1993). Cases of typhoid in such endemic regions generally show a seasonal distribution, with infections peaking in the summer months, either as a result of increased consumption of contaminated water, or due to an increase of bacterial proliferation during the warmer months (LeBaron & Taylor 1993). Once infection occurs, the disease takes several weeks to run its course in an untreated patient. At the time of the gold rush, medical intervention would have been limited to palliative care since antibiotics, were not available for nearly half a century after the gold rush had subsided—with mortality ranging between ten and twenty percent (LeBaron & Taylor 1993). Therefore, a subsequent peak in mortality is to be expected from typhoid fever in the fall season as a consequence of the rise seen in summertime morbidity. Typhoid is thus a disease intimately linked to the environmental conditions of the community in which it is present. Since *S. typhi* bacteria are shed by an

infected individual and then transmitted to others through the ingestion of contaminated water sources, adequate sanitary measures are critical. This was particularly true for Dawson City, which experienced a dramatic population growth in a very short time, while public health measures struggled and lagged behind. In the early days of the gold rush, thousands of people resided in Dawson, crowded together in what was then a waterfront tent-town without proper drainage or waste disposal services. These pioneer gold rushers lived ankle-deep in mud, surrounded by their own refuse and without a source of pure water for domestic purposes. These conditions proved to be the optimal environment in which typhoid fever could flourish.

Between 1898-1904 exactly one hundred deaths from typhoid fever were recorded in the Yukon Territory, with significantly more individuals having died from typhoid fever than any other recorded cause of death in both 1898 and 1899 ($\chi^2 = 213.804$, $df=6$, $p<.001$). These years correspond to the period prior to the introduction of a reliable supply of pure water and the development of effective sanitary infrastructure in the community. As the years progressed, the incidence of typhoid fever fell dramatically, with only one death from typhoid in 1904 (Figure 6.1).

Admissions to St. Mary's Hospital show a similar tendency for reduced typhoid morbidity as time went on. As late as 1900, significantly more diagnoses for this sickness were being made than for all other illness combined ($\chi^2 = 28.116$, $df=4$, $p<.001$), yet by 1904 only one diagnosis of typhoid fever was made at the hospital (Figure 6.1). Had earlier hospital records been preserved dating to prior to 1900, the toll exerted by typhoid fever on the health of the gold rushers would undoubtedly be much more obvious, as there are numerous references to the hospitals being full beyond capacity with typhoid

Figure 6.1: Typhoid Fever Morbidity and Mortality in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory; Patient Register for St. Mary's Hospital.
Note:

patients during the epidemics of 1898 and 1899.⁸⁴ Typhoid morbidity was obviously a significant factor influencing the health status of Dawsonites, as is evident from the account given by Georgia Powell, one of the most experienced members of the Victorian Order of nurses stationed in Dawson, “I thought I had seen something of typhoid fever, perhaps in its worst form – bad enough truly – but nothing like this...Such sick men!”⁸⁵ Yet it must be assumed that it is also underrepresented by the available data, as both St. Mary’s Hospital and the Good Samaritan Hospital purportedly treated as many typhoid fever patients as could be accommodated and occasionally even had to turn some away, yet only records from the former institution are preserved to attest to this, and as previously noted, these are limited to entries which only date back as far as 1900. There are also several references made by contemporary sources to individuals who toughed-out their illnesses alone in their cabins (DDN August 31, 1899), or who were able to afford a house call by a local doctor, a private nurse or even accommodation in Dr. Bourke’s private hospital (DDN August 21, 1899, September 11, 1899). Such cases are not captured in analyses of morbidity based on hospital records, and so while the burden which typhoid fever imposed on the population appears to have been immense, the actual toll was inevitably even greater.

Since in the era prior to the introduction of antibiotics typhoid fever could only be combated by improvements to the sanitary environment and the behavior of individuals (such as routinely boiling water for domestic purposes), the observed decrease in both mortality and morbidity from typhoid fever has important implications for better

⁸⁴ Library and Archives of Canada. Victorian Order of Nurses for Canada fonds (R2915-6-8-E) Volume 6, File 5.

⁸⁵ Ibid.

understanding how the development of sanitary measures impacted the health of the gold rushers who resided in Dawson City, and when such interventions reached a level which was sufficient for controlling infectious diseases, such as typhoid fever.

Environmental Factors Contributing to Endemic Typhoid

In addition to Dawson City's rapid growth and densely settled population, the initial absence, and then slow implementation of sanitary infrastructure was the foremost contributing factor which led to endemic typhoid during the community's early years.

That environmental conditions had a direct effect on the health of the local population was not lost on contemporary commentators, as is evidenced in the report of the Medical Health Officer for the Dawson district:

We found, practically, one vast swamp...still in almost a primitive condition, or even worse, cess pools [sic], and filth of all kinds occupying irregular positions, typhoid fever...rife in the land...[after] getting all the garbage and refuse out on the ice in the early spring so that it might float down the river at the break up. We then specified places at which garbage, &c should be dumped, we had the streets cleaned by prison and other labour, had offensive materials removed and rubbish burnt, while the Commissioner with great vigour inaugurated a system of drainage...In order to get a proper grip of our duties, we asked ourselves as all sanitarians should do, what are the causes of disease? The answer, so far as our duties were cornered, was...impure water. The water question was settled in the following way: The sources from which it could be were specified, and where practicable the boiling of water was insisted upon, we had placards posted up in all public places, calling the attention of the people to the fact, that for all practicable purposes typhoid could only be prevented by the exclusive use of boiled water (Sessional Papers of the Dominion of Canada #15 1900: 76-77).

Thus, there were three primary factors contributing to the existence of endemic typhoid in the community. First, was the problem of improper refuse and night soil disposal.

Dawson's burgeoning population was initially without any facilities for managing its own

waste, and so early residents lived surrounded by ‘filth’ of every imaginable kind. The second problem concerned poor drainage, which was exacerbated by annual flooding; Dawson had been built on a mudflat which flooded annually, making it at best a swamp in the spring and early summer, and at worst, little better than a sprawling cesspool throughout the City’s early days. These factors ultimately culminated in the third issue surrounding the existence of typhoid in the community; Dawson’s contaminated water sources. Sanitation was therefore an increasingly important concern for Dawsonites, particularly as successive waves of gold rushers arrived and settled in the area.

The Problem of Refuse Disposal

The disposal of Dawson’s garbage into the Yukon river does not seem to have posed the same threat to public health as was felt in many other North American cities which compromised local water sources through similar practices around the turn of the last century. As will be discussed below, mortality and presumably morbidity (although no data was available for analysis) from typhoid fever rarely occurred among children and the elderly, suggesting that a significant force was influencing the natural tendencies of this disease in the population, as these groups should at least be equally if not at greater risk of contracting and dying from exposure to infectious diseases such as typhoid fever (MacDougall 1981). Other Canadian and American cities dumped raw sewage, night soil and refuse into nearby fresh water reservoirs, hoping that the size of the water body would facilitate sufficient dilution to render the water drawn from it safe for domestic consumption (Brace 1995). While all too often this was not the case, the situation in Dawson seems to provide an example of relative success, at least for most months out

of the year when the river was open and swift enough to rapidly sweep such contaminants downriver and away from the bulk of the local population. Problems tended to occur in the early spring as the ice began to thaw, allowing residue of the waste piled atop the frozen surface to seep through into the water below, or when garbage and night soil was improperly disposed of—a problem which plagued Dawson throughout its early years.

In Dawson's early years, there were no facilities or means of disposing of waste, and so many gold rushers merely tossed their garbage out the door of their tent or cabin. A mound of discarded tin cans was a common sight in the Klondike (Figure 6.2) and while such accumulations were probably not a significant menace to the health of local residents, their presence serves as a likely indicator of the location of far more hazardous materials. Thus local officials were right to be concerned in the winter of 1898 that a dangerous situation was developing which would ultimately culminate in “a serious outbreak of disease. The town [being] situated on a frozen swamp, [and the] thousands of people camped over the ground last summer, [having left] deposits of every imaginable kind of filth”.⁸⁶

After the designation of a permissible disposal site at the foot of eighth street in the northern end of town, the primary issue concerning the threat posed by garbage to the public's health became the neglectful dumping of refuse matter either along the bank of the river, or too close to shore rather than in the current which normally carried it downstream. As early as the summer of 1899, complaints were being made that

most of the city's garbage is merely dumped into the edge of the river where it is strewn along the shore or drops down to the big eddy at the lower end of town where it swirls around and around...purveyors of garbage dispose of their accumulations...back their carts into the river as

⁸⁶ Sessional Papers of the Dominion of Canada #15, 1899: 17.

Figure 6.2: An Early Klondike Home (circa 1901).



Note the pile of discarded tin cans.

Source: Yukon Archives /Adams & Larkin fonds 9066.

Written permission to include this image was obtained on August 30, 2007 from the Yukon Archives.

far as is convenient for them to do so and then dump the filth, not in the current, but in the comparatively still water...This is despite an ordinance requiring dumping at a distance that ensures it is carried 'a good distance beyond the city limits'...Laws are made to be observed...and the public health should not suffer because of the negligence and carelessness of individuals (DDN Aug 31, 1899).

As previously noted, the use of the Yukon river for waste disposal was effective for part of the year, however in the early spring when the garbage and night soil which had been piled on the surface since it froze in the fall (Figure 6.3), began to rot and seep into the river and thawing ground as the ice slowly melted before going out, the health of Dawsonites was greatly threatened by the infectious disease agents which made their way into local water sources in this manner.

This reality was of utmost concern to the citizens of Dawson who feared that the "melting of the filthy snow on the Yukon around the many water holes" (DDN March 17, 1900), would contaminate the water drawn from beneath the ice for domestic purposes. Prior to the introduction of a municipal water system, men, women and children all relied on this water source until the ground thawed sufficiently in the spring or early summer, making other sources of ground water once again viable. The Medical Health Officer issued an order in the winter of 1899-1900 outlining where garbage could be dumped upon the ice, however his warnings that violations could not be taken too seriously "for the poison taken into the system from such polluted water mean[t] lingering diseases and to any death (DDN March 17, 1900), went unheeded by those who continued to pile refuse along the bank and on the near side of the line which marked the boundary for deposition.

