INVESTIGATING DISEASE EXPERIENCE IN ABORIGINAL POPULATIONS

INVESTIGATING DISEASE EXPERIENCE IN ABORIGINAL POPULATIONS IN CANADA: THE 1918 INFLUENZA PANDEMIC IN BERENS RIVER AND POPLAR RIVER, MANITOBA

By

KRISTEN M. BECKETT, B.A.

A Thesis

Submitted to the School of Graduate Studies

in Partial Fulfillment of the Requirements

for the Degree

Master of Arts

McMaster University

MASTER OF ARTS (1998)
(Anthropology)

McMaster University
Hamilton, Ontario

TITLE: Investigating Disease Experience in Aboriginal Populations: The 1918 Influenza Pandemic in Berens River and Poplar River, Manitoba.

AUTHOR: Kristen M. Beckett, B.A., (McMaster University)

SUPERVISOR: Professor D. A. Herring

NUMBER OF PAGES: vi, 142

Abstract

This research focuses on the 1918-1919 influenza pandemic and its impact on and spread through two Aboriginal communities in Manitoba: Berens River and Poplar River. The mortality experiences these communities had during the 1918 influenza pandemic are used to examine (a) variations in disease experience between communities, (b) factors influencing the spread of influenza in the study communities during the 1918 pandemic, and (c) the usefulness of employing a holistic health model for community level health research.

Reconstruction of the epidemic in these two communities is possible through the integration of both qualitative and quantitative data: ethnohistoric information, demographic, mortality, and mobility data, and environmental information. This thesis provides evidence that (1) closely related communities may have significantly different mortality experiences; while Berens River and Poplar River may have shared similar mortality patterns in some years between 1909-1929, the relationship was not predictable since significant differences could occur, as was the case during the 1918 influenza epidemic from which Poplar River did not suffer, and (2) differences in local economic activities were important determinants in the spread of the 1918 influenza epidemic in these two communities.

The results of this investigation suggests that although communities share characteristics in common, such as culture and history, and show similarities in mortality experience, in the case of the introduction of a virgin soil epidemic these similarities cannot predict the course of an epidemic. It is argued that the holistic approach to health research

provides a useful method investigate this epidemic since the use of epidemiological, ethnohistorical, environmental and historical information were all necessary in order to understand all the factors that contributed the spread of the 1918 flu.

Acknowledgments

Many people contributed in some way to the completion of this thesis. My thanks to my thesis advisor, Dr. Ann Herring, who gave me permission to use data she collected on Berens River and Poplar River. Dr. Herring's guidance was instrumental to the development and completion of this thesis. I also want to thank Dr. Jennifer Brown for our conversations about Berens River, and for materials she provided me with. I am grateful to Rob Hoppa for his quick and informative responses to my panic e-mails. Also, thank you to Raymond Beaumont for his eagerness to help provide direction and data. My thanks to my committee members, Dr. Shelley Saunders and Dr. Trudy Nicks, for their comments and suggestions throughout my research.

I am grateful to my husband, Shawn Beckett, for his comments on my thesis, but also for his patience and understanding through this process. I am also appreciative of the ongoing support I have received from all of my family. Thank you to my wonderful and patient cousin, Kelly Jacklin, who guided me through many computer related panic attacks. I would like to express my gratitude to Tracy Farmer who was always eager to discuss my research and always had insightful and useful suggestions.

In addition to Dr. Herring there are two other individuals who helped a great deal with the statistical analysis in this thesis: Dr. Alan Harrison, and Dr. Larry Sawchuk. I would like to say thank you to Dr. Harrison for our conversations about my analysis and the ideas he provided me with, and to Dr. Sawchuk for providing independent verification of my results.

Finally I wish to thank The American Philosophical Society for providing me with a grant through the Phillips Fund. This grant allowed me to visit their Library in

Philadelphia and incorporate information from A.I. Hallowell's unpublished writings into my analysis.

Table of Contents

List of Figures

List of Tables

List of Maps

Chapter 1

Introduction

The 1918 influenza pandemic was a virgin soil epidemic that spread through the world as World War One came to an end. Virgin soil epidemics are outbreaks of disease in communities that have had no prior experience with that pathogen, or where herd immunity has been lost through the gradual depletion of cohorts who had survived previous epidemics caused by the same strain of virus (Herring 1994a:366). Virgin soil epidemics produce unusually high mortality and morbidity rates and afflict all ages and both sexes (Cohen 1989:54). They are equivalent to the 'new', 'emerging' and 're-emerging' diseases the world is facing today since the populations they affect have had no prior experience with the microbes in question.

It has been proposed that when a new infectious disease is introduced to a virgin population, as happened with the 1918 flu, the resulting virgin soil epidemic will have a universally devastating effect (Dobyns 1966). When only the biological mechanisms of disease transmission are taken into account, such as the virulence of the pathogen and the susceptibility of a population, then this hypothesis makes sense. But, humans are not only biological, we are social. When socio-cultural factors such as mobility, economics, religion, and politics are accounted for, patterns of disease transmission become much more complicated. While this may seem obvious, it is consistently overlooked in the design of health strategies which, in industrialized nations, rarely focus on the community, but speak of entire populations or sub-populations as being at risk for a particular disease (see Wilkins 1996; Centers for Disease Control and

Prevention [CDC] 1995; Health and Welfare Canada 1996). To explore how social mechanisms of disease transmission can influence the spread and impact of a virgin soil epidemic in a region, this thesis investigates the course of the 1918 influenza pandemic in two Ojibwa communities on the eastern shore of Lake Winnipeg: Berens River and Poplar River, Manitoba. The 1918 flu is a well documented historical virgin soil epidemic that can be used to better understand contemporary emerging and re-emerging infectious diseases.

Populations and sub-populations are often considered to be homogeneous groups. In the public health literature, it is common to speak of 'Aboriginals' and 'foreign-born' as sub-populations who are at increased risk for particular diseases (Wilkins 1996; Health and Welfare Canada 1996; CDC 1995). Anthropologists working at the community level know this to be an unrealistic categorization. Each community has a unique set of characteristics that distinguish it from similar communities.

For the purpose of this thesis, population will be used to refer to all persons living within a political boundary (e.g., country, city, town, reserve) irrespective of the inhabitants characteristics (e.g., sex, gender, ethnicity, immigration status, religious or political affiliations). A sub-population simply refers to a group of individuals living within the population who can be defined on the basis of their characteristics as listed above. The term community can be especially difficult to define since it can mean many different things to different groups of people. Aboriginal communities in Canada are more easily defined since the reserve system of land has created specific geographic locations where people of a common history and culture reside together. While this definition will be used for this research, it is acknowledged that communities' geographic, political and social boundaries are fluid and complex (Manderson et al. 1998:225).

A. Irving Hallowell made the observation that each community is unique when he traveled to Manitoba, Canada to study the Ojibwa. His fieldwork was conducted among

Ojibwa living in communities located along the Berens River from 1930-1940. During the course of his fieldwork he noticed that although these communities shared a common culture and history and had been exposed to similar political and economic forces, there were vast differences in the way in which they lived (Hallowell 1992:8-9, 26). Hallowell noted (n.d. [a]):

> ...An historical perspective was inescapable. There were manifest cultural differences from group to group, which hypothetically could only be explained by assuming the occurrence of differential rates of acculturation in response to varying historical events such as the fur trade, movements of population, the local activities of missionaries, marriage with whites, and relations with the Dominion government.

Today it would be said that the Ojibwa living in the Berens River region were exposed to similar macro-level economic and socio-political forces, but micro-level differences in those forces played a part in shaping the differences Hallowell observed at the community-level.

It is important to understand these subtle community differences when studying the health of a population. It has been shown that generalizations about the health of a population are problematic. Proulx and Turcotte (1996) studied tuberculosis (TB) in Inuit communities in Quebec and found that the rates of TB were different among communities in the same region. They found that 79% of all cases in the region occurred in four of the fourteen communities and that three villages had no TB. Yet, Health Canada identifies all Aboriginal people as being at risk for tuberculosis (Health and Welfare Canada 1996).

Research on the 1918 influenza pandemic also demonstrates that variation exists in disease experience at the community level. The 1918 influenza pandemic killed an estimated 20 million people around the world. It is said to have caused illness in two hundred to seven hundred million people (Walters 1978:856). More people died of the flu

that year than were killed in World War One. In Canada, it is estimated that one in six individuals were affected, and between 30,000 and 50,000 people died (Pettigrew 1983:6).

Herring's (1994a, 1994b) investigations on the 1918 influenza pandemic in the Canadian Subarctic have made the point that closely connected and related Aborginal communities may experience significantly different mortality rates. She has shown that mortality rates among the Aboriginal communities along eastern Lake Winnipeg during the pandemic varied considerably, and that some communities were spared entirely (Herring 1994a:371).

The impact of the 1918 flu epidemic on sub-populations living in North America has been noted by medical historians. It has been suggested that Italian-Americans had one of the highest mortality rates in the United States (Crosby 1989:227), and that the Canadian Aboriginal population suffered a substantial loss, approximately 3% of their population (Graham-Cumming 1967:149). However, the presumption that all populations were equally susceptible to this virgin soil epidemic suggests that factors other than biology were working to create differential mortality rates between these sub-populations.

This thesis studies the 1918 influenza pandemic in two Ojibwa communities to examine the hypothesis that it is not the population or sub-population that is at risk, it is communities that are at risk. Berens River and Poplar River Manitoba had two distinct experiences with the 1918 flu. This study explores factors that may have promoted disease at Berens River, while preventing it at Poplar River. One reason these communities are so interesting to study is that they share many characteristics in common. They provide an unusual opportunity to explore community-level differences (or micro-differences) that are important to the spread of disease. This thesis stresses that broad generalizations about the effects of an epidemic on the health of a population or sub-population are not appropriate and can be incorrect.

This historic health research bridges the gap between the methods of anthropology and epidemiology to create as complete a picture as possible of the health of residents living in Berens River and Poplar River. Much debate has surrounded the acceptance of various paradigms within the sub-discipline of medical anthropology. This thesis supports the contention that no one paradigm will suffice when investigating the health of a community (Baer 1996:452). The ways in which the 1918 flu unfolded in Canadian Aboriginal communities could conceivably be governed by a community's political organization, economic involvement with the fur trade, local historical and cultural factors, and/or ecological factors such as the weather. This historical research reveals the complexity of disease causation in these communities and uncovers factors which played a part in their disease experience during the 1918 pandemic. It then contextualizes those factors, so that the underlying causes can be determined (Dunn and Janes 1986:3). Necessarily then, this research incorporates a macro perspective including the consideration of macro-political and economic factors, and, it incorporates a community perspective, or micro-perspective, which considers local economic, political, historic, cultural, and ecological factors.

The aims of this research are to:

1. demonstrate that within sub-populations variations exist in community health status and disease experience;
2. determine what factors were influencing the spread of disease in Berens River and Poplar River during the 1918 pandemic and to uncover the forces governing those factors;
3. demonstrate the usefulness of using a holistic model of health research.

This thesis is organized into two sections and six chapters. The first section of the thesis concentrates on ethnohistoric data. It begins in chapter two with a description of the communities and the lifeways of the people living in Berens River and Poplar River, Manitoba. This is followed by a description of ethnographic methods and materials used to assess the similarities and differences between the two study communities. Chapter three provides a description of the 1918 influenza pandemic in Canada, Manitoba, and the eastern Lake Winnipeg region. The second section of the thesis focuses on the demographic and epidemiological analysis. Chapter four describes and evaluates the quantitative materials and methods used in this research. Chapter five presents the main findings of the quantitative research, while their significance to this thesis is left to the discussion in chapter six.