Violations of the orders concerning garbage given by the Medical Health Officer continued to occur on an annual basis, with an increase in both public attention to and

Figure 6.3: Dawson City's Garbage Disposal Site (1903).



PA-016547

Source: Library and Archives Canada/PA-016547.

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police enforcement of these laws being particularly notable during the spring and summer months when the city launched its annual clean-up campaign. During this time the residents of Dawson were urged to remove the piles of rubbish that had accumulated on their property under the snow throughout the winter, and drain the sporadic stagnant water pools that collected wherever kitchen slops and dirty water had been tossed out (DDN July 13, 1900). When individuals were charged with maintaining filthy premises, excuses ranged from not being aware of the ordinances, to not being able to secure the services of a scavenger or it simply being too difficult or inconvenient to transport refuse to the dumping site (DDN April 17, 1900, June 6, 1900).

In the summer of 1900 Dawsonites began to protest the poorly chosen garbage dumping site because not only had the formerly breathtaking view been ruined for local residents who now saw “passing mounds of filth, and a continual flood of tins cans and bottles and every kind of disgusting garbage” when they stepped outside, but garbage was also being insufficiently swept away by the current which was substantially slower in this locale, but was instead accumulating on the shoreline, practically “under the eaves of a great many cabins”.⁸⁷ It had been hoped that when the river rose, that the residue would be washed away, but this was not the case (DDN June 6, 1900). While the people called for the removal of the garbage scow from this location, (DDN July 17, 1900), a month later when the amassing trash began to ruin the area for docking, the Yukon Council was finally incited to act, as the “[c]rude measures, suitable to a temporary camp, [would] no longer do” (DDN August 3, 1900). By this time, two large barges were purchased to extend the dumping site at the wharf further out into the river. The barges were planked

⁸⁷ Library and Archives of Canada. Central Registry Files. Numbered Files. Volume 10, File 2033.

over, enabling teams to reach the farthest edge, and so no excuse remained for anyone to empty their bins anywhere but directly into the current at the outer edge of the new wharf. Once completed, an order to this end was issued by the Medical Health Officer, with a warning that violators would be sentenced to hard labour on the government woodpile (DDN June 6, 1900).

The improved infrastructure combined with the swift and harsh punishment accompanying violations of the garbage bylaws evidently provided sufficient motivation for Dawsonites to comply with the edict of the health officer, as only minor and sporadic complaints occasionally surfaced in the Dawson Daily News throughout the remainder of this period. These were comprised minor annoyances expressed towards scavengers plying their smelly trade, as opposed to the formerly frequent and heated discourses regarding the proper means of disposal, violations of bylaws and the threat thereby posed to public health. In the summer 1901, for example, complaints were lodged against scavengers who dumped their offensive accumulations at all hours of the day. The issue was quickly resolved by limiting dumping times to between the hours of 11 p.m. and 5 a.m. (DDN July 17, 1901). A minor objection was again raised in 1902 when the route leading to the new garbage road was designated to pass in front of a local church, but the limitation of the hours between which the garbage men were permitted to work seems to have alleviated the concern. Then in 1903 one man complained that the contents of these carts often spilled out, the liquid soaking into the street (DDN August 13, 1903). And finally in 1904 the Sisters of St. Ann brought the fact that certain scavengers were being lazy, and emptying their carts on the wrong side of the flags which designated the dumping limit (DDN February 18, 1904). All of these incidents were slight, and easily

remedied in contrast to the hefty infractions which threatened the public's health and had been the bane of the medical health officer only a few years prior.

The Problem of Drainage

Dawson City is situated in a region of permafrost at the meeting point of both the Yukon and Klondike Rivers. In the spring when the melting snow flooded down from the hillsides that bordered the town site on two of its edges and the rivers swelled, Dawson City's frozen foundation was unable to accommodate the rising water table. Once the water receded, Dawson took many weeks to dry out because despite the fact that "there is almost a continuous sun in the summertime evaporation is very slow owing to the thick moss which will conduct the heat, in consequence the ground is always swampy. It is only after several years of draining that the ground will become sufficiently dry..."⁸⁸ (Figure 6.4). During the months that it took each year for the town site to dry out, sanitary standards were impossible to maintain, and typhoid ran rampant. Dr. W.A. Richardson, who was the acting Assistant Surgeon for the North West Mounted Police in the Yukon district commented on this situation in his annual report in 1898:

the town of Dawson City is situated on a swampy ground and owing to the utter disregard of ordinary attention to sanitary arrangements on the part of its inhabitants, the situation has been rendered much worse during the year. No attempt had been made to improve this condition... (Sessional Papers of the Dominion of Canada #15, 1898: 317).

The pressing need for the development of sanitary infrastructure in order to prevent future outbreaks of typhoid fever was fortuitously recognized by those with the authority to act. In January of 1899, Superintendent Steele of the North West Mounted Police

⁸⁸ Sessional Papers of the Dominion of Canada, 1896 #15: 17.

Figure 6.4: Main Street, Dawson City (1898).



Source: Library and Archives Canada/Credit: George G. Murdock/C-000666.
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prophesized in his annual report that unless action was taken, there would be another outbreak of disease following the spring thaw, as Dawson was at that time essentially a frozen swamp of mud and “every imaginable kind of filth” left by those who pitched their tents there the previous summer (Sessional Papers of the Dominion of Canada #15, 1899).

This warning was heeded by the Commissioner of the Yukon Territory, William Ogilvie, under whose supervision a preliminary drainage system was constructed for Dawson City in the spring of 1899. By 1900 Dawson City had a provisional sewerage system that included surface drains and ditches, all of which discharged directly into the Yukon River at the foot of each street along Front Street. This system was laid out from year to year with additions haphazardly constructed wherever water happened to accumulate (DDN April 30, 1902). The Medical Health Officer noted that the system was at best a temporary solution, and recommended that due to the unique environmental challenges entailed in keeping Dawson dry, “[a] permanent and extensive one...devised on scientific principles and its construction...superintended by a civil engineer who thoroughly understands the problem of drainage...” was needed (DDN April 2, 1900).

Local officials also quickly established the practice of waging an aggressive annual campaign in Dawson known as the annual spring cleanup. In April of 1900, Dr. Good, the presiding health officer announced that by thoroughly cleaning the streets and seeing that as much snow and ice as possible was removed from the city before it melted, Dawson would be “in the best possible sanitary condition” come summertime (DDN April 2, 1900). This promise went unfulfilled, however with citizens openly criticizing efforts to bring sanitation to the city, inviting the health officials to:

put on rubber boots and take a stroll around the suburbs of town and see the fast rising foul waters in all the low places [noting that]...Many cabins are already flooded, some having to be vacated. The danger in all this lies in the fact that this water is as foul as can be, being the thawings of all the filth, refuse and garbage that has been allowed to accumulate all winter. In other words, it is full of typhoid fever germs... (DDN April 11, 1900).

In order to have the work of cleaning and grading streets, opening frozen sewers and clearing garbage-clogged drains completed as quickly and as early in the year as possible, prison labour was sanctioned by the Yukon Council and wholeheartedly embraced by the community as a “wise and useful move”,⁸⁹ and a means for these individuals to repay their debt to society, as their maintenance over the long Klondike winter was a costly necessity since there was no way to send them out once navigation closed for the season. In March of 1900 newspapers accounts reported that many of Dawson’s drains and sewers remained out of commission, however by the middle of April, many had become operational once again, and “[a]t nearly every street crossing along the water front one encounter[ed] a considerable stream, big enough, as a miner remarked to furnish a couple of sluice heads” (DDN April 13, 1900). While the columnist prophesized that Dawson would be dried out within a few days’ time, a week later the headline read ‘Dawson is Being Drenched’, and efforts at clearing the drainage system continued to be frustrated by thick ice which necessitated the use of steam points supplied by one of Dawson’s fire engines. When thawing was finally achieved through this method, the root of the problem was revealed – mounds of garbage that had found their way into the drains throughout the winter (DDN April 21, 1900):

The spring of 1902 saw Dawsonites combating many of the same problems as in previous years. In late April, “[w]ater [had] gathered in a number of low places on the flat

⁸⁹ Sessional Papers of the Dominion of Canada #15, 1900, DDN April 27, 1900.

on which the main portion of the town stands, and [had] formed into black lagoons...” (DDN April 25, 1902). The drains in the area of York and Third streets had once more been blocked by refuse, as well as the rotting sawdust which had been sprinkled the length of York street to remedy the mud in 1901. This area had formed the largest body of standing water within the city’s limits, and made that area of town impassible. The return of Dawson’s drainage problems for the fifth consecutive spring since Dawson’s founding seemed to have finally brought a sense of urgency to a situation in which “an entire city was built on frozen ground, and where nothing drained away” (DDN May 15, 1902). The city engineer promised to complete a surface contour of the city as soon as possible so that proper grading could facilitate natural drainage, streets were finally paved to prevent water from seeping into the ground, and steam pipes were laid in all new sewers in an effort to prevent them from freezing in the winter and thus be fully functional from the very first day of the annual spring runoff (DDN April 30, 1902, May 22, 1902, September 30, 1902).

Although these improvements were necessary in order to dry out Dawson City—a prospect which appealed to all of its citizens—not all residents were happy with the measures this entailed. The paving of streets, for example, was expensive (at least fifty dollars per residence) and was the financial responsibility of those who resided along that particular street. While it was argued that in addition to improving public health, paved streets made all parts of the city accessible thereby improving traffic to local businesses, many of which were home-based, many people were renting their accommodations, and therefore found such a substantial investment distasteful (DDN November 8, 1902).

The drainage system continued to be expanded and improved upon throughout the period of study, yet no advancement seemed to be entirely sufficient for overcoming the challenges posed by local environmental conditions. In the winter of 1903, it was decided that men should not be employed to keep sewers from freezing. The decline of waterborne infectious diseases such as typhoid fever, by this time seems to have played heavily on the minds of local politicians who were forced to decide which was more costly: paying to keep the sewers operational all winter long or dealing with the consequences in the springtime. With the threat of an outbreak of typhoid considerably diminished, the Mayor announced that although “the sewers were made for use...should they freeze they will have to remain so until spring, and the people now getting the use of them will have to find some other way of getting rid of their waste water” (DDN November 17, 1903). As in prior years, the sewers inevitably froze, and in the spring of 1904, forty-five men had to be hired to open the drains and gutters with steam thawers. It took this crew one hundred and four hours at a rate of four dollars an hour to complete the work, which had been deemed urgent since water had risen almost level with sidewalks in some parts of Dawson (DDN April 13, 1904).

Drainage continued to be a significant issue for Dawsonites throughout this period, although the impetus had shifted from concern over the transmission of infectious diseases in Dawson’s early years, to the impact that annual flooding had on the economical wellbeing of the City. In 1904 a plan to reclaim fourth and fifth avenues which were by that time “covered by green slimy swails”, had been all but abandoned despite the fact that they were located in the heart of the city (DDN May 11, 1904). It was hoped that by laying gravel and building sidewalks, this area could be revitalized and the

draining of Dawson finally completed as this was purportedly the last area remaining within city limits where water regularly accumulated during the spring freshets (DDN May 11, 1904).

While poor drainage certainly complicated efforts at maintaining a separation between human waste and water for domestic purposes in Dawson City, accessibility to a reliable source of pure water was also of great concern for those working to eradicate the disease. When it came to water, however, the gold rushers tended to be far more concerned with being able to obtain sufficient amounts of water for their sluice boxes in the springtime, than they were with the quality of the water that they consumed. The Dawson Daily News for example, ran frequent advertisements and commentaries regarding the amount of water to be had for this purpose, while the police court records show that many disputes among miners erupted over perceived infringements on each other's rights to the streams produced by the spring runoff in the gold fields.

The Problem of Contaminated Water Sources

The miners' lack of concern over water for any purpose other than separating gold from gravel was not shared by the medical men and entrepreneurs of Dawson City, who had realized that pure water was essential to both the health and prosperity of the community. In the spring of 1899 a Board of Health was established, with Colonel Steele of the NWMP acting as chairman, Dr. J.W. Good serving as Medical Health Officer and Corporal Wilson of the NWMP appointed as Sanitary Inspector. One of the chief duties of the board was to protect the public's health by ensuring that only pure water sources were being used by the locals, which was to be assured through regular inspections on

behalf of the Medical Health Officer (Sessional Papers of the Dominion of Canada #15, 1900).

While this resolution was seemingly straightforward and easily enforced through the introduction of bylaws restricting the locations from where people were permitted to draw water for domestic purposes, the problem remained that there were relatively few water sources in the vicinity of Dawson City which could be exploited by the rapidly increasing population. The fact that the very best of these water sources were simply the lesser of known evils is evident in the Medical Health Officer's order that people boil their water since, he announced, it was "through the water that disease germs reach the system...Just tell the people to boil their drinking water and I do not believe there will be much trouble on the score of sickness" (DDN April 2, 1900). Since the waterfront was polluted as a result of its use as the official site for garbage disposal by both scavengers and local residents, the only remaining choice for readily available water were the natural springs, into which many people put their faith. Due to the character of the environment, however, these water sources mistakenly perceived as pure were in reality formed through the "soakage into somewhat deeper holes from the adjoining swamp...[and thus] extremely dangerous" to the health of those who consumed it (Report of the Medical Health Officer, Sessional Papers of the Dominion of Canada #15, 1900: 77).

Throughout 1899 various entrepreneurs peddled a variety of water for domestic purposes. There were merchants who marketed distilled water, spring water and water from artesian wells. There was the Artic Water Company, as well as Belinda Mulrooney's Hygenia Water Company which advertised "filtered, boiled and germless

water, rendered pure and germless”.⁹⁰ Finally there was the example of Alexander Kerr, the entrepreneur who ran a pipe from directly beneath the ice formed on top of the Yukon River to a tank on Second Avenue where he sold his product in the winter of 1900 (DDN January 6, 1900). In all cases, water was sold by the bucket, and was usually dispensed from a wagon driven down the streets of Dawson, or out of barrels carried by mule, or even from reservoirs strapped to a sled and pulled by a team of dogs (Figure 6.5). Whether there was a legitimate difference in quality between the water offered by the various dealers and the water procured by individuals who violated the orders of health officials, is a matter of speculation.

The first systemic water distribution scheme in Dawson City was the Dawson Water Works founded by Colonel Samuel Word, which was operational in September of 1899. With the approval of the Yukon Council, a well was sunk near the Klondike River to a level that drew pure water from the undercurrent of the river. It was ten feet square, walled with tightly fit logs, and enclosed in a covered structure intended to prevent surface water and other contaminants from making their way in. The Colonel went on record stating that the water had been tested by ‘eminent chemists in the west’ and guaranteed to be free from both mineral and vegetable matter, despite the rejection of the river itself as a source of supply since it was known to be contaminated and fluctuated to extreme high and low levels throughout the year. From this site, water was drawn and pumped at a rate of 100 gallons a minute, into a 10,000-gallon holding tank at a height of forty-five feet, which was heated by steam in order to keep the water circulating though

⁹⁰ Report of the Medical Health Officer Sessional Papers of the Dominion of Canada #15, 1900., Library and Archives of Canada Yukon Territorial Records sous fonds, RG 91, Volume 220., DDN September 13, 1899.

Figure 6.5: Dog Team Hauling Water for Dawsonites.



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the wooden pipes which had been laid just a few feet below the foundation of the townsite. The system relied on gravity to push the water through the mains as it gushed downwards from the holding tank. In order to prevent freezing, the water was allowed to flow continuously, discharging any surplus from an open vent directly into the Yukon River. Thus, Dawsonites were promised an uninterrupted supply of water throughout the winter months, the pipes themselves being expected to withstand temperatures as low as -40°C. Water was sold at a weekly rate, payable in advance from approximately twenty taps sporadically placed along the 'H' shaped pipeline, the parallel sides of which were over one mile-long and spaced half a mile apart. The taps themselves were housed in shelters heated around the clock by small stoves maintained by patrolmen who each had three or four in his charge. Prices started at fifty-cents per week depending on the size of the family and how much water they consumed. Although Colonel Word had planned to expand upon this infrastructure to meet the anticipated growth in demand by extending water service to the very top of the hill in the eastern end of Dawson the following year, a series of setbacks resulted in the company folding instead.⁹¹

The first setback occurred early in the winter of 1899 when it was realized that the one-and-a-half inch spruce planks used to construct the water pipes were a poor choice of material. Although it was the best wood on hand in the Klondike, spruce was nevertheless unable to withstand the pressure of the water, became saturated, and leaked profusely. The Colonel's response to this was to propose the insertion of iron pipes into the existing wooden ones, which would then act as an insulating encasement. This, however, could

⁹¹ DDN August 25, 1899, DDN October 18, 1899, DDN December 14, 1899, Report of the Medical Health Officer, Sessional Papers of the Dominion of Canada #15, 1900.

not be done while the ground was frozen and would thus have to be delayed until the following spring.

The second difficulty was encountered in mid-December when concern was raised that the water supply was in danger of being cut-off as the pipes were threatened by frost. This was a further complication of the already leaking pipes, which by this time had become so porous that they could no longer maintain sufficient pressure to prevent freezing. The leaks had become so problematic, in fact, that the pressure had to be reduced by one-third in order to prevent further damage, as streams of runoff were beginning to trickle onto private property and flood cabins (DDN December 14, 1899, December 20, 1899, April 18, 1900). This situation escalated until December 20, 1899, when the water pipes had to be completely shut off and the pump stopped.

After having experienced two seasons of rampant typhoid (in 1898 and 1899) and following nearly four months of having enjoyed a reliable source of clean water, the citizens of Dawson City were understandably upset that they would again have to resort to purchasing water of uncertain quality by the bucket from street vendors, or rely on their own resourcefulness to procure enough water for household purposes. The following excerpt from the Dawson Daily News captured their disappointment:

the splendid water supply of Dawson is cut off for the balance of the winter. This is a calamity to the community and a much more serious one than the surface shows...it deprives the citizens of that pure, wholesome water which has had so much to do with the present good health of the city and throws it back on the primitive, unwholesome system in vogue a year and a half ago...if there is any blame at all in the matter it may be found to lay with the citizens themselves who failed to appreciate a good thing when they had it (December 21, 1899).

This was easily enough accomplished during the wintertime by melting snow or taking water from beneath the ice on the Yukon River (Figure 6.6). However, the ice afforded only the perception of a barrier between the garbage which was piled on the frozen surface, and the water which was drawn from below, particularly in the early spring when the ice began to melt but before it went out, carrying the garbage down river, and out of sight of Dawsonites.

In much the same way that the gold rushers' concern over water centered on the quantity available for mining purposes, the principal motivation for the development of an effective water supply system in Dawson City revolved around the provision of a sufficient amount of both water, and water pressure, for fire protection. It was this third issue then, which ultimately brought about the end of Colonel Word's water company.

After the water had to be shut off, the Colonel announced that the endeavor had not been a total loss, as he had at least demonstrated with his wooden pipes that water could be kept flowing in the coldest months, and announced that he had already planned to bring in iron pipes and other expensive machinery which was presently aboard a steamer frozen in 200 miles below Dawson City, and would arrive as soon as navigation resumed in the spring (DDN December 20, 1899, December 21, 1899). In March, he began overhauling the water pumps already in place in anticipation of the arrival of the rest of his supplies, all the while continuing to promise the residents of Dawson City that he would "have Dawson supplied [with water] before any notice from Dr. Good may be expected, warning the people of the danger in the river water or ice" (Dawson Daily News, March 17, 1900). However, only three days later, the Yukon Council granted a second franchise to Messrs. McLennan and Matheson, allowing them to erect a new

Figure 6.6: Drawing Water from the Yukon River.



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water works in Dawson City, which operated as The Dawson Water and Power Company. This came as a serious blow to the Colonel, who had invested substantial capital in his water business, and seemed to have the best interests of the public at heart.