This thesis provides evidence that: (1) Berens River and Poplar River may show similar mortality patterns in some years between 1909-1929; however, the relationship between the mortality rates is not predictable since significant differences could occur, as was the case during the 1918 influenza epidemic from which Poplar River did not suffer; and, (2) local economic activities, such as the seasonal subsistence cycle, were important determinants in the spread of the 1918 influenza epidemic in Berens River and Poplar River. Mobility data suggests that the possibility existed that the virus was introduced to Poplar River, but the ethnohistoric data suggests that local socio-economic forces were important in preventing its spread.

It is argued that the holistic approach to health research provides a useful means to investigate this epidemic: "...a holistic understanding implies one where analysis crosses artificial boundaries - social, political, or economic - to encompass an explanation incorporating all these factors" (Warry 1998:88). For this research it was necessary to incorporate epidemiological investigations into this research so that mortality rates could be

established and disease patterns over time could be examined. Ethnohistoric data provided insight into the community level similarities and differences between these two Ojibwa groups. In addition to the micro level differences, a macro perspective was necessary to understand what forces shaped the local variations. Ecological and biological investigations were important components to the investigations into mobility.

Chapter 2

Ethnohistoric Dimensions: The Lifeways and History of the Ojibwa in the Berens River Region

Introduction

This chapter provides an overview of the Northern Ojibwa. It reviews the literature on their environment and lifeways (i.e., patterns of activities) and discusses the socio-cultural and environmental changes affecting them during the nineteenth and early twentieth centuries. Next the chapter considers macro-political and economic forces which played a central role in the local conditions communities in this area experienced. Following this, the chapter moves to a discussion of the specific Ojibwa communities of Berens River and Poplar River. An explanation of ethnohistoric materials used in this research precedes the analysis of this data. It is argued that while the communities of Berens River and Poplar River do share some common characteristics with each other, and with the Northern Ojibwa as a whole, there are subtle community-level differences in their lifeways, such as subsistence activities.

The Northern Ojibwa

This discussion of the Northern Ojibwa provides a brief overview of the typical lifeways and history of Aboriginal people in the Lake Winnipeg region around the time of contact with Europeans.

By the early 19th century there were four main divisions of Ojibwa: Southeastern, Southwestern, Plains and Northern. Their territory stretched from southern Ontario to eastern Saskatchewan (Bishop 1974:4). In addition to being known as the

Ojibwa, they are also referred to as "Saulteaux", "Bungi" (Hanks 1982:110), and "Chippewa" (Brown 1995:211). The Northern Ojibwa inhabit the region north of Lake Superior and east of Lake Winnipeg (Skinner 1911:118).

Physical Environment and Seasonal Movements

The environment in this region is classified as subarctic, characterized by long cold winters, short variable summers, boreal forests and the Canadian Shield (Young 1988:9). Faunal resources include: moose, deer, black bear, caribou, wolves, hares, otters, muskrats, beavers, mink, fishers, lake trout, pickerel, white fish, northern pike, geese and ducks (Rogers 1962). These resources fluctuate annually and seasonally. Agriculture is not a viable practice due to poor soils and short growing seasons, but wild rice and various berries can be harvested in season (Skinner 1911:134, 138).

In the late nineteenth and early twentieth centuries the lifeways of the Ojibwa in the region were influenced by the seasons. The seasons affected the types of resources that could be exploited, the size of hunting groups, where people lived, and the mode of transportation. The subsistence cycle was entwined with climate changes, with freezing and thawing of the lakes and rivers being important phenological events. The Ojibwa summer corresponded to the warmest months of the year (June - August). Winter began in November with the appearance of the "freezing over moon." February was the coldest month, and the snow could begin to melt in April. The ice could be expected to break up in early May (Hallowell 1992:43). Travel in winter was by dog train over land and ice, and in the summer by canoe, sailboat, and steamboat (Asher 1950:85). During the winter months, the Ojibwa in this region congregated in small hunting groups of about 16 people on average (Hallowell 1992:44). In the summer, many of these groups joined together to form larger fishing settlements containing between 50 and 122 people (Hallowell 1992:48).

Health

Shamans were responsible for curing the sick in these communities. The Shaman, or Medicine Man, was noted to be the most important person in any Canadian Ojibwa village (Landes 1969). Jacob Owen (Matthews 1993:22) told the story of how Fairwind (Naamiwan), a Medicine Man at Paungassi, prevented the 1918 flu from causing any deaths in Paungassi by giving everyone in the community a spoonful of his medicine. While deaths were reported in Berens River, and as close as 10 miles away at Little Grand Rapids, no one was reported to have died from the flu at Paungassi (Matthews 1993:22).

In addition to the powerful healers, there were also important healing ceremonies. The Midewiwin, or Grand Medicine Society, was a ceremonial organization concerned with curing. "Its practitioners were an organized preisthood of men and sometimes women. The Mide priests were also carriers of myths and legends" (Brown 1995:221).

Changing Lifeways Among the Northern Ojibwa

The Hudson's Bay Company (HBC), the Christian missions and the Canadian Government all influenced Northern Ojibwa lifeways and culture in this region. These three institutions all altered traditional patterns of political, religious and economic activity. The early years of the fur trade (1670-1763) were characterized by competition and expansion as the English and the French colonial struggle unfolded in Canada (Notzke 1995:143). By 1763, the Treaty of Paris had put an end to France's role as a colonial power in North America. Britain replaced France's abandoned positions in the fur trade, and adopted French policies which had focused on strategic and political relationships with the Aboriginal people. In 1779, the Northwest Company was formed using British capital and French Canadian skills and techniques. The creation of this new trading company in Canada lead to increased competition and an increase in the number of trading posts in the

west (both HBC and Northwest Company) and pushed the fur trade frontier to its outer most limits (Notzke 1995:144).

The Northwest Company was the first trading company in the Lake Winnipeg region. The Northwest Company's first post was established at the mouth of the Winnipeg River in 1792 (Hallowell 1955:1122). It was soon followed by the HBC. The trading institution spread swiftly throughout the region and "before the end of the 18th century Lake Winnipeg had become the crossroads of a continent, traversed by the canoes of explorers, fur traders, and missionaries, where before there had been only those of native Indian hunters and fishermen" (Hallowell 1955:114).

Subsistence Economy

The effects of the arrival of Europeans in Canada, and the impact of international trade on the economies of Aboriginal people are debated (see Brown 1995; Tough 1990; Ray 1974). While it is beyond the scope of this thesis to provide a comprehensive review of the literature concerning how contact with Europeans changed the lives of Aboriginal people in Canada, a brief mention of this issue is necessary since the local impacts of this relationship will be discussed for Berens River and Poplar River later in this chapter. The following discussion simply provides an overview of the possible ways in which the lives of the Northern Ojibwa were affected by this new relationship with Europeans.

The initial relationship between traders and Aboriginal people has been described as mutually beneficial. It is argued that the Aboriginal people could acquire trade goods (e.g., tools, weapons, cooking utensils) that could improve their standard of living (by European standards), and the Europeans could acquire commodities of great value on the European market (e.g. beaver pelts) (Fleras and Elliott 1992:135). While this relationship was argued to be initially beneficial, it eventually became one where Aboriginal people came to depend on these technologies (Waldram et al. 1995:13). By 1890, Aboriginal people were dependent on the trading posts. The Ojibwa became dependent on store foods such as

flour, oatmeal, sugar and tea, and on goods such as canvas tents and 'Peteboro' canoes which all had replaced locally-made goods (Bishop 1974:78). This new relationship brought technological changes such as reliance on fire arms, metal traps, nets, and processed foods (Young 1988:16). The debt or credit system was instrumental in creating this dependence. It allowed equipment to be issued to the Aboriginal people in the fall in return for fur in the spring. As a result, the Aboriginal people became more and more specialized in trapping in order to meet their debt repayments, and were paying less attention to subsistence activities (Hanks 1982:107).

Ojibwa hunting practices changed. Mobile and cooperative hunting, which had focused on large game animal resources, shifted to individualistic and sedentary methods as game animals were depleted (Bishop 1970:9). The trade industry also contributed to changing settlement patterns as Aboriginal groups began to congregate in permanent settlements near the HBC trading posts (Skinner 1911:118). This relationship of dependence made the Ojibwa vulnerable to economic fluctuations in the region, as well as in the world market: "The Canadian fur trade brought a market-oriented, mercantile economy into contact with the non-market-oriented, barter economies of Indian people" (Notzke 1995:145).

The coalition of the HBC and the Northwest Company in 1821, which ended forty years of competition, spurred many policy changes in the region. Non-profitable posts were abandoned, conservation practices were applied, the extension of credit was reduced, and the price of materials increased (Bishop 1974:12). Bishop (1974:12) argues that it was these changes during this period that changed the collective social organization of the Ojibwa to a more individualistic one. Ray (1974:3) has pointed out that not only were Aboriginal groups at risk of serious shortages, but their ability to deal with those shortages had been undermined. By the late 19th century game depletion, unproductive posts, low seasonal income and the extension of credit had all worked to create a "welfare society"

among northern Aboriginal people (Ray 1974). While these theories of dependence may have held true in some communities, it should be noted that the degree to which a community came to depend on the European market system could vary depending on factors such as the location of the post, who was in charge of the post, and the readiness of the community to accept this system of economics.

Health and Disease

The Christian missionaries played an active role in the abandonment of traditional healing ceremonies and religious beliefs. Their influence was said to have undermined the influence of Shamans in the communities (Bishop 1974:89). After mission houses and trading posts were established in the communities in the late 1800s, they were often approached for medicine instead (Young 1988:96; Bishop 1974:88). Following the creation of treaties with the Canadian government, the communities were visited once a year, at treaty time, by a physician (Young 1988:96). These encroachments into health and healing contributed to the demise of the Midewiwin ceremonies. The last performance of the Midewiwin in Berens River was some time around 1870, and as late as the 1920's for some inland bands (Hallowell 1992:12).

At the same time, trading posts often became prime areas for disease outbreaks (Herring 1994b; Ray 1976). These centers brought Aboriginal people and Europeans from various locations together allowing for the exchange of microbes. The Northern Ojibwa were exposed to many infectious agents. Skinner (1911:161) noted that pneumonia, consumption and La Grippe were the most common and most fatal diseases; Ray (1976) identified scarlet fever, measles, smallpox and influenza as the prevailing diseases in the mid-1800s.

Religion

The main goal of the missionaries was to convince Aboriginal people to convert to Christianity. Their success varied from region to region and was linked to increased

European contact, that is, when European power over Aboriginal people was consolidated the success of the missions increased (Waldram et al. 1995:134).

The decline of the fur trade and increasing poverty after 1821 decreased the ability of Aboriginal people to resist missionization efforts. The period of greatest success for the missions came after 1867 when the churches were given control over Aboriginal education by the newly formed Government of Canada (Waldram et al. 1995:15). The missionaries performed baptisms, funerals and weddings in the communities, discouraging and sometimes suppressing Aboriginal religious expressions. They provided education founded in Christian fundamentals which resulted in the undermining of Aboriginal cultural goals and world views (Young 1988:17).