The new company had already landed its equipment in Dawson City and planned to lay a network of six- and eight-inch iron pipes along the surface of Dawson's streets, which would be supplied from a thirty-foot deep well located on government land that produced so great a volume of water, that the drawing of water to supply the entire city of Dawson lowered its level only a few inches (DDN April 18, 1900). This system could supply water at a rate of 1000 gallons per minute, and thus had the inherent advantage of being capable of providing sufficient water for fire protection purposes. These factors, in combination with public disenchantment with Colonel Word's failed attempt at delivering a reliable product, enabled the Dawson Water and Power Company to promptly corner the market by having their system operational before the Colonel's supplies could even reach the city. By laying their pipes over-ground, with plans to bury them beneath the streets after the ground had thawed, this new company eclipsed the Dawson Water Works by offering their product at a time when Colonel Word could do little but protest the unfairness of the situation. By March of 1900, Colonel Word had his pipes in the south end of town pumping water once more and attempted to service the rest of the city by wagon until the rest of the system could be made operational (DDN March 20, 1900), but, by June, he had sold the Dawson Water Company to his competitors and retreated from the Yukon Territory (DDN March 20, 1900, July 17, 1900, June 9, 1900).

The Dawson Water and Power Company had, in the meantime, laid out a much larger network of water mains, which were fully operational on April 17, 1900. For the

first time in Dawson's brief history, service was now available to all business and residential areas of the city (DDN July 17, 1900, July 25, 1900). In addition to the machinery initially set up to beat-out the Dawson Water Works the company brought in additional pumps, boilers and pipes and aggressively expanded their scheme during the summer months, providing service to the hillside settlements, and offering to put water directly into homes and businesses upon application (DDN April 17, 1900), while continuing to maintain their promise that this new infrastructure would enable them to provide running water to its customers throughout the winter months. This pledge was well received by Dawsonites whose hopes had been dashed the year before, and the Dawson Daily News proclaimed that indeed:

[e]veryone [was] looking forward hopefully for a full supply of pure running water in the city throughout the coming winter, a blessing that can only be appreciated during the long winter months by those who have been here the last three winters and suffered the privation of good water and the labor and cost of getting it through the ice on the Yukon (DDN July 26, 1900).

When the pipes were eventually relocated underground from their initial location on the street surfaces, they were placed inside wooden boxes as Colonel Word had intended to do, and the vents at the end of the mains were left open to allow the water to constantly run through the pipes. As a final precaution, an electric wire was strung along the outside of the pipes so that if necessary, heat could be conducted to ensure that Dawsonites would not have to endure another winter and spring without a reliable source of pure drinking water. The company also offered to place fire hydrants wherever the Yukon Council decided, and incorporated valves into the system so that in case of a large fire, water could be diverted from all other purposes to the hydrants (DDN July 25, 1900).

The decline observed in both morbidity and mortality from typhoid fever following the provision of a reliable and affordable commercial source of pure water by The Dawson Water and Power Company in the early months of 1900 speaks to the quality of the product being supplied by the distributor. Once Dawsonites no longer had to rely on the polluted water drawn from the Klondike and Yukon Rivers or from springs that were inundated with run-off from the City, and enjoyed the convenience of indoor plumbing, typhoid incidence fell dramatically, and continued to decrease annually until it all but disappeared within a few years' time. The Dawson Water and Power Company was thus largely responsible for bringing an end to the era of endemic typhoid in Dawson City, and the health status of the gold rushers was significantly influenced by the actions of a private corporation which forever altered the disease environment of the community.

Once the threat posed by tainted water to the health of the community no longer captivated the attention of local officials, the impetus of the Dawson Water and Power Company shifted from benefaction to profit, as they began prosecutions in May of 1902 against individuals who allegedly stole water from the tap houses, arguing that "no one had more right to take water than milk. The river was open to anyone, so that distress could not be pleaded" (DDN May 13, 1902). The company reported an immediate increase in the number of customer subscriptions once the fact that they were pressing formal charges was publicized (May 13, 1902).

Improvements continued to be made throughout this period, with galvanized pipe slowly replacing the iron pipes beginning in 1902, and the Company increasing its clientele by connection of all remaining households to the water system free of charge in

1904, as many occupants had been hesitant to make such a substantial investment in a property which they only leased.

By the turn of the century, the sanitary state of Dawson was so much improved that the annual report of the North West Mounted Police praised the efforts of the sanitarians, reporting that “the residents may well be proud...To convert a swamp, or slough, into a town site and then bring the sanitary condition of the town to such a degree of excellence arrived at here is a matter of congratulation”.⁹²

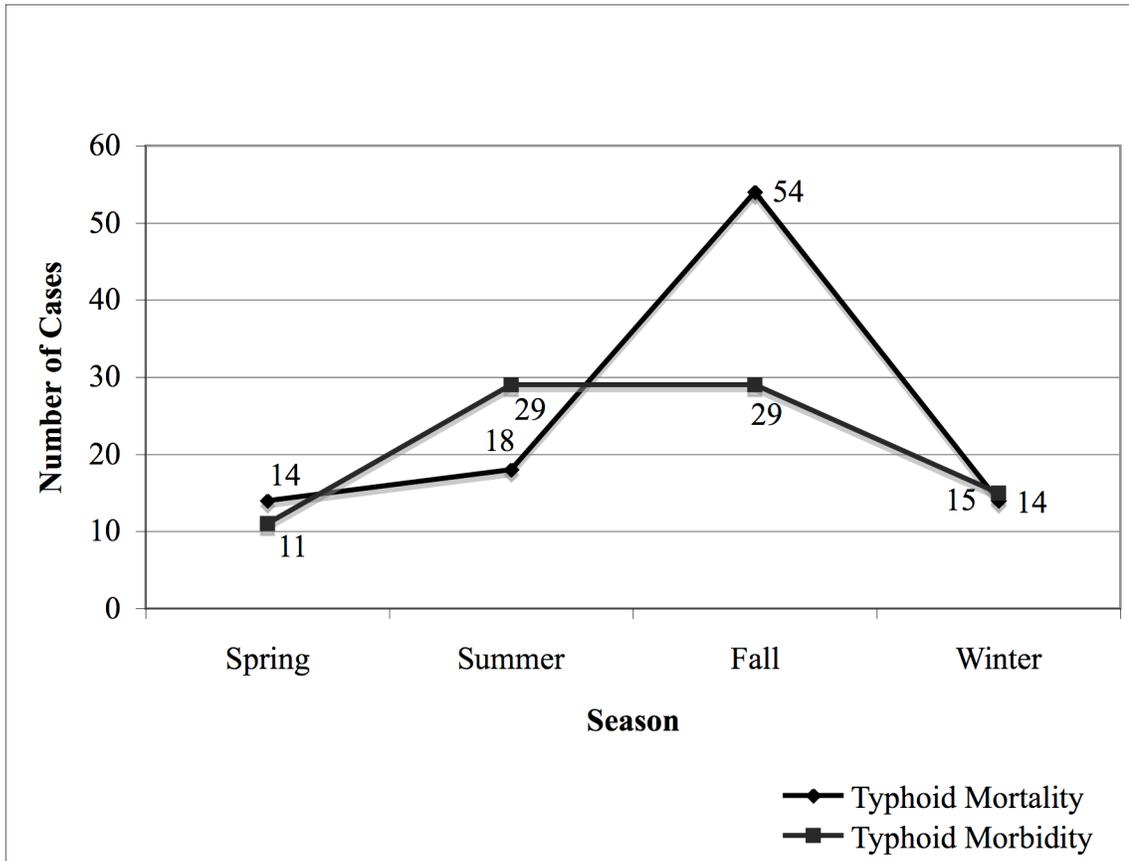
Seasonality of Typhoid in Dawson City

As outlined earlier in this chapter, a peak in incidence of typhoid fever tends to occur in the summer months in areas where the disease is endemic (LeBaron & Taylor 1993). This expected increase in morbidity was found in the patient register for St. Mary’s Hospital, with significantly more admissions for typhoid fever during both the summer and fall months, than for all other illnesses combined ($\chi^2=13.429$, $df=3$, $p=.004$). In fact, the admissions recorded during these two seasons accounted for 69% of all typhoid patients treated at the hospital between 1900-1904.

This seasonal distribution of sickness effected a corresponding pattern of typhoid mortality in the Klondike during this period (see figure 6.7), with significantly more typhoid deaths having occurred in the fall than for all other fatalities combined ($\chi^2=48.031$, $df=3$, $p<.001$). The coinciding patterns of typhoid morbidity, which peaked between June and November, and increased mortality September through November, is not surprising. According to the patient registers, the majority (72.7%) of patients

⁹² Sessional Papers of the Dominion of Canada #15 1902: 64.

Figure 6.7: Seasonal Distribution of Typhoid Morbidity and Mortality in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory; Patient Register for St. Mary's Hospital. Note that morbidity is limited to data from St. Mary's Hospital (1900-1904).

suffering from typhoid fever at St. Mary's were hospitalized for three weeks or longer. Therefore, individuals who contracted the disease in the summer or early fall would have been sick for several weeks before either recovering or succumbing to the disease, which the majority did, in the fall months. The burden of typhoid fever on the community during the fall was particularly great, as the deaths that occurred during this season accounted for 59% of all typhoid mortality throughout the period (1898-1904).

As can be seen in Table 6.1, typhoid victims in the Yukon during this period were predominantly adult males. They were overwhelmingly of European descent, as only a single Native Canadian is known to have died of typhoid fever between 1898-1904. While at first glance it appears that those who succumbed to typhoid fever were primarily employed as miners and prospectors and of Christian faith, as will be demonstrated below, these latter observations are not statistically significant.

Statistical analysis of the databases compiled from the Yukon Territory Death Register and the Patient Register for St. Mary's Hospital was conducted using the SPSS Statistical Software program. The Pearson chi-square method of analysis was selected because of its ability to test the independence of both qualitative (numerically coded) and quantitative variables, and to determine whether differences between the expected and observed frequencies are statistically significant, thereby supporting or rejecting the null hypothesis. This is a popular and well-known technique that is often employed by others conducting research within the field of demographic anthropology, and following the tradition of the discipline; the confidence interval is set at .05. While such analyses do not imply a cause-effect relationship, the ability to discern significant relationships among the variables is particularly valuable to anthropological studies that are able to draw on

Table 6.1: Typhoid Deaths in the Yukon Territory by Sex, Age, Ethnicity, Occupation and Religion (1898-1904).

Source: Death Register for the Yukon Territory.

Note that analysis of occupation is limited to males fifteen years of age and older

		N	% of Typhoid Deaths	% of All Deaths (N=754)
SEX	Male	96	96%	12.7%
	Female	4	4%	0.5%
AGE	0-14.9 years	0	0%	0%
	15-44.9 years	37	37%	4.9%
	45+ years	3	3%	0.4%
	Age unknown	60	60%	7.9%
ETHNICITY	Native Canadian	1	1%	0.1%
	Non-Native Canadian	99	99%	13.1%
OCCUPATION	Miner/pro prospector	23	23%	3.1%
	Unskilled labour	4	4%	0.5%
	Skilled labour	5	5%	0.7%
	Professional	4	4%	0.5%
	Hospitality	0	0%	0.0%
	Occupation Unknown	1	1%	0.1%
RELIGION	Christian	22	22%	2.9%
	Catholic	6	6%	0.8%
	Other	3	3%	0.4%
	Religion Unknown	69	69%	9.20%

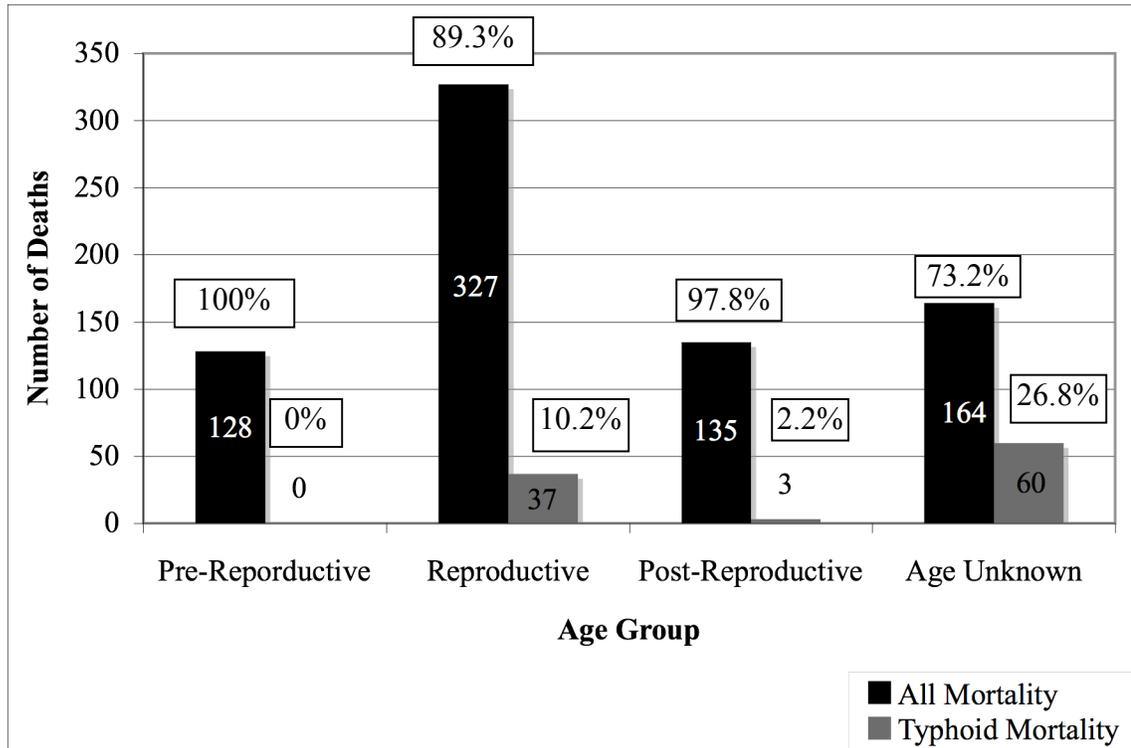
qualitative information about the population in order to shed light on why such relationships exist, and thus make inferences regarding cause and effect. Written records are available for few of the past human populations studied by anthropologists, however when they are preserved they offer a “rich repository of social, economic and other kinds of environmental information available to correlate with population characteristics” (Swedlund 1978:140).

Typhoid and the Gold Rushers

While infectious diseases typically tend to differentially claim the lives of the very young and elderly over young and middle-aged adults (MacDougall 1981), this was not the case when it came to typhoid fever in the Yukon Territory during the Klondike Gold Rush. As is shown in Figure 6.8, deaths recorded in the Territorial Death Register were categorized into one of three groups according to the individual’s presumed life-stage based on their age at death. Contrary to expectation, individuals of reproductive age (15 - 44.9 years old) were significantly more likely to have died from typhoid fever than any other cause relative to their fellow gold rushers of either pre- or post-reproductive status ($\chi^2 = 24.3388$, $df=2$, $p<.001$).

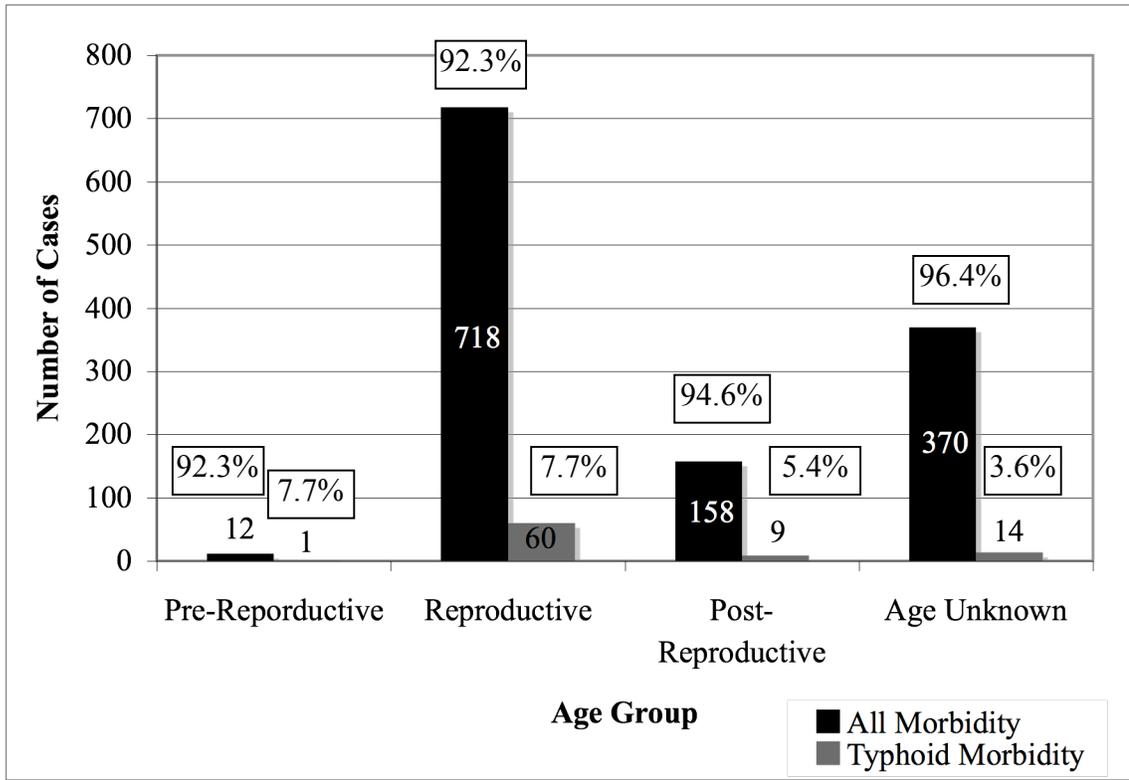
As is evident in Figure 6.9, it was likewise primarily individuals of reproductive age who suffered, but recovered from typhoid fever at St. Mary’s Hospital, although statistically speaking, there was no significant relationship between the life-stage of patients and whether or not they were suffering from typhoid or another illness ($\chi^2 = 1.541$, $df=2$, $p=.463$). The finding that it was most often the individuals who were expected to be at the least risk of dying from exposure to an infectious diseases that were

Figure 6.8: Distribution of Typhoid Mortality by Age in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory.

Figure 6.9: Distribution of Typhoid Morbidity by Age in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory.

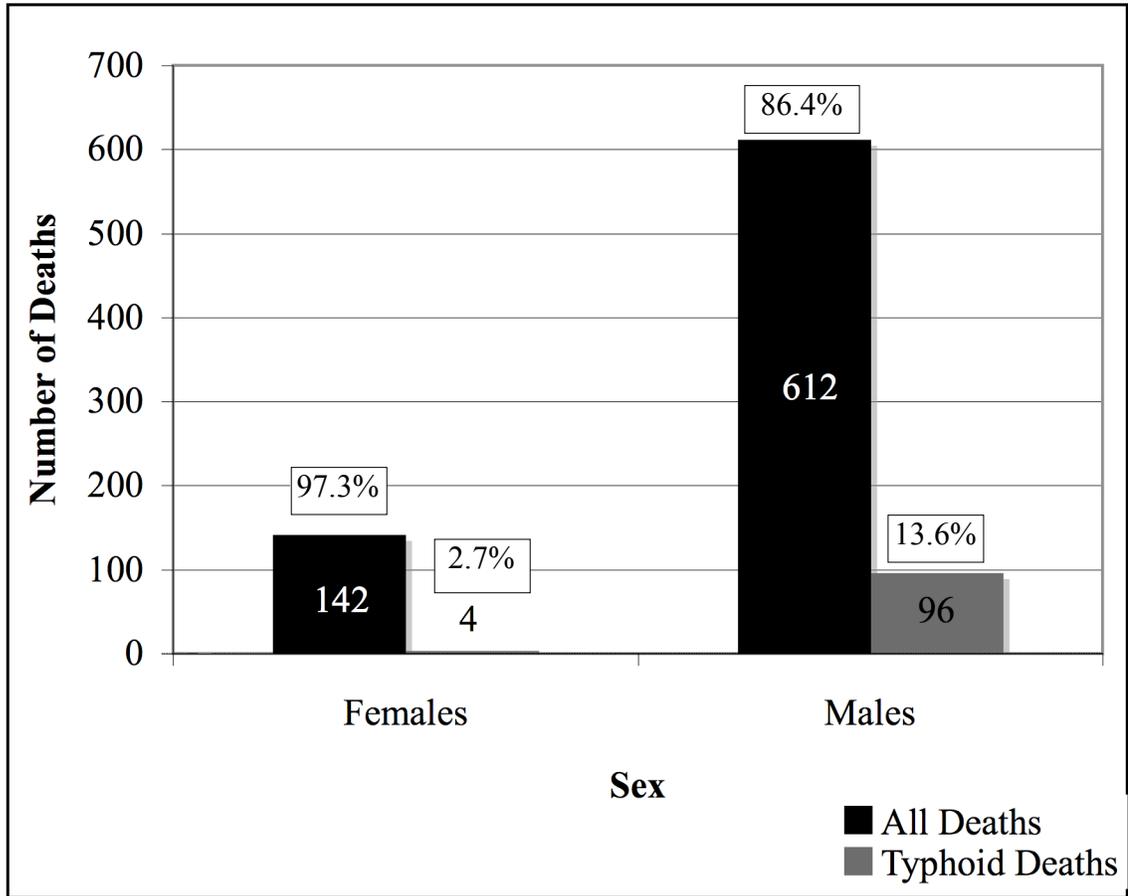
Note morbidity is limited to data from St. Mary's Hospital (1900-1904).

succumbing to typhoid fever was surprising, as these individuals are assumed to be less susceptible to infectious diseases than the very young and elderly, in that their immune systems are neither in the developmental stage nor are they compromised by the effects of increasing age.