Governments

The policies of the colonial, and later, the Canadian Government also impacted the lives of Aboriginal people in Canada. After Britain had secured power over the colony in 1763 the Royal Proclamation established British sovereignty over the unexplored interior of the continent. It recognized Aboriginal people as 'Nations' with whom political alliances could be forged and treaties could be made. The direct result was the creation of treaties with Aboriginal 'Nations' across Canada over the next 100 years (Fleras and Elliott 1992:40). The principles of the Royal Proclamation were upheld when in 1867, control over Aborginal people was transferred to the Canadian Government. This meant that the surrendering of Aborginal lands continued to be a political process (Waldram et al. 1995:14).

While the political policies of the early contact period have been described as "pacts of mutual assistance and friendship", the politics of the nineteenth century are described as "a system of internal colonialism and conquest oriented acculturation, reflecting the need for (a) political control over Native populations, (b) protection of British and French interests, and (c) removal of competition for scarce resources" (Fleras and Elliott 1992:40).

The result was a policy of assimilation, the objective: "to subdue and subordinate aboriginal peoples" (Fleras and Elliott 1992:41). The policy of the Canadian Government in the early twentieth century, as it pertained to Aboriginal people, can best be exemplified in a quote by Duncan Campbell Scott, Superintendent-General of Indian Affairs (1920, cited in Fleras and Elliott 1992:40):

> I want to get rid of the Indian problem....Our objective is to continue until there is not a single Indian in Canada that has not been absorbed.

It is clear that, within Canada, political policies, the fur trade, and Christian missionaries had a great impact on the lives of Aboriginal people, but it is also evident that these forces were founded in the fundamental goals of colonialism. Throughout Canada's history of power transfer, during the colonial period and after independence, the policies and goals of the government, trading companies, and missions continued to reflect colonial policies. The Aboriginal people in Canada were tied to the world economic and political systems through (a) their participation in the fur trade, and (b) their political and economic relationship with colonial and national governments. The missions facilitated this relationship through the promotion of European and Christian values and the suppression of Aboriginal culture.

This discussion has focused on how these forces affected the Northern Ojibwa. I now turn to the specific descriptions of Berens River and Poplar River to show that the larger, macro influences of trade, politics, and missionization affected these communities in varying degrees.

Qualitative Methods and Materials

In this thesis the analysis of the changing lifeways in Berens River and Poplar River, and similarities and differences between them is based on the collection and review of various qualitative data sources. The Government of Canada Sessional Papers (1900,

1910-1919, 1925) provide basic community information such as size, demographics, income opportunities, and health and sanitation. Ethnohistorical data were obtained primarily from the field notes of A. Irving Hallowell, housed at the American Philosophical Society (APS) library in Philadelphia. The APS information was collected during fieldwork at the APS library in Philadelphia in July 1997. Information was also obtained from unpublished memoirs and reminiscences of Aboriginal and non-Aboriginal residents of Berens River and autobiographies of missionaries from the area. In addition to the collection of these data, several library sources on the Ojibwa were consulted.

The Hudson's Bay Company (HBC) post journals provided qualitative data regarding human mobility (Hudson's Bay Company Archives [HBCA] B.331/a/1; B.16/a/12-20;B.154/a/87-95; B331/a/2-3). These post journals were obtained by interlibrary loan through Mills Library at McMaster University. These data offered insight into the many variables that could influence mobility in this region, and which ones may have been operating during the epidemic.

Community level information was also available from parish registers for Berens River and Poplar River (United Church of Canada Archives [UCCA], Berens River, 1909-1952; Poplar River, 1886-1963), which were collected by Dr. Ann Herring (McMaster University) from the UCCA in Manitoba. The United Church of Canada Registers of Marriage (Berens River, Poplar River) allowed for the assessment of the relatedness of these two communities. In this exercise, the number of marriages between Berens River and Poplar River were counted and compared to the number of marriages overall in order to determine the extent of familial ties shared by the two communities. The quality of the parish registers is discussed in detail in Chapter 4.

These data are used in this study to investigate community level differences between Berens River and Poplar River so that micro-level factors influencing the disease experience in each community can be known. I was specifically interested in exploring the

question: what community level differences between Berens River and Poplar River existed that might have prevented an epidemic at Poplar River, while promoting one at Berens River?

While the objective was to collect the same information for both communities, this was not possible. Berens River was a larger community and was economically important to the HBC, and thus, is mentioned more frequently in the records and in the literature. Further, it gained a certain degree of notoriety during and following Hallowell's visits there which, in turn, sparked interest in further research there (Boggs 1952; Brown 1989, 1998, Brown and Matthews 1994).

This research incorporates various types of oral histories, including reminiscences of residents of Berens River (Asher 1950, William Berens 1940), memoirs of residents of Berens River (Henry Everett 1986), and autobiographies of missionaries (Stevens n.d.; Stephenson 1925). These documents provide information vital to the interpretation of the 1918 flu in these communities and therefore must be considered carefully. It is important to remember when using such documents that they reflect the way the author remembers an event and not necessarily the truth of what occurred:

> The essence of history is people, and all people are bound by their cultural perceptions of the world. Documents, since they are written by people do not automatically become truth once they are transferred to the written page. [Wilson 1986:254]

Problems such as bias, mistakes and factual errors can occur in any historical document (Hollingsworth 1968:416); however, oral histories and reminiscences have their own problems:

> Reminiscences, although they may be connected with historical chronology, also have reliability problems, the narrator after all, is a human being who is likely to have prejudices and quirks which filter his memories and give a somewhat altered perspective to his account. [Page 1986:279]

An example of this problem in sources used in this research can be found in accounts of mortality. One source put the number of deaths in Berens River from the 1918 flu at 50 for the entire population (Matthews 1993:22), while the Methodist burials list only 24 deaths (UCCA Register of Burials, Berens River). The number 50 was collected through a translated interview with Jacob Owen, upon whom the epidemic had a considerable impact (Jennifer Brown, personal communication). Accepting this number would mean that either numerous burials were not recorded in the Methodist burial registers, or that the Roman Catholics had an estimated mortality rate from the 1918 flu of 481.48 per 1000, compared to 105.73 per 1000 for the Methodist population[1]. It is unlikely that the Roman Catholics had significantly higher mortality rates than the Methodists, and the number 50 is more likely an error in fact. Alternatively, it could be due to a lapse in recording during the epidemic. Attempts to obtain Roman Catholic burial registers for 1918 and 1919 met with no response from the Catholic Church in Berens River, so these estimated mortality rates cannot be verified.

To establish the reliability of these types of documents it is necessary to cross check different narrators' perspectives (Page 1986:279). Most often, historians and historical demographers are working with only one or two sources of information and therefore cross-checking is not always possible. In these cases, Page (1986:280) suggests that background information on the narrators and the topics discussed is the historian's best guard against misinformation.

To address these problems I have consulted as many independent sources as possible. In some cases I have been able to cite multiple sources for the same view point.

---

[11] This mortality rate for Roman Catholics in Berens River was estimated using census data (Government of Canada Sessional Papers 1917) and Jacob Owen's estimation of the number of flu deaths in Berens River (50). The number of Methodist deaths records were subtracted from 50, leaving 26 deaths possibly attributed to Roman Catholic residents.

When this was not possible I have tried to provide a context for the information, for example, who is speaking (i.e., Aboriginal person, HBC employee, Missionary etc.) and what their motivations and possible biases might have been. This approach allows the reader to evaluate the credibility of the evidence.

The History of the Study Communities

Berens River and Poplar River are two Aboriginal communities on the eastern shore of Lake Winnipeg, Manitoba. Each community lies at the mouth of the river for which it is named (Map. 2.1). The Aboriginal people inhabiting the communities of Berens River and Poplar River belong to the cultural and linguistic designation of Ojibwa. Poplar River is approximately 75 miles north of Berens River and is characterized by rocky and swampy land (Government of Canada 1900:100). Berens River is also rocky and swampy, however, there is enough soil for gardening purposes (Government of Canada 1900:101).

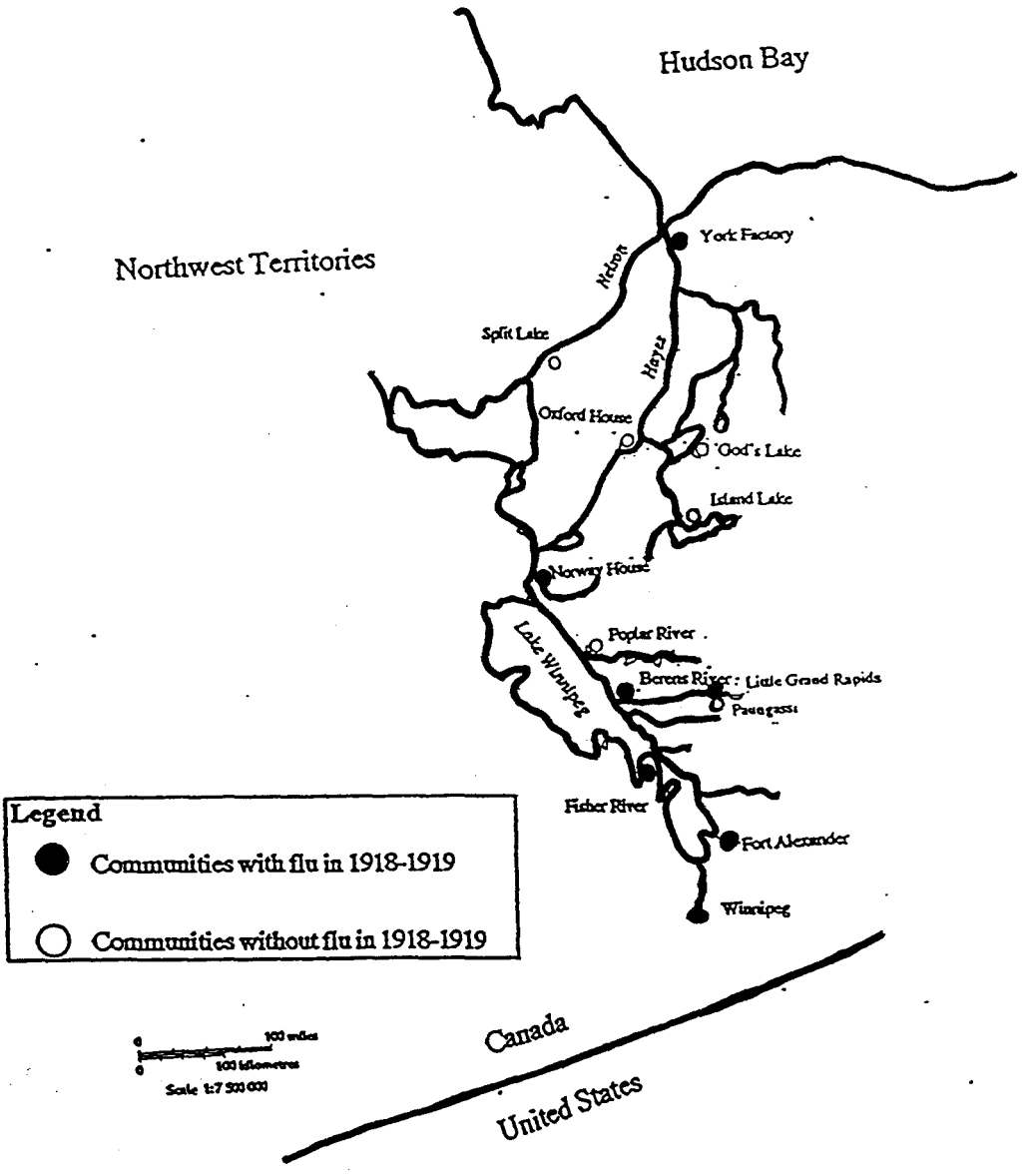
Traders

The presence of trading posts on these two rivers can be traced back to approximately 1800. At this time, traders operating out of the HBC Albany post decided to pursue an aggressive inland policy (Lytwyn 1986:45). During early periods of exploration the traders found a new route to take them from Island Lake to Osnaburgh, which led them to the Berens River (Map 2.2).