Referring back to Table 6.1, a finding which further confounds a clear understanding of the experience of typhoid fever among the gold rushers, was the observation that rather than mortality being observed at a fairly equal distribution between the sexes—as is to be expected in populations where the disease is endemic (LeBaron & Taylor 1993)—significantly more males than females (Figure 6.10) died from typhoid fever in contrast to all other causes of death through this period ($\chi^2 = 16.594$, $df=1$, $p<.001$). While an analysis of typhoid morbidity by sex was unfortunately not possible as sex was not recorded in the patient register for St. Mary's Hospital, it is noteworthy that ninety-six males, but only four females died from typhoid between 1898-1904.

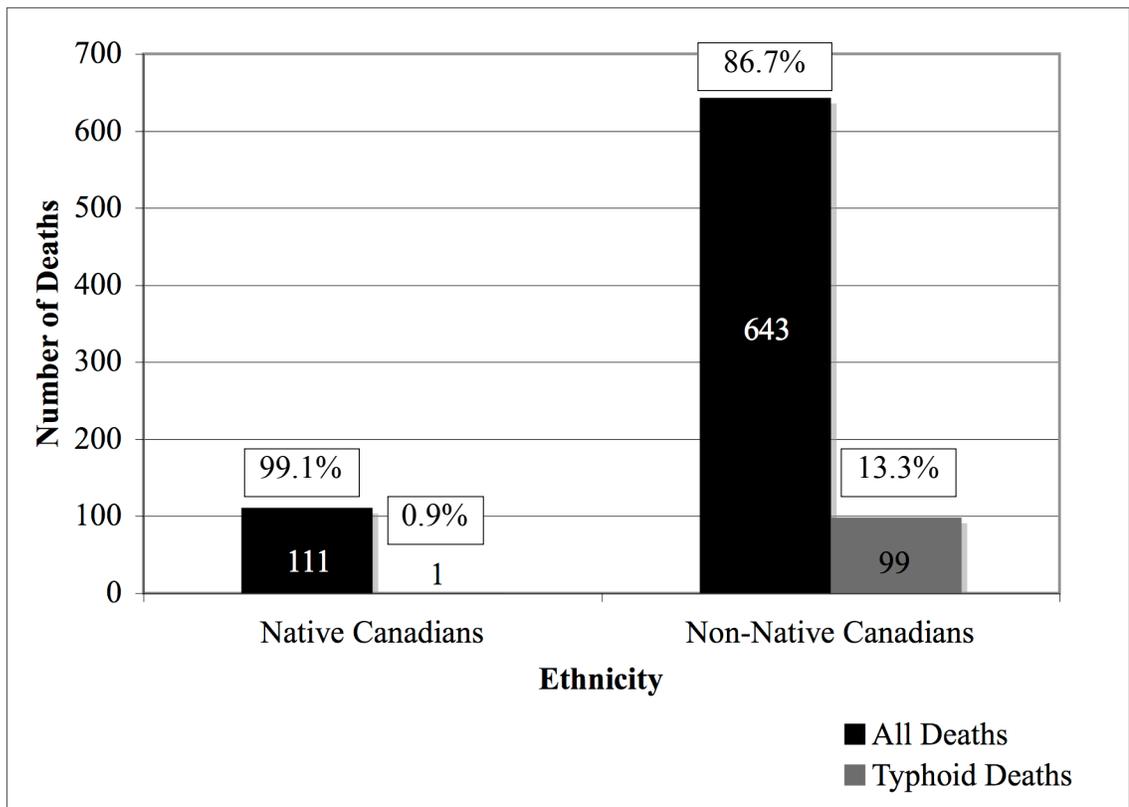
Again returning to Table 6.1, another paradox regarding the experience of typhoid fever among those living in the Yukon Territory during the Klondike Gold Rush must be resolved given the observation that significantly more non-Native Canadians died from typhoid fever than Native Canadians ($\chi^2 = 17.290$, $df=1$, $p<.001$) when compared with all other causes of death (Figure 6.11). While there is no morbidity data available as it pertains to the ethnicity of those suffering from typhoid fever, since this data was not recorded in the patient register for St. Mary's Hospital, the fact that only one of the ninety-seven deaths recorded among Native Canadians during this period was due to typhoid fever (representing only 1% of all typhoid deaths) is surprising.

Figure 6.10: Distribution of Typhoid Mortality by Sex in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory.

Figure 6.11: Distribution of Typhoid Mortality by Ethnicity in the Yukon Territory (1898-1904).



Source: Death Register for the Yukon Territory.

Interestingly, however, neither socioeconomic status ($\chi^2 = 2.342$, $df=4$, $p=.673$), as defined by occupation among males aged fifteen and over, nor religious affiliation ($\chi^2=3.793$, $df=2$, $p=.150$), were found to be significantly correlated with differential mortality from typhoid fever. While a correlation can sometimes be found between cause-specific mortality and certain religious groups (see for example Sawchuk & Herring 1984), a greater burden of infectious disease mortality is generally expected to be levied on individuals of lower socioeconomic strata (Farmer 2004, 2001). This was not the case in gold-rush era Dawson.

Porsild (1998) has noted that Klondikers residing in Dawson City tended to cluster both in their area of residence, as well as in occupational settings according to ethnicity, social class and place of origin. Thus if poor sanitation resulting in a contaminated water source was the sole factor responsible for the transmission of typhoid fever in Dawson City, one would expect to find incidence of both morbidity and mortality clustered among individuals either living in a certain area, who relied on a shared water source, or who shared a similar occupational (and thus financial) situation, however these generalizations are not representative of the experience of typhoid fever by the Klondikers who called Dawson City their home.

A Cultural Aspect to Infection?

The discrepancies between the expected and the observed presentation of typhoid morbidity and mortality in the community suggests that a cultural aspect to infection was at work within the population.

For example, although there were fewer women in the Klondike than in most other communities (women accounted for only 17% of the adult population in 1901), they nevertheless lived and labored alongside the men. The fact that significantly fewer women than expected died from typhoid fever, and the fact that there was no significant difference found between the socioeconomic status of males of working age and their likelihood of having died from this infectious disease therefore makes a domestic or workplace source of contagion unlikely. This trend is immediately apparent when comparing the death rate for men (4.16/1000) and women (0.97/1000) residing in the Yukon Territory from typhoid fever in throughout the period.⁹³

While one would typically expect to see young children and the elderly members of the population accounting for the majority of the mortality from infectious diseases such as typhoid, this was not the case in the Klondike, where significantly more young adults of reproductive age were found to have died as a result of typhoid fever, implying that these individuals were being differentially exposed to the source of contagion.

Finally, the observation that few Native Canadians were afflicted with typhoid fever, despite the long documented history of aboriginal groups typically bearing the brunt of infectious disease upon contact with Europeans is unexpected, particularly since the Village of Moosehide (the community of Native Canadians who originally resided on the very spot where Dawson City was erected), was located just three miles downriver from Dawson City on the Yukon River, which was the same waterway into which Dawsonites dumped their garbage and sewerage. In fact, there was only one case of

⁹³ Death Rates calculated based on the 1901 Canada Census for the population of the Yukon Territory and the number of typhoid deaths recorded 1898-1904.

typhoid fever resulting in death reported among Native Canadians throughout the entire Yukon Territory between 1898-1904.

Thus, some factor which predisposed certain unlikely individuals to become infected by the typhoid bacillus was most certainly at work in the community, and a cultural aspect to transmission must thus be sought in order to explain this unexpected pattern of differential morbidity and mortality from typhoid fever in the Klondike community during the gold rush.

The image of the ‘typical’ typhoid victim has been revealed as a young to middle-aged, Caucasian male. While this vague description may seem to preclude any hope of ascertaining what social factor was differentially influencing the health status of these individuals—putting them at a greater risk of both contracting and dying from typhoid fever—it is nevertheless possible to ask what activities these men were engaging in that neither women nor children were participating in, that simultaneously excluded Native Canadians, while including individuals from all rungs of socioeconomic strata and religious backgrounds. When all these pieces of the puzzle are fitted together, the picture revealed is familiar symbol of the Klondike gold rush.