This route became important in 1799-1800 in developing Albany's East Winnipeg Trade (Lytwyn 1986:96). The location of Berens River and its inland connections were important determinants in using this route (Lytwyn 1986:104); however, navigability was the main reason the HBC eventually chose Berens River over Poplar River to the north.

Map 2.1

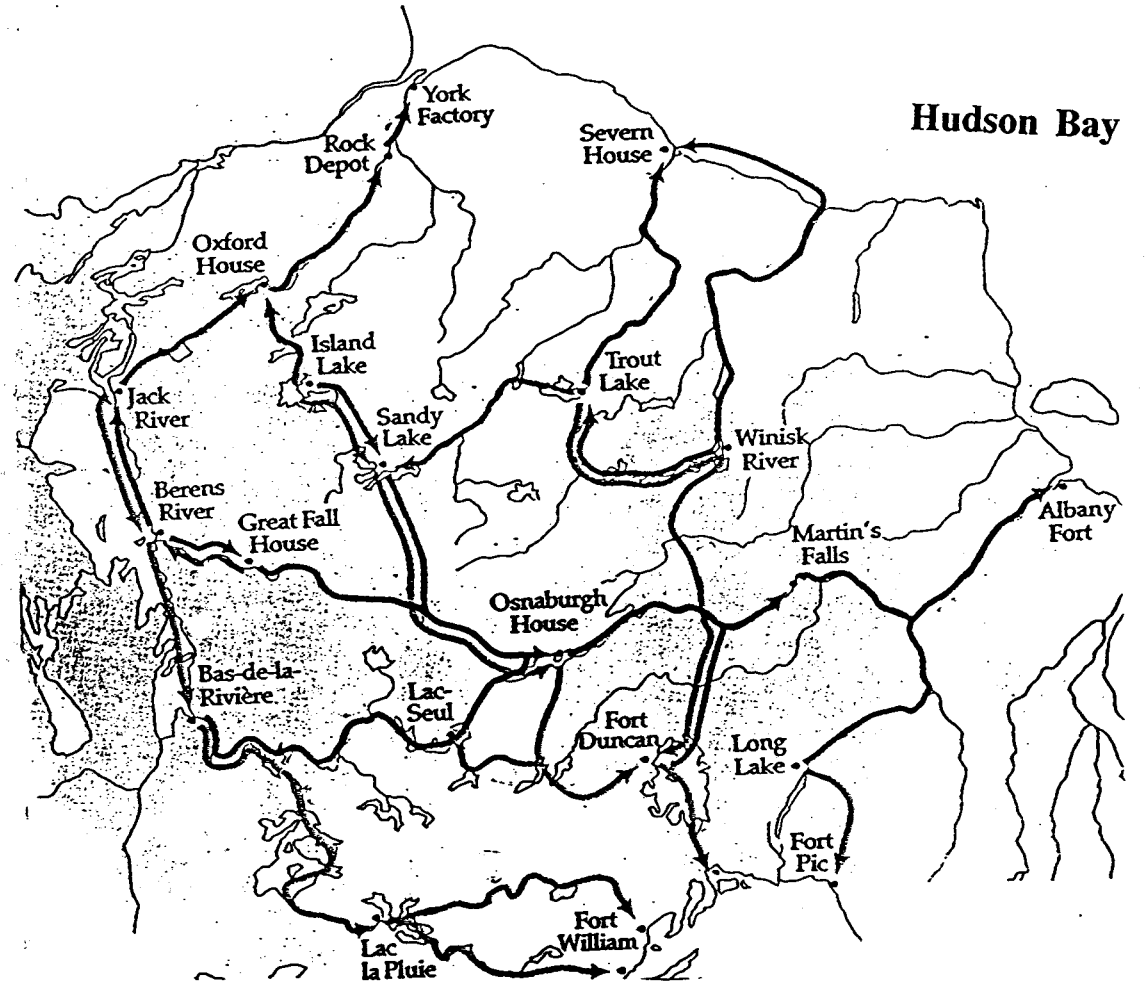
Historic Lake Winnipeg Region: Communities Known to Have Suffered from the 1918 Influenza Pandemic



Source: Map redrawn from *The Historical Atlas of Canada, Vol. 1* (Harris 1987)
Information on the 1918 Influenza Pandemic: (Herring 1994a; Matthews 1992; UCCA Register of Burials, Berens River and Poplar River)

Map 2.2

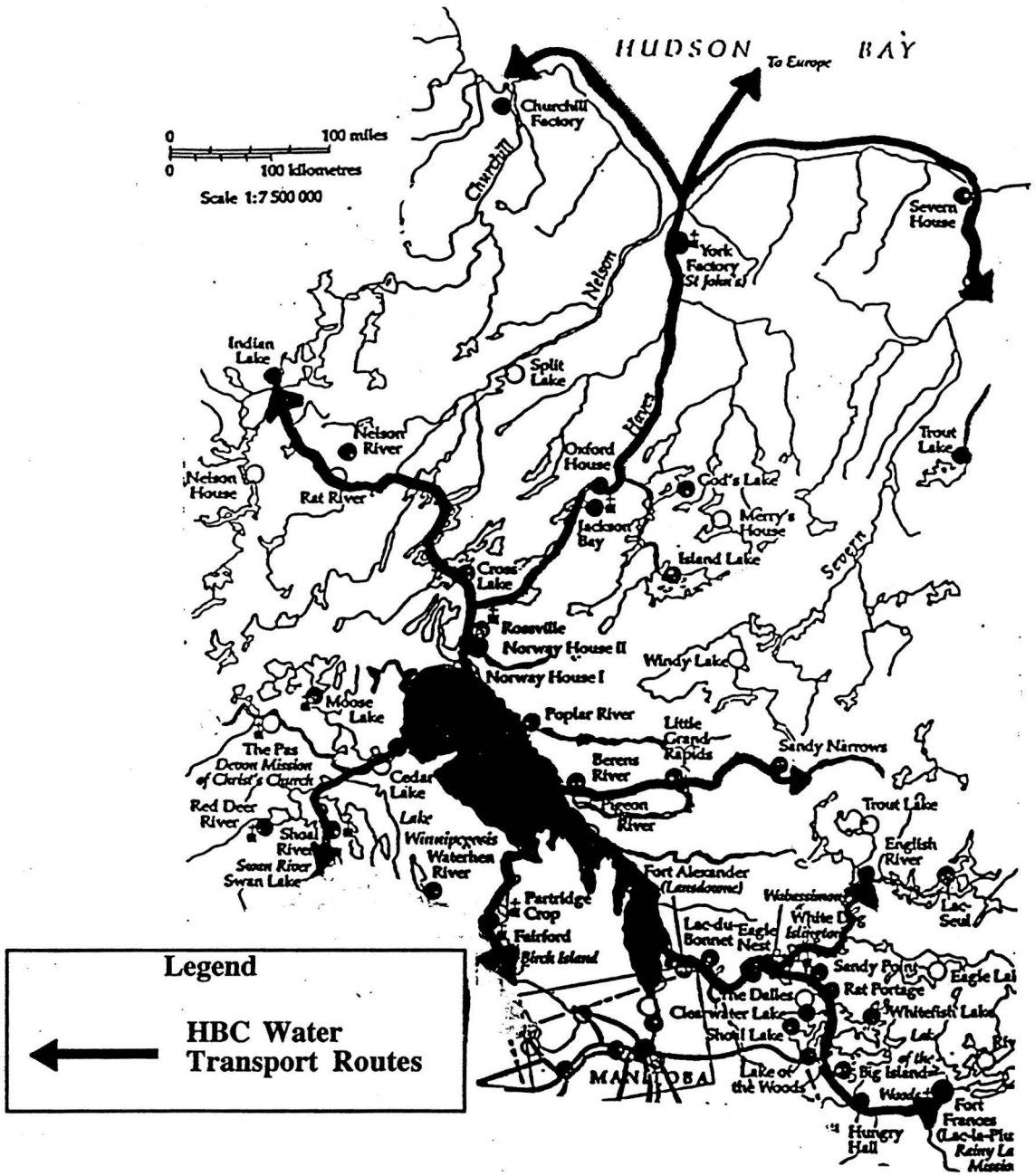
Hudson's Bay Company Travel Routes, 1774-1821



Scale 1 : 12,500,000

Source: Redrawn from *The Historical Atlas of Canada, Vol. 1* (Harris 1987:63)

Map 2.3
Hudson's Bay Company Water Transport Routes



Source: *The Historical Atlas of Canada, Vol. 2* (Gentilcare 1990)

Berens River occupied a strategic location which connected inland posts by waterways (Map. 2.2 and 2.3), and it could be traversed in the batteaux instead of the larger more expensive canoes (Lytwyn 1986:104). While the journey on Berens River was difficult, attempts to use Poplar River "proved to be even more dangerous" (Lytwyn 1986:145).

The first post on the Berens River was established by the Fort Albany traders in 1800 at Sandy Narrows (Map 2.3). Following this, posts were established at Little Grand Rapids in 1801 and Windy Lake (Favorable Lake) in 1902 (Map 2.3). There was also a Northwest Company post at the mouth of the river (Lytwyn 1986:104). In 1802, the Sandy Lake post was abandoned and a post was established at Poplar River. The canoe route from Berens River to Poplar River was "easy," and once on the Poplar River traders could travel as far as Rice Lake with ease; however, beyond Rice Lake it was impossible to travel much farther by batteaux (Lytwyn 1986:104).

By 1810 the fur trade in the eastern Lake Winnipeg region declined sharply, large areas had been over-trapped and reports indicated that the beaver had disappeared from this area. The Northwest Company had begun to withdraw in 1808 in response to the dwindling trade. The Hudson's Bay Company, however, was preparing to increase trade in the region. In 1810, they made plans for new settlements in the region, which would be directed from York Factory. In 1811-12, 1863-64, and 1869-70 an HBC post was re-established at Poplar River (Lytwyn 1986:140). An HBC winter trading post was established at the Berens River community in 1814 (HBCA B.16/e/l.fo.5d, cited in Berens River Post History). The post was originally built at Big Fall on the river (Lytwyn 1986:145).

The company met with successful trading in the area by supplying the posts from Norway House from where men and supplies would be shipped up river by canoe from the eastern coast of Lake Winnipeg (Lytwyn 1986:156). After the decline of the Northwest

Company in 1821, the post at Big Fall was moved to the mouth of the Berens River (Lytwyn 1986:156). It was not until 1824 that a permanent post was established at the mouth of the river (HBCA B.16/a/12-20). Between 1821 and 1870 Berens River was the "principal trading post in East Winnipeg" (Lytwyn 1986:162). When the 1918 flu epidemic struck, Berens River was still a functional trading post; Poplar River, however, was not (HBCA A12/FT273/4).

Religion and Government

Following the expansion of Europeans and their market economy into the western interior, their religion and politics soon began to infiltrate the region. The Methodist mission at Berens River was built in 1874 (Brown 1989:211), and by 1912 a Roman Catholic church had been erected (Brown 1998:64). Treaty 5 was signed with the government of Canada in 1875 (Hallowell 1992:32). This treaty, better known as the Lake Winnipeg Treaty allocated land to the bands who signed it. It gave the Aboriginal people permission to exploit economic resources and the right to pursue hunting and fishing. The treaty also resulted in annual payments to each band of $500 for ammunition and twine; and, annuity payments of $5 to each person (Hallowell 1992:32-33).

The introduction of Methodism came later to Poplar River. The Methodist mission was established in Poplar River around 1890 (UCCA Poplar River Register of Baptisms); but, it is likely that the community was visited by Methodist ministers from other communities prior to that time. Like Berens River, Poplar River signed Treaty 5 in 1875 at which time both communities were represented by the Chief of Berens River (Hallowell 1992:32).

Changing Lifeways

The end of the nineteenth century brought many changes to the region. Schools, that were the joint responsibility of the church and the government, were erected (Brown 1989:213). Annual treaty payments brought traders to the communities each summer and

especially around treaty time (Brown 1989:213). Men from the communities began to move seasonally to commercial fisheries operating on Lake Winnipeg by 1883 (Dueck 1986:109).

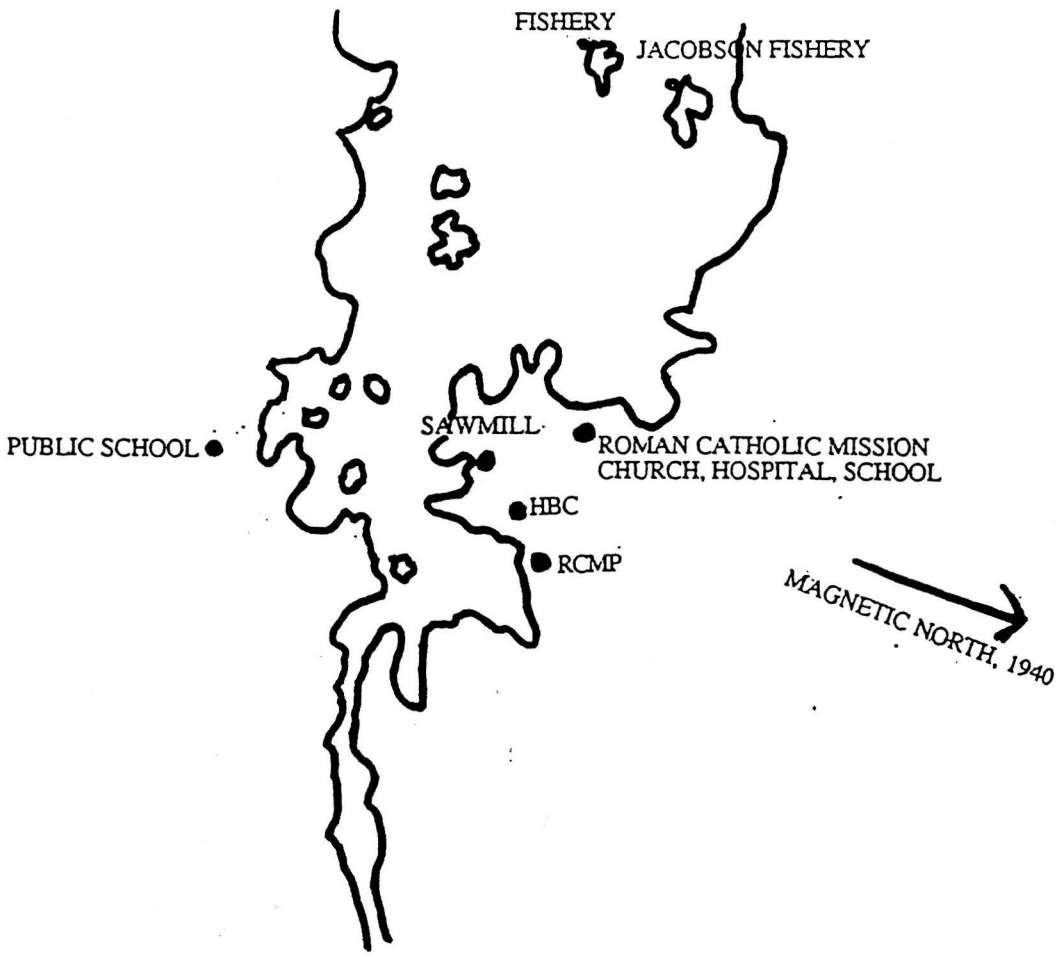
Berens River experienced the introduction of many new institutions during the last decade of the nineteenth century. By 1898, Ewing and Fryer opened a fishing station on Sheep Island a few miles from the mouth of the Berens River. This fishing station greatly increased the amount of steamer traffic coming into the community (Asher 1950:88). By 1900 a government fish hatchery was built in Berens River and two more fishing stations had opened (Dueck 1986:118). Maps 2.4 and 2.5 show the locations of most of the developments in Berens River.

The HBC trading post, along with the fisheries, eventually drew many of the residents of Berens River into a cash economy (Boggs 1952). However, this reliance on the international market economy could be detrimental in poor fishing and hunting years. The HBC post journals for Berens River equate starvation with poor hunting[2] (HBCA B.16/a/12-20, 1909, November 23-30). Food from the HBC store was not a viable alternative since although the HBC store carried many items, they were expensive and fresh vegetables and meat were often unavailable (Boggs 1952).

[2] The term "starvation" in the HBC post journals should be interpreted with caution since its meaning in HBC post journals can vary from the literal definition of "lack of food" (see Black-Rogers 1986).

Map 2.4

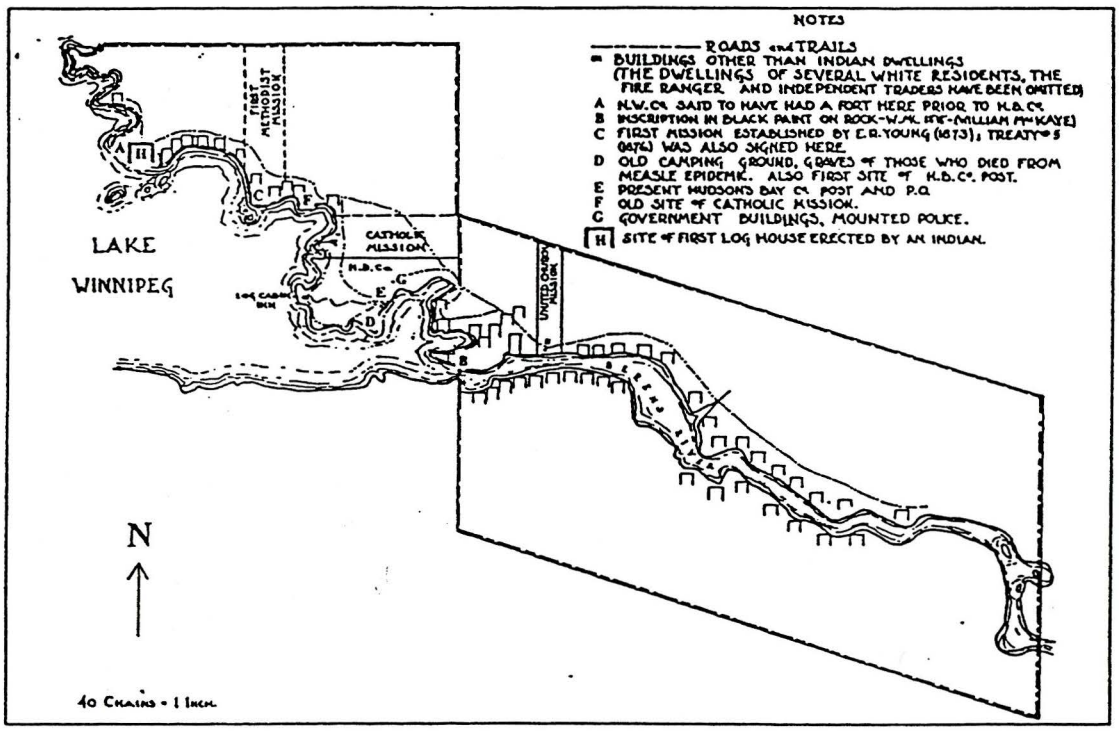
The Mouth of Berens River, 1940



Source: Redrawn from the records of S.T. Boggs, PAM P4989 f. 10

Map 2.5

The Mouth of Berens River, 1878 - 1910



Map 3. The Berens River Indian Reserve at the mouth of the river, based on surveys of J.P.O. Hanley (1878) and J.F.K. McLean (1910). Note the water and shore orientation of almost all structures. The house labeled "H" was the first Indian log cabin on the reserve and belonged to Cauwanās, the brother of Bear (William Berens' grandfather).

Source: Hallowell 1992:34

Health and Disease

The health of the study communities was poor by modern standards. Many deaths were caused by infectious agents such as tuberculosis and influenza. In Berens River, tuberculosis accounted for 33.4% and influenza 13.1% of all the deaths recorded in the burial register from 1909-1952 (UCCA Berens River Register of Burials). In Poplar River tuberculosis was reported to have been the cause of death for over half of all deaths in the burial register (52.7%) and pneumonia the cause of death for 22.1% of the entries from 1909-1952 (UCCA Poplar River Register of Burials). The reports of the Indian agents also attest to this. "Scrofula" and tuberculosis were reported to be the prevailing diseases at Poplar River, and "consumption", "scrofula" and bronchial infections at Berens River (Government of Canada 1900:100).

Western health care in the region was almost non-existent. A doctor visited the communities only once a year at treaty time (Everett 1986:1). Babies were delivered by midwives who did not have direct access to medicines in cases of emergency (Hallowell n.d [b]). The Methodist mission at Berens River reportedly played a medical role in the community. Harry Everett, an Aboriginal resident of Berens River, writes about several visits he made to the mission house to have his wounds dressed (Everett 1986:19), and observes:

> People used to suffer with their sickness as there was no doctor. Indian Medicine was used a lot ... I noticed that they boiled water and brought granite stones about eight to ten inches in size. These stones they dropped in boiling water that was in a pail and my dad had a blanket over his head and the steam going in. He had cut on the side of his head, a flint stone was used to cut the skin. I don't know how deep it was. I guess that was what they used to call "pulling blood" from the side of the head ... some herbs had been put in the water too. They used to dig roots from the swamp that they used a lot. We called it "Wiki" use it for colds, toothaches, and ground it for baby cramps. It was like ginger ... There was a lot of heat to it like ginger and I used it for a sore

> throat. I always had some on hand whenever I went summer or winter. [Everett 1986:23]

Various methods of treatment for the sick were employed by the Ojibwa in these communities. Hallowell (n.d [c]), wrote that skunk musk was used to protect against disease. This involved the extraction of the musk with a needle from the skunk, dipping the needle in water, and then drinking the water. This process was said to be especially useful against smallpox and chickenpox. Other treatments included drinking Senna tea at the first signs of a cold and a hot drink of ginger or a pain killer to treat a cold (Everett 1986:14). By the time Hallowell visited the region in the 1930's he noted that shamanism was only practiced at Poplar River (Hallowell 1930-32); and, the Midewiwin had not been performed since 1870 in Berens River (Hallowell 1992:12).

Summary

Both communities were exposed to the same historical influences: governments, missions, and traders; however, the introduction of these institutions occurred later in Poplar River. Berens River's strategic location resulted in an HBC post being established there quite early. This in turn lead to an early introduction of missionaries and government officials. By the late nineteenth century Berens River had a trading post, a Methodist mission and a mission school, a Roman Catholic mission, fishing stations, and was a Lake Winnipeg steamer destination. During the same period, Poplar River was only beginning to be introduced to these same institutions, and therefore change in that community came at a slower rate.