The Saloons of Dawson

While recent research on the Klondike gold rush has refuted earlier literature that has popularized the misconception of Dawson as the tawdry centre for prostitution and debauchery (Backhouse 1995, Cruikshank 1992, Duncan 2004, Guest 1982, Porsild 1998, 1995), there was nevertheless no shortage of saloons. These were, in fact among the first permanent buildings in Dawson City, and therefore functioned as important social

institutions and meeting places, as well as providing the only source of entertainment for the gold rushers. Meetings of all sorts were held in Dawson's saloons, "[e]very saloon was a place of general business, debt, contracts, pacts were made, with an elbow on the bar, and a jolt of whisky to seal the deal",⁹⁴ the practice even being a regular habit of government officials who lacked any more appropriate locale in which to conduct their business. Even the United States Consul James McCook held conferences in local barrooms, a practice of many prestigious public figures, which resulted in the reprimand of several government officials for failing to present themselves in a respectable manner on more than one occasion (Porsild 1998, Berton 1958). In fact, many Klondikers kept a residence (of whatever sort) only so that they may have a place to sleep, while spending most of their free time socializing in the warm and inviting atmosphere of restaurants and saloons (Porsild 1998). This was especially true in the early days of the gold rush, when Dawson offered little in the way of alternatives. As William Cautley, a government employee lamented:

In those days there were no clubs, no private houses to which one might be invited, no place to which one could invite one's friends... Instead, even the most respectable single men unwound at the M & N, the North Star, the Aurora, the Monte Carlo, and the Alhambra saloons (Porsild 1998: 186).

The men of the gold rush thus congregated in Dawson's saloons on a regular basis (Figures 6.12 and 6.13). Children would have been excluded from such places, and there were laws prohibiting the sale of liquor to minors (Berton 1958), which could explain why significantly fewer children than expected succumbed to typhoid fever.

When cases of typhoid were observed among the members of the North West Mounted Police, the assistant surgeon, Dr. W.E. Thompson who was stationed at Dawson

⁹⁴ Library and Archives of Canada, Katherine Maclennan Collection.

Figure 6.12: Dominion Saloon, Dawson City (1901).



Source: Library and Archives Canada/PA-013409.

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Figure 6.13: Monte Carlo Saloon, Dawson City (circa 1898).



Source: University of Washington Libraries/Special Collections/Hegg 3144.
Written permission to include this image was obtained on January 29, 2008 from the
University of Washington Libraries Special Collections Division.

City noted that the cases had been contracted outside of the barracks.⁹⁵ Interestingly, the North West Mounted Police were in the habit of regularly sending officers to inspect the saloons' compliance with liquor and gambling ordinances requiring them to mingle and sometime pose as patrons while undercover. There are also several mentions of young officers being reprimanded for sneaking out of their bunks and being found intoxicated and in the company of 'fast' women in the local saloons (Porsild 1998).

The skewed ratio of men to women who died from typhoid fever during the period in question was mirrored in the composition of the patrons of Dawson's Saloons. Respectable women of the Victorian era did not partake in the amusements offered by the saloons and dancehalls, even in rustic Dawson City. In fact, it was "unheard of" for such women to so much as set foot in these establishments for fear of irreparably tarnishing their reputation (Porsild 1998: 158). While many women were employed in these establishments as dancehall girls and percentage women, the fact that they worked grueling hours from the early evening until seven or eight the following morning, six days a week (Porsild 1998), makes it unlikely that they were actually consuming the drinks which they coerced their clientele into purchasing. This hypothesis becomes a near certainty after the turn of the century, as an ordinance was passed in 1901 prohibiting women from consuming alcohol in licensed establishments (Guest 1982).

Along these lines, it was also a criminal offense to sell or otherwise provide Native Canadians with liquor in the Yukon Territory, and the multitude of fines handed down in the police court attests to the rigid enforcement of this law. Long before gold was discovered in the Klondike, missionaries had been stationed in the Yukon Territory.

⁹⁵ Sessional Papers of the Dominion of Canada #15, 1900

Once the rush began, these messengers of God worked to maintain a strict segregation between Native Canadians and the gold rush population in hopes of limiting the impact that contact would have on their culture, and to help preserve their traditional way of life (Porsild 1998). There is evidence that the efforts of these missionaries were highly successful, and in addition to prevailing racism (Porsild 1998), it is unlikely such individuals would have even considered entering a saloon at all, let alone be served by the proprietor who would have risked his liquor license in doing so.

All of these factors offer support to the argument that it was the habitual patronage of Dawson's saloons that differentially predisposed the adult male population to first contracting, and then dying from typhoid fever at a rate that far surpassed many of their fellow gold rushers. The residents of Dawson City must not have been oblivious to the fact that men contracted typhoid during their visits to the saloons, as tragic accounts of such occurrences emerge from contemporary sources, an example of which is the story of the Karlson brothers.

Robert and Charles Karlson along with their friend and partner, Andrew Anderson had been among the first to stake a claim on Bonanza Creek following the discovery of gold in the Klondike. After mining a small sum, the partners sold their combined claims for \$50,000 and made plans to return home to Norway, having finally made their fortune in the Americas. Prior to their departure, Robert and Charles decided this momentous occasion called for a celebration, regrettably, "their spree in town left them both ill with typhoid fever and they died shortly afterward" (Porsild 1998: 77). Not only did these men never have the opportunity to enjoy the spoils of their many years of labour but a legal complication resulted in Andrew never receiving a cent from the partnership.

There are numerous documented incidences of individuals having contracted typhoid fever from the consumption of food or beverages in restaurants throughout modern history, the case of Typhoid Mary being the most famous example (see for example; Ethelberg, et al. 2004, Lin et al.1988, Shanera et al. 1985, Taylor et al. 1984, Valenciano et al. 2000, Yoon et al. 2004). As saloons in the Klondike were not in the business of serving food to their customers, and the fact that when food sources are responsible for outbreaks of typhoid fever, the disease erupts in a localized area and presents as an epidemic (not as an endemic disease as it was in the early years of the gold rush), it is reasonable to rule out food as an likely cause of contagion in this instance. Additionally, the immediately obvious decrease in typhoid mortality following the introduction of a reliable pure-water delivery system in the early months of 1900 provides strong evidence that water, not food, served as the reservoir for *S. typhi* in Dawson City.

Since typhoid is primarily a waterborne infectious disease, it is possible that it could have been transmitted through the improper washing of glasses in saloons with contaminated water. However liquor was a precious commodity during the Klondike Gold Rush. When the first steamboats of the 1899 transport season arrived in Dawson, people crowded the docks to find out if they carried a fresh stock of liquor (which they did), despite rampant rumors circulating on the Outside that there had been starvation in Dawson over the previous winter (Berton 1958). The urgency felt for replenishing the town's supply of alcohol is telling, considering that in 1898 alone, one hundred and twenty thousand gallons had been brought into Dawson, and then sold at a price of anywhere between twenty-five cents and a dollar a glass in the saloons, following the

laws of supply and demand and depending on the quantity on hand (Berton 1958). The potential for profit was thus great, but could have been greater if the stockpile could be made to stretch. Liquor was so highly valued in fact, that customers were willing to pay outrageous prices and drink just about anything the bartender poured for them. As point in fact, one man had become so enamored with the dancehall queen Cad Wilson that he ordered a bathtub filled with wine for her to bathe in. Whether or not she actually took the bath is not known, however the frugal barkeep was assumed to have “salvaged, re-bottled and [put the wine back] into circulation” once she was done with it, as the liquid could fetch a price of thirty dollars a quart.⁹⁶

It is therefore far more likely that patrons of Dawson’s saloons were being infected with typhoid through the consumption of adulterated liquor, which was watered down from contaminated sources. Archibald (1981: 36) has testified that by the end of winter in 1898, “bars had been serving what amounted to whisky-flavoured water”, as stocks began to run particularly low towards the end of the season. If the *S. typhi* ridden water had stagnated in the barroom bottles for any length of time, the bacteria would have had the opportunity to multiply exponentially (Coté et al. 1995), making the quantity ingested per drink greater than that which would be taken into the body had the water itself been consumed, direct from the source. Thus, alcohol could easily have been the vehicle through which many young men ingested large quantities of the bacteria, and explain why this segment of society was at a significantly greater risk of dying from typhoid fever since the quantity of bacilli ingested is directly proportionate to the severity

⁹⁶ Library and Archives of Canada, Katherine MacLennan Collection., Berton 1958: 385.

of the individual's infection (LeBaron & Taylor 1993), and the individual's risk of infection would have increased upon entering Dawson's saloons.

As has been previously discussed, most men visited a saloon at least occasionally, and, in most cases, habitually. Kingsdale (1973) has discussed how the saloon functioned as a 'natural social centre', that provided men of all backgrounds with a variety of services which went far beyond dispensing liquor. The proprietors of these establishments often served a variety of important functions in remote communities such as Dawson City; cashing cheques, lending and holding money in safe keeping for patrons, introducing potential workers and employees, taking messages and receiving mail for regular customers, as well as hosting meetings and political assemblages (Kingsdale 1973). In addition to the services rendered by the proprietor, a variety of entertainments were available to customers within these establishments such as; dancing, gambling, recent newspapers, and viewing movies, boxing matches and live performances. Most importantly however, was the companionship that many lonely and homesick men found amongst themselves in saloons. Thus, while any one man's reason for visiting such places may have been different, the fact that these establishments "catered to a larger clientele in a greater variety of ways than any other...institution" (Kingsdale 1973:478), facilitated men's unbiased exposure to the pathogen within. Côté and colleagues (1995) have effectively demonstrated that the transmission of typhoid fever can be facilitated through cultural practices such as social gatherings. Given the social factors which unequally predisposed the men of the gold rush to acquiring typhoid fever, the hypothesis of typhoid being alcohol-borne as a result of its dilution with impure water seems to be a rational explanation for why typhoid fever did not respect the usual

protections afforded by social status and religious affiliation, and seemed to spare women, children and Native Canadians alike. If, as has been argued, it was Dawson's domestic water source which was transmitting the *S. typhi* bacteria, a high incidence of infection should be observed for all members of the population, particularly children and the elderly. This was a well known fact during this period, as the Dawson Daily News cautioned its readers that:

The greatest care should be exerted by every man, woman and child in Dawson in the matter of drinking water...The water running in the Yukon in front of the city is fouled at all points, even on the Klondike...Notwithstanding the fact that the health board has forbidden the taking of water from the Yukon, a string of water carriers can be seen any morning at the various water hotels filling their buckets out of the Yukon and delivering same in the various business places around town...This is criminal and no punishment is too severe for the scoundrels... (April 11, 1900).