Similarities and Differences Between Berens River and Poplar River

From the previous discussion it is clear that Berens River and Poplar River shared much in common. They had a similar physical environment and were in close proximity to one another, they shared a common Northern Ojibwa culture, and they both had early

experiences with the government, traders and Methodist missionaries. Just prior to the 1918 flu epidemic they were also similar in demographic structure, that is, they had similar age and sex distributions (Figure 2.1 and 2.2) (Government of Canada Sessional Papers 1915:9). This similar demographic pattern was found to be consistent from 1909 to 1924 with the exception of Berens River's under six population which increased in the 1924 census making that category larger than the 6 to 15 group for the first time since 1909 (Government of Canada Sessional Papers 1910, 1915, 1925). A discussion of the quality and evaluation of the census data is found in Chapter 4.

The UCCA Registers of Marriage (Berens River and Poplar River), confirm that these two groups shared family ties. Of the 116 marriages recorded in the register of marriages for Berens River, 7.75% of them were unions where one of the couple resided, or had been born, in Poplar River. This is a substantial proportion since there was intermarriage with many communities including: Little Grand Rapids (6%), Jack Head (2.6%), Fisher River (2.6%), Norway House (1.7%), Dauphin River (1.7%), Fisher Bay (0.9%), Matheson Island (0.9%), Hodgson (0.9%), Bloodvein River (0.9%), Lac Seul (0.9%), Big Grand Rapids (0.9%), Big Bull Head (0.9), and Black River (0.9%).

Generally, Ojibwa communities in this region followed the seasonal subsistence pattern typical of the Northern Ojibwa. In the summer, families came together to form large fishing settlements of about 50 to 122 people, and in the fall, winter and spring they separated into smaller winter camps of about 16 people to hunt and trap (Hallowell 1992:44, 48).

Figure 2.1
Age and Sex Distribution of the Population at Berens River, Manitoba: 1914[3]

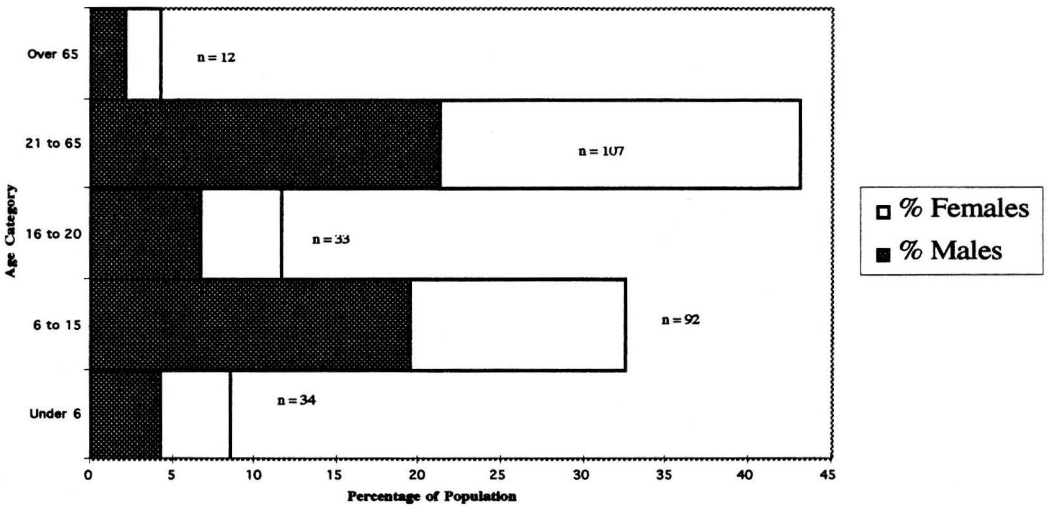
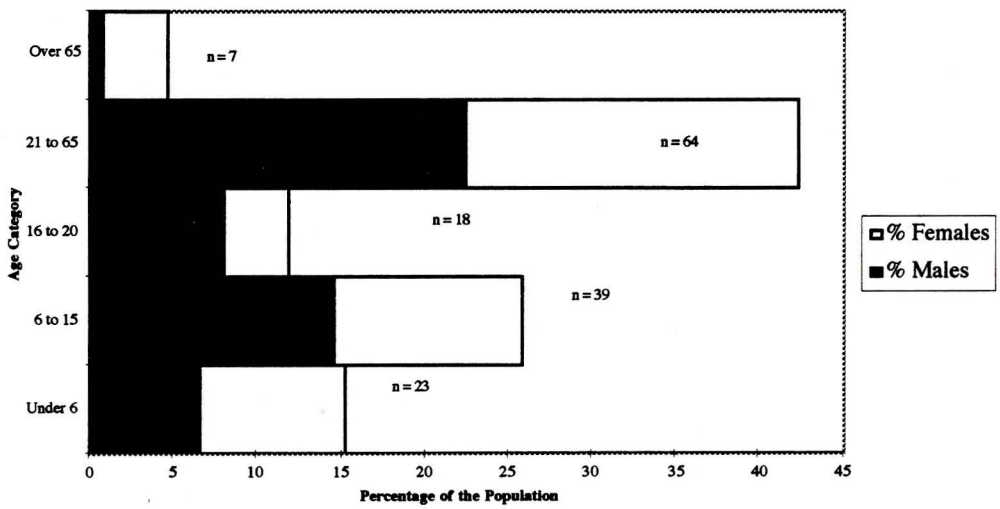


Figure 2.2
Age and Sex Distribution of the Population at Poplar River, Manitoba: 1914[4]



[3] 1914 census figures (Government of Canada 1915:16)
[4] 1914 census figures (Government of Canada 1915:16)

It should be noted the seasonal movements of the Ojibwa in Berens River and Poplar River could be less definite. An examination of the HBC post journals for both communities revealed that between 1893 and 1940 in Poplar River, and 1905 to 1928 in Berens River, hunting and fishing would often occur simultaneously. There are references in multiple years to the "spring hunt" for both communities, which would take place between February and April (likely the exact timing depended on the weather). During the same period fishing was reported. Likewise in the fall (October - November) the post journals make note of outfitting hunters and trappers for the winter or fall hunt. At the same time (late September to mid- December), there are many references to "fall fishing" (HBCA B.16/a/12-20, 1905-1914; B.331/a/1, 1883-1894, 1936-1941). This is in agreement with what Flannery (1995) has observed among the James Bay Cree.

While Berens River and Poplar River share many characteristics in common, some important differences are evident. First, with 283 residents, Berens River was almost twice the size of Poplar River with a population size of 148 (Government of Canada, 1918:9). The second difference was noted by Hallowell as he traveled through the region. He observed that life at Berens River had changed dramatically as a result of contact with Europeans (Hallowell n.d. [a]). It was no longer necessary for everyone to continue to hunt and fish seasonally since the location of the community made it possible for some residents to find employment on steamships, with the HBC, in sawmills, and in fisheries (Government of Canada 1900:102). In fact, Hallowell noted that, "[Berens River] is more continuously occupied all year round by a majority of the families of the bands than any of the settlements up stream" (Hallowell n.d.[b]). Men visited their hunting grounds periodically during the winter, while their wives and children remained in the settlement (Hallowell 1955:119).

In contrast, the people in Poplar River had no other means of employment but hunting and fishing (Government of Canada 1900:101), which necessitated adherence to a seasonal pattern of subsistence. This contention is reinforced by Stephenson, a missionary in the area (1925:28):

> at Poplar River, about 40 miles north of Berens River, there is a band of 160 Indians who live by hunting and fishing, and are constantly away from home...

Another important, and related, difference relates to school attendance at each location in the early twentieth century. According to descriptions of the school buildings, the Poplar River school was in superior condition and of higher quality construction (Government of Canada 1900:101). E. McColl, inspector of Indian Agencies noted in 1900 that:

> The school house was rebuilt by Mr. Dargue, the school teacher. It is 30 X 22 feet. A new foundation was put under it, the roof was shingled, and the building was mortared. A new stove was bought for it, and it is now warm and comfortable. [Government of Canada 1900:101]

The teachers at the Berens River school were continually writing the government requesting money to improve the schools' construction so that they might improve attendance (Gray 1995). This was described in a letter from Reverend J.W. Niddrie to the Minister of the Interior in 1936 as follows:

> Twenty years ago [1916], the Indian department created a school house here 20 X 30 with logs for foundation and no concrete. Walls were of siding out-side and unseasoned lumber inside. Building paper (long since rotten and eaten by mice) was put between... For nearly 20 years our children have eaten off the same desk as they study on. Children roast and freeze at the same time... The foundation is rotten and the walls are giving way, having been held together for some time by an iron rod across the inside. [PAM, RG 10, DIA vol. 6227, file 500-1, part 2, cited in Gray 1995 p. 3]

Yet, attendance averages at Berens River were much higher than at Poplar River. The average attendance at Berens River was 47.2% at the Methodist school and 68% at the Roman Catholic School, while it was only 11.1% at the Methodist school in Poplar River (Government of Canada 1920:84). The fact that attendance at the Berens River school was higher than at Poplar River, despite the superior condition of the Poplar River school, may be related to the degree of European influence on these communities. In a report on Poplar River, E. McColl wrote, "The teacher, Mr. Dargue, is labouring under considerable difficulty in teaching, as the Indians have to go away from home to hunt and fish for their living; hence attendance is most irregular." (Government of Canada 1900:101).

The attendance rates are another example of how micro-economic differences, influenced by colonialism, can influence the lifeways of the residents living in these communities. The economic differences between these communities resulted in different patterns of subsistence and seasonal movements. In Poplar River it was necessary to adhere to a more traditional system of food procurement, whereas at Berens River, where much colonial attention had been focused, alternatives such as wage labour soon undermined the traditional movements of people and subsistence practices. The impact of the differing micro-economic systems in effect trickles down to influence other aspects of community life, such as education.

Conclusions

The timing of the 1918 flu epidemic coincided with a period of considerable social change in this region. The Ojibwa at Berens River and Poplar River were becoming increasingly integrated into the cash economy and accepting European religious and political ideologies, while at the same time, maintaining their own subsistence patterns to varying degrees.

The degree to which the communities changed varied. For example, Berens River's strategic location undoubtedly played a role in the degree of contact and attention received from Euro-Canadians. The importance of this site was also emphasized when Treaty 5 put the Chief at Berens River in charge of the entire treaty area. In contrast, Poplar River, approximately 75 miles to the north, lacked a vital link on its river system. While it played a small role in south-north trade (i.e., perhaps a stop over point), its post was over shadowed by Berens River to the south and Norway House to the North. This resulted in less involvement in development initiatives such as fisheries and sawmills. Thus the people of Poplar River were able to better maintain traditional subsistence economies and were drawn into the world market to a lesser extent than the people of Berens River.

Chapter 3

Background to the 1918 Influenza Pandemic

This chapter describes the pathophysiology, symptoms, and transmission of influenza, in order to gain an understanding of how the disease manifests itself and spreads through regions and communities. This is followed by an account of the spread and severity of the 1918 epidemic, primarily in Canada, Manitoba, and the eastern Lake Winnipeg area, and a discussion of current research on the 1918 flu in Aboriginal people in Canada.

Pathophysiology and Symptoms

There are three groups of influenza: influenza A, B and C. Influenza mutates frequently through two processes: antigenic shift and antigenic drift. Antigenic drift can occur in all three influenza groups. These are minor changes in the two envelope glycoproteins of the virus; haemagglutin (H) and neuraminidase (N). These usually occur through a point mutation every 1 to 3 years. Antigenic drift probably results from natural selection of virus variants circulating among immune or partially immune populations (Saunders 1994:506). Antigenic shift occurs only in type A influenza every 10 to 40 years. Antigenic shift creates a new strain in which one or both of the glycoproteins are completely different antigenically to those of the preceding strain (MacKenzie 1980:130). This occurs when pieces of the RNA genome from two genetically distinct strains become associated, for example, when they infect the same cell (Brock et al. 1994:224). This can

occur when human and animal (e.g., avian and swine) strains genetically recombine in 'doubly' infected hosts (Mims 1995:188).

The 1918 influenza was a new strain of influenza A designated H_1N_1 (Mims et al. 1995:191). Influenza A epidemics tend to be more severe and in some cases, such as the H_1N_1 strain, have their greatest impact on children and young adults (WHO 1996). Everyone in the world was susceptible to the 1918 strain of influenza since this was a virgin soil epidemic (Herring 1994a:366).

Influenza is mainly a respiratory disease affecting the cells lining the nose, throat, trachea and lungs, and in a few cases the blood, heart muscle and brain (Beveridge 1977:12-13). Symptoms of the flu include a sudden onset of headache, chills or fever, and a short dry cough (Beveridge 1977:11). Occasional symptoms include sneezing, nasal blockage and discharge, sore throat, watery eyes, nausea and vomiting (Beveridge 1977:12). Primary symptoms are followed by aching muscles in the limbs and back, and joint pain (MacKenzie 1980:135). It is important to note that these symptoms will vary depending on the strain of flu infecting the individual (Beveridge 1977:12). Symptoms characteristic of the 1918 flu included a tickling in the throat, a slight pharynogotracheitis (infection of the trachea), and an impulse to cough, all in the early stages of infection (Journal of the American Medical Association 1918:1594).

The incubation period for influenza is normally a very short one to two days, after which acute infection ensues (Beveridge 1977:11). The infection generally lasts three days but can range anywhere between one and six days. The acute phase usually lasts three to five days but symptoms such as cough, lassitude, malaise and depression can remain for up to two weeks, and may prolong convalescence (MacKenzie 1980:135). Pulmonary complications are indicated when body temperature remains high after four days (Beveridge 1977:12).

Influenza on its own will not usually kill an individual; it is the secondary infections which become fatal. Infection by the flu virus destroys the lining of the lungs, which allows normally nonpathogenic bacteria to invade the lungs and to cause secondary pneumonia (Mims et al. 1995:263). Pneumonia is the greatest threat to life for those suffering from influenza. It can appear at any time during infection with the flu (Beveridge 1977:14). People with chronic bronchitis, chronic heart disease, and kidney disease are particularly susceptible to influenza infection. As well, pregnant women tend to have more severe symptoms of the flu and are at increased risk of pneumonia and death (Beveridge 1977:15). The increased susceptibility of pregnant women could contribute to the lowering of fertility rates of affected populations and thereby further reduce the size of the population. In Hawaii, for example, decreased fecundity was observed following historic virgin soil epidemics. In this example, the decrease resulted from high rates of infant mortality and infertility which were consequences of various disease outbreaks (Stannard 1990).

The 1918 strain of influenza was especially virulent, that is, its capacity to infect, replicate and transmit was relatively high. Its pathogenesis (i.e., disease outcome) shared some characteristics with other influenza strains, however, there were important differences. One distinctive feature was the sudden onset of symptoms — people would suddenly collapse and have to be carried to bed (Beveridge 1977:15). Also, no other strain of influenza has had such a tendency to induce pneumonic complications (Crosby 1989:5). Twenty percent of the 1918 flu cases developed pneumonia and 50% of pneumonia cases ended in death (Beveridge 1977:15). Pregnant women fared worse with 50% of them developing pneumonia and 50% of those with pneumonia dying (Harris 1919: 978).

Transmission

Influenza is spread from person to person either through expulsion from the respiratory tract or by direct contact (MacKenzie 1980:137). Airborne particles are produced and expelled from the infected individual during speech, normal breathing, sneezing and coughing. Smaller droplets can remain suspended in the atmosphere and viable for up to one hour. Survival of the virus is aided by a relatively low humidity and low temperature in the environment (MacKenzie 1980:137). The airborne, person to person mode of transmission of the influenza virus limits the speed at which it may spread to the speed of human travel.

Influenza, like many other respiratory diseases, follows a seasonal pattern of transmission in temperate regions. In the Northern Hemisphere its attack rates are highest between late November and March (Stuart-Harris et al. 1985:142). The rise in incidence of influenza during these months may be due to improved transmission resulting from increased frequency of indoor congregation during the winter. Crowded living conditions and frequent contact increases the rate of transmission of influenza (Mims et al. 1995:48).

Treatment

There was no specific treatment for the 1918 flu. Even after the epidemic it was noted "no specific treatment has been found to date" (Dever et al. 1919:265). However, sources providing information on how best to treat it during and after the epidemic were consistent in recommending bed rest, fresh air, good nursing, and proper nourishment (Wetmore 1919:1078; Dever et al. 1919:265; Manitoba Free Press, [Winnipeg] October 12, 1918).

People were instructed to sleep with their beds moved close to open windows (Manitoba Free Press, October 12, 1918). Further, they were instructed to clean out their

bowels frequently (Wetmore 1919:1078; Dever et al. 1919:265; Manitoba Free Press, October 12, 1918). For pain, cough, and/or insomnia whisky (Dever et al. 1919:266) or heroin (Wetmore 1919:1079) may have been prescribed. Nourishment was important and a combination of milk and lime water was recommended (Wetmore 1919:1079), or unsweetened lemonade, tea or milk (Dever et al. 1919:265; Manitoba Free Press, October 31, 1918 p.7).

A vaccine or "anti-flu serum" was also available. Although its effectiveness was questionable, many people received the vaccination. The most successful vaccines employed were a mixture of Pfeiffer's bacillus (thought to be the cause of the initial symptoms) and different strains of the pneumococcus and streptococcus thought to be causing the deadly pneumonic complications. This type of combination was reported to be successful in preventing deaths and pneumonia in various locations including an armed forces base in Winnipeg, Canada, the civilian population in Winnipeg, a Naval training station in San Francisco, and, in South Africa (Wetmore 1919:1076-1077).

Epidemiology

In 1918 - 1919, influenza killed an estimated 20 million people worldwide (Kilbourne 1997:14). In the United States, the number of deaths from influenza in 1918 was ten times the nation's death toll in World War One (Karlen 1995:145). The mortality rate among the infected was greater than 2.5 percent, while other influenza epidemics have not exceeded 0.1 percent (Taubenberger et al. 1997:1793). The 1918 pandemic came in three waves (Beveridge 1977:31). The first wave in the Spring of 1918 was mild and mortality was not unusually high (Beveridge 1977:31). The second wave was the most virulent and deadly. It occurred in the fall of 1918 and generally struck people in the 5-14 and 20-40 year age groups, with the greatest mortality occurring in the 25-29 age group

(Walters 1978:855). The third wave had an age distribution similar to the second wave and occurred in the early months of 1919 (Beveridge 1977:31). It has been noted that deaths in the 5-34 age groups were 20 times higher than in other influenza outbreaks (Taubenberger et al. 1997:1793).

The disease spread around the world quickly. Its transport to the continents was aided by wartime movements across oceans and its grip on the soldiers was aided by wartime conditions:

> Wherever his armies met in Europe, man was creating chemical and biological cesspools in which any kind of disease might spawn. Never before had such quantities of explosives been expended, never before had so many men lived in such filth for so long, and never before had so many human corpses been left to rot above ground, and never before had anything so fiendish as mustard gas been released into the atmosphere in large amounts. [Crosby 1989:9]

In Europe, the disease spread from army to army. It appeared in the British army in April, and by May it was infecting French troops (Crosby 1989:9). It was so severe that it affected the course of World War One as troops from every country began to fall ill (Crosby 1989:26).

The epidemic killed at least 500,000 people in the United States (Kilbourne 1987:14). Native Americans were hit particularly hard. Twenty-four percent of Native Americans living on reservations caught the flu and 9% of those who caught it died. It is estimated that two percent of all Native Americans died from the 1918 flu (Crosby 1989:228).

The pandemic is thought to have first affected Canada during the late spring or early summer of 1918 when soldiers who were exposed to the flu in Europe, returned to Canada (Pettigrew 1983:8). It is believed that the first outbreak in Canada occurred in Quebec on September 8, 1918 (Pettigrew 1983:8). The epidemic traveled westward across

Canada. The first death from the 1918 flu in Winnipeg, Manitoba was recorded on October 3, 1918 (Pettigrew 1983:57). Although precautionary methods were put in place in Winnipeg, by January 1919, 12,863 people were recorded to have fallen ill with influenza and 824 of them had died (Pettigrew 1983:59). It is estimated that the epidemic affected one in six Canadians and killed between 30,000 to 50,000 of them (Pettigrew 1983:6).

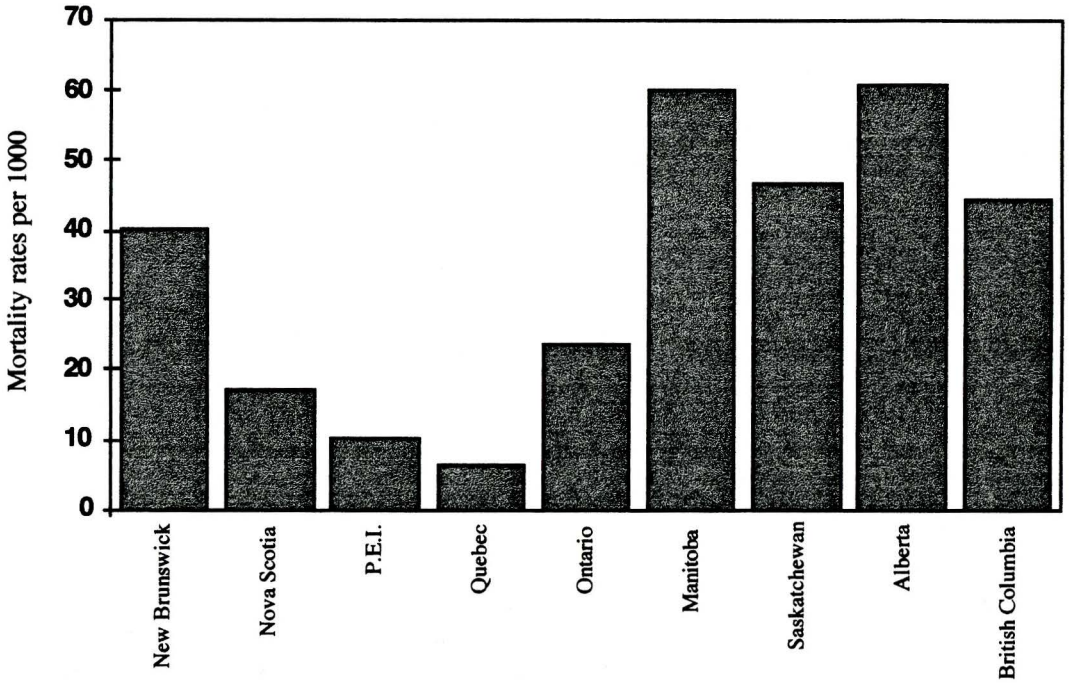
In Canada, many Aboriginal people lost their lives. Graham-Cumming estimated that the 1918 influenza pandemic killed 3% of the Canadian Aboriginal population (1967:149); however, using source documents I obtained a slightly higher estimate of 3.7% of the Canadian Aboriginal population living on reserve at a rate of 36.7 deaths per 1000 people.[1] There was great variation in death rates between provinces and communities. Figure 3.1 illustrates that Aboriginal people living in the Western provinces suffered higher mortality rates than those living in the Eastern Provinces, especially Quebec, Prince Edward Island and Nova Scotia.[2] Likewise, mortality rates for Aboriginal people within the province of Manitoba were variable (Map 2.1). Mortality rates ranged from 188 deaths per 1000 at Norway house to 35 deaths per 1000 at Fort Alexander (Herring 1994a:375). Some communities were spared entirely. 1918 flu never reached God's Lake, Split Lake, Oxford House, Island Lake (Herring 1994a:371), Paungassi (Matthews 1993), or Poplar River (UCCA Register of Burials, Poplar River).