The fact that males of reproductive age were at a significantly higher risk of dying from typhoid fever than women, children or elderly men is thus striking evidence that either individuals were dogmatic in boiling the water they used privately for domestic purposes, or that the water supplied by the various water vendors was not the source of contagion.

Patrons of the Dawson City Water & Power Company, Ltd. were required to sign an agreement which forbade them from concealing the purpose for which the water was to be used, and the client was obliged to permit company employees to inspect their compliance with this regulation at any reasonable hour.⁹⁷ In Dawson's early years, water was not pumped directly into businesses and residences, but had to be gathered from public water houses, thus the combination of the regulations restricting prohibited uses of the water company's product likely discouraged those who were responsible for watering

⁹⁷ Yukon Archives, Central Registry Files, GOV 2028, file 118

down the saloon's liquor stock from using a source which was open to public observation and corporate scrutiny. Thus, the bartenders likely turned to less wholesome water sources, and in the interest of secrecy, probably neglected to boil it in the process of adulteration, since the stoves in these establishments tended to be located front and central, serving the dual purpose of providing heat to the establishment. Interestingly, incidence of typhoid fever fell dramatically around the time that the Dawson Water and Power Company began piping water directly into these establishments, this convenience thereby negating the need to clandestinely acquire water for such illicit purposes.

The fact that not a single death from typhoid fever was ever occurred among individuals working in the hospitality or service industry (this category of workers being primarily comprised of bartenders, waiters and entertainers) bolsters this argument, as it is unlikely that drinking on the job would have been permitted, thus protecting such individuals from exposure to the contagion. An alternative, more sinister explanation may simply be that saloon employees knew that the drinks were tainted, and were thus less inclined than their thirsty patrons to consume the dangerous beverages.

While there are accounts of typhoid-stricken men who were forced to walk as many as twelve miles from their mining claims to reach Dawson's hospitals with fevers in the 101°-103° range (suggesting a source of contagion from outside the city proper), it should be noted that typhoid fever has an incubation period of ten to twenty days, and since Dawson was the supply and service centre for the goldfields, everyone had to visit at least occasionally. Coupled with the fact that the conditions for water contamination in Dawson were right, and the glaring association between the introduction of a stable municipal water supply and the dramatic decrease in typhoid fever mortality recorded for

the whole territory, Dawson City can be most certainly identified as the primary site of infection.

Conclusions

While poor sanitation and improper drainage which resulted in a contaminated water supply was ultimately responsible for endemic typhoid in Dawson City during the early years of the Klondike Gold Rush, the individuals expected to be the most susceptible to typhoid fever were not, however, the individuals who tended to get sick or die from it. That typhoid fever was transmitted throughout the Klondike community by consuming tainted water in Dawson City is a near certainty, as incidence of the disease fell dramatically as soon as a reliable municipal water source was established, and all but disappeared once pure water was being piped directly into residences and establishments. This correlation was not lost on the resident Klondikers, who by 1903 insisted that “[t]he water supply of Dawson could hardly be better than it [was], and it is due to its purity that we have been so free from typhoid”.⁹⁸ During the height of the typhoid epidemics, however, the traditional mode of infection from a contaminated water source has been found to have been compounded by a cultural aspect to its transmission. And thus the habit of men congregating in the saloons of Dawson predisposed an unlikely segment of society to differentially succumb to typhoid fever over those groups generally expected to be at the greatest, or at least an equal risk of dying from infectious diseases.

⁹⁸ Sessional Papers of the Dominion of Canada 1903, #15: 17.

Chapter VII: Conclusion

Although tens of thousands of hopefuls set off for the Klondike gold fields, only a fraction ever reached their destination, while even fewer stayed upon realizing that stories of the potential for instant wealth had been greatly exaggerated. Those determined enough to remain and seek fortunes endured hardships for which many were unprepared. These early gold rushers were often unable to cope with the combined effects of a “long, harsh winter, poor diet, and most important[ly], the failure to strike it rich” (Ratzlaff 1999: 81), and suddenly found themselves suffering from myriad illnesses in an unfamiliar country, thousands of miles from the comfort of their homes and families. The thrill of setting off on the adventure of a lifetime to the Klondike likely overshadowed any thoughts of the potential for disaster which lay ahead; even those with better judgment were impaired by gold fever, and the stampedeers scaled perilous trails, shot merciless rapids and laboured in treacherous mines. To this end, Father Judge (the founder of St. Mary’s Hospital in Dawson City) lamented the fate of the hundreds of patients who crossed his threshold; “It is sad to see how many poor people have left god homes to come here and find themselves without the necessaries of life” (Judge 1907: 240).

The number of deaths that occurred annually in the Yukon Territory throughout the period of study has been found to correspond with the rise, culmination and decline of the gold rush as well as the various discoveries of gold in Alaskan territory. The infant mortality rate for the Klondike population in 1901 was potentially rather low in contrast to other Canadian and American urban populations considering the fact that the community was only a few years old at the time. Given lagging public health protocols

and a struggling sanitary infrastructure, it is in fact remarkable that so few children were succumbing to infectious diseases typically spread through contaminated city environments and congested living conditions, as was the character of turn-of-the-century Dawson City. The discovery of unexpected relationships highlights the contribution that a biocultural approach can make in evaluating the health of historical populations. One such benefit is the potential insight that can be gained into the lived experiences with disease that may otherwise be overlooked when data is analyzed independent of the cultural features of a community. Typhoid fever provides an excellent example with the finding that young Caucasian men were significantly more likely than all other members of the Klondike community to become sick or die from this disease than any other cause of death. This peculiarity of the data led to a closer examination of the cultural milieu, and the discovery that saloon patrons were potentially differentially exposed to typhoid through the consumption of contaminated alcoholic beverages.

The importance of drawing upon qualitative data sources in support of quantitative analyses has been further emphasized by the presence of scurvy among members of the gold rush community. As there were no records of any admissions having been made to St. Mary's Hospital for the treatment of this condition, nor any recorded deaths from this potentially fatal disease, any evidence of the existence of this illness is virtually precluded in the typical data sources. Thus, had qualitative records not provided testimony to the burden of scurvy in the Yukon Territory during this period, the existence of this disease could have gone undetected.

Again, as was the case with the character of typhoid fever in Dawson City, certain extraordinary cultural circumstances provided the necessary opportunity for scurvy to

threaten the health of unsuspecting gold rushers, otherwise, the impact of the disease would have been negligible. In this instance, the high cost associated with importing fresh foods into the Yukon Interior was compounded by the unnecessary risks taken by gold-hungry stampeder who forfeited their health by skimping on the variety and quantity of foods packed into their outfit. The existence of scurvy in an established community, rather than among sailors or soldiers could be difficult to explain without also considering the historical context of the population.

The presence of scurvy in the Klondike serves as a general indicator of poor diet, a reality suffered by many of the earliest gold rushers. While vitamin C deficiency had an observable impact on the bodies of the early gold rushers, it is likely that other, less obvious effects of malnourishment and nutritional deficiencies were also influencing the health status of the population. Although accidental deaths were the leading cause of mortality throughout the period of study, infectious diseases nevertheless accounted for a very large proportion of the suffering in the Yukon Territory, the high mortality rate of which was undoubtedly related to the poor nutritional status of the population.

The seasonal flow of individuals in and out of the Klondike resulted in strong patterns of seasonally-distributed differential morbidity and mortality from infectious disease. Following this pattern, mild strains of smallpox erupted in the Yukon each spring between 1900-1902. The cyclic emergence of the disease was a direct consequence of the opening of river navigation for the season, thereby facilitating the movement of people, but also the spread of infectious diseases. The distance traveled by stampeder who were lured to the Klondike by their lust for gold was often quite vast. This relocation of bodies facilitated the widespread dispersal of pathogens, resulting in individuals who may never

have otherwise come into contact with a disease witnessing its effects in the most unlikely of settings. Such was the nature of malaria in the Yukon Territory, deaths from which resulted from the displacement of the disease from its natural ecology via the bodies of infected individuals who stampeded north.

The cosmopolitan character of the Klondike population resulted from the transplantation of myriad strangers, drawn from all corners of the world and all walks of life, into a foreign and inhospitable territory. This motley amalgamation of frontiersmen may have only had shared dreams of fortune in common, yet, this collective bond proved to be a sufficient foundation on which to build a lasting community. The peculiarities of the Klondike resulted in local conditions that had never prevailed anywhere else before and could never occur again, such was the inevitability surrounding the last great gold rush. The experiences of morbidity and mortality which deviated for certain illnesses from their expected presentation, while adhering to trends typical of more conventional communities for other sicknesses, can only be interpreted within the historical and biocultural framework in which they occurred.

The experience of measles in the Yukon Territory during the gold rush differed, for example, from how the disease typically infected susceptibles in less isolated communities. Rather than being primarily a disease of childhood, it seems that adults in the Klondike were the most affected age groups, accounting for all measles hospitalizations throughout the period. Pneumonia morbidity and mortality, however, conformed to the usual seasonal experience of the disease, with an epidemic erupting late in 1900, as the combined result of extremely cold weather and damp working conditions.

The goal of this study has been not only to contribute to the efforts of other researchers working to dispel the prevailing myths surrounding life and death during the Klondike gold rush, but also to add to anthropological discourses regarding epidemiological trends of infectious disease in urban communities, as well as to offer a new perspective on the health status of a Canadian population around the turn of the last century. This study represents the first utilization of both the Death Register for the Yukon Territory and Patient Register for St. Mary's Hospital for statistical analyses pertaining to morbidity and mortality during the Klondike gold rush. The subject matter of this project has necessarily been constrained, while the date range has been limited to consider the years of the rise and demise of the gold rush. Thus, there are many areas beyond those addressed here which remain to be explored, including the nature of accidental deaths which, when considered together accounted for the leading cause of death throughout the period. Another topic of interest is the high percentage of deaths due to vascular disorders despite the general youthfulness of the gold rush population. The potential also exists to expand the temporal limits to examine changes in the demographic composition of Dawson City, as well as fluctuations in morbidity and mortality as the population transitioned from a placer-mining boomtown to a stable commercialized mining community. As the phenomenon that was the last great gold rush continues to be unraveled through future research, more light will be shed on what it meant to the average individual to live, labour, and die in legendary anonymity as a Klondike Gold Rusher.

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