---

[1] I estimated the mortality rate for Canadian Aboriginal people by dividing the number of Aboriginal deaths in Canada (excluding Inuit or Eskimo) (available from the National Archives of Canada [NAC] RG 29 vol. 2970, file 851-4-096 [2ti]), by the total Aboriginal population (excluding Inuit or Eskimo) (available from the Government of Canada Sessional Papers 1919) and multiplying by 1000 to get a mortality rate per 1000. This is only an estimate since there is no way to cross-check this data for errors in recording. It is possible that communities were not counted, or that Indian Agents made errors in their records. Further, since the Agent was likely relying on parish registers of burials, or some other local record of death, all of the problems associated with parish registers (described in Chapter 4 in detail) must be considered as possible sources of error.

[2] I estimated these rates using the number of Aboriginal deaths on reserves in each province (available from the National Archives of Canada RG 29 vol. 2970, file 851-4-096 [2ti]), divided by the total Aboriginal population living on reserve in each province in 1918 (available from the Government of Canada Sessional Papers 1919) and multiplying by 1000 to estimate a mortality rate per 1000.

Figure 3.1
Estimated Provincial Mortality Rates For Canadian Aboriginal People Living On Reserves During the 1918-1919 Influenza Epidemic



Control Efforts In Manitoba

Once the epidemic spread to Winnipeg, Manitoba, precautions were enforced to reduce the impact on, and the spread through, the region. In Manitoba, three methods were employed: vaccination, isolation within a city, and the quarantine of cities.

In Manitoba vaccination was made available in many locales. On October 23, 1918, Dr. Gordon Bell issued the following statement:

> It is not claimed that this vaccine will prevent a person from contracting influenza, nor is it even certain that it is made from the organism which causes this disease, for this causative agent has not yet been definitely determined. There does, however, seem to be evidence that in a certain proportion of cases it prevents the development of pneumonia, or if pneumonia does occur, it modifies the severity of its course, and that is all. The majority of

> fatalities occur among young adults from twenty to thirty-five years of age, children and elderly are escaping in a way that it is at present impossible to explain. For this reason the vaccine should be used chiefly on young adults [Manitoba Free Press, October 23, 1918,]

The same article in the Manitoba Free Press goes on to say that the vaccine would be distributed free and would be available either that day or the next; however, this was 23 days after the first cases appeared in Winnipeg. The next day it was reported that the anti-flu serum was "sent out to all important flu centers in Manitoba by the provincial health department" and that the vaccine was being produced at a rate of 7,000 doses per day (Manitoba Free Press, October 24, 1918). It is unlikely that the vaccine was made available to remote Aboriginal communities, since many of them did not have clinics or hospitals, and a doctor was only seen during the summer when treaty annuities were paid (Everett 1986).

The last two methods of control employed in Winnipeg were aimed at limiting the spread of the virus through the province. To do this, the Department of Health tried to limit contact between infected and susceptible individuals. Within the city of Winnipeg public meeting places were ordered closed:

> All schools, churches, theaters, dance halls, and other public meeting places in Winnipeg and suburbs will be closed for an indefinite period at midnight tonight, as a precautionary methods against the spreading epidemic of 1918 "flu," of which new cases were reported in the city yesterday.
> All public meetings after midnight tonight, will be absolutely banned, while departmental and other stores, street cars, dining rooms and cafes, and railway trains will be regulated under precautionary measures. [Manitoba Free Press, October 12, 1918 pp. 1 and 4]

Winnipeg also enforced an anti-spitting by-law as a preventative measure. The fine for spitting was "$50 and costs or a jail sentence" (Manitoba Free Press, October 12, 1918, p.1).

In addition to these measures, Gordon Bell, the chairman of the Provincial Board of Health for the Province of Manitoba, enforced regulations regarding notification of the authorities of suspected or known cases of the flu. The public was instructed to isolate ~~individuals~~ suffering from the disease and those who had come in contact with infected individuals, and to destroy "clothing, bedding and other infected materials" (Manitoba Free Press, October 12, 1918, p.4).

However, the Board of Health was slow to implement these measures. The first cases of the 1918 flu were brought to the city by soldiers heading westward by train, on September 30, 1918 (Manitoba Free Press, October 1, 1918), yet the restrictions were not announced until October 12, 1918. The ban remained in place until November 29, 1918 (Manitoba Free Press, November 25, 1918 p.5). A further note should be made regarding this preventative measure; allowing stores to remain open during this period, may have aided the spread of the virus, especially with Christmas approaching. It was not uncommon for stores to use the epidemic as an advertising ploy. The following is an example of one such advertisement that appeared in the Manitoba Free Press, October 19, 1918):

> *Flu-Proof Entertainment* With all the theaters and picture houses all closed we must look elsewhere for entertainment. We also must get it with a minimum amount of risk. The Edison Phonograph store, 355 Portage Avenue, corner of Carlton, claim that the New Edison, with a fine array of artists played at your command, is one of the economical ways which entertainment may be secured. Phone them for terms — advt.

The third method employed was the quarantine of entire cities and towns. But once again this seems to have come too late. By October 18, 1918, it was being reported that influenza had infected Aboriginal people living on a reserve near Oak Lake, and in the

town of Minnedosa, both of which were west of Winnipeg (Manitoba Free Press, October 18, 1918). By October 19, 1918, the Manitoba Free Press was reporting infections in the province at the Brandon Industrial School for Indians. By October 23, 1918, the epidemic was reported to have struck Shoal Lake Village and Shoal Lake Reserve, Portage la Prairie, and several other towns near Winnipeg (Manitoba Free Press, October 23, 1918). On October 26, 1918, the epidemic had reportedly spread north of The Pas, and to reserves at Fort McLeod, Fort Alexander, Waterhund and Kenora (Manitoba Free Press, October 26, 1918). In every issue of the Manitoba Free Press between October 18 and December 1, 1918, new cases of influenza were being reported in various towns, cities, and reserves.

It was not until November 1, 1918 that the Manitoba Free Press (p.12), reported the isolation of many small towns situated on the railway lines in Manitoba. Railway passengers were notified that they would not be permitted to stop at these towns, and likewise, people living in the towns were told not to leave. Reported to be under quarantine on the CPR railway line were: Aminiota, Birtle, Foxwaren, Soisgirth, Arden, Treherne, Binscorth, Neepawa, Shoal Lake, Strathclair, Newdale, Hartney, Oak River, Basswood, Renton, Elkhorn, Virden, Carberry; on the CNR lines, Birnie, Deloraine, Eden, Hageldeon, Liege, Mountainside, Keiwood, Algerville, Roseburn, Gladstone, Hartney, Virden, Riding Mountain, Russell; and on the GTP lines, Miniota (Manitoba Free Press, November 2, 1918 p. 21).

Despite these attempts more towns continued to become infected. On November 2, 1918, Selkirk reported its first cases (Manitoba Free Press, November 2, 1918 p. 2), on November 4, Winnipegosis and Dauphin were reporting cases (Manitoba Free Press, November 4, 1918 p. 5), and on November 5, Fairford, Rosedale, and Somerset were among towns reporting for the first time (Manitoba Free Press, November 5, 1918). Fisher Branch reported its first cases on November 8, 1918 (Manitoba Free

Press, November 8, 1918 p. 5), and as late as November 18, Pine Creek reported cases of influenza (Manitoba Free Press, November 18, 1918 p. 5).

While the Manitoba Free Press (Winnipeg) gives a detailed account of the progress of the epidemic in Manitoba, this source must be utilized with caution. Not all towns could expect to be able report cases of influenza. Isolated reserves and villages could be overlooked by the health inspector until much later dates. This seems to have been the case with Berens River, where the epidemic was well under way in early November, but was not reported in the Winnipeg newspaper. The flu was brought to Berens River on October 31, 1918 when the "Wolverine", a steam ship on Lake Winnipeg, docked there (Pettigrew 1983:70). The epidemic continued to spread through the subarctic during the winter months of 1918 to 1919, and likely reverberated throughout the north in subsequent years (Herring 1994a).

The 1918 Flu Among Aboriginal People in Canada

The study of the 1918 flu in Aboriginal communities in Canada is a relatively new research area. While it was estimated in 1967 (Graham-Cumming 1967) that Aboriginal people had suffered high mortality (about 3%) from the epidemic, research into the underlying reasons for the high mortality rate did not begin until the 1990's (see Lux 1992; Herring 1994a, 1994b; Sattenspiel and Herring in press, 1998). Perhaps this was because the severity of the epidemic had been overshadowed by the end of World War One, or it could be that the high mortality was not surprising since virgin soil epidemics had been taking their toll on Aboriginal people since the time of contact with Europeans. What is so interesting about this pandemic is that the entire world was a virgin population for the 1918 flu, therefore theoretically, all populations should have suffered similar mortality rates. As mentioned earlier, however, discrepancies in mortality rates between

populations were clearly evident. During the 1918 influenza pandemic, certain segments of the American population were identified as being at increased risk of dying from influenza. It was noticed that American immigrants born in Canada, Austria-Hungary, Poland, and Russia were at a higher risk of pneumonia and death than those born in England, Ireland and Germany. Furthermore, Italian Americans had one of the highest mortality rates from the 1918 flu in all of America (Crosby 1989:227). Since all populations should have had a similar biological risk of dying from this new disease, researchers began to investigate non-biological or non-immunological virulence factors for the 1918 flu.

Lux (1992) studied the epidemic among the Aboriginal people of the Prairies in Canada. She demonstrated that Aboriginal populations in this region had higher mortality rates than the non-Aboriginal communities. Further, she suggested that socio-cultural factors such as crowded living conditions, lack of nursing care, inadequate nutrition and crowding in schools were likely contributors to the higher mortality rates.

Herring (1994b) studied the epidemic in the subarctic community of Norway House. This community suffered a substantial population loss as a result of the 1918 flu. She demonstrated that (a) Norway House had a mortality rate much higher than that of the total Aboriginal population in Canada, and (b) that this high mortality was probably linked to social organizational changes linked to the fur trade. Subsequent studies by Herring (1994a) have strengthened this hypothesis. She found that many Aboriginal communities in the subarctic had different mortality rates, and that some communities escaped the epidemic. It was suggested that differences in mortality rates were linked to a community's involvement in the fur trade. Herring (1994a:380) found that factors such as intensity of trade, distance from trade route, isolation, and seasonal subsistence were key factors in preventing illness in some communities.

Most recently, Sattenspiel and Herring (1998; in press) have investigated the role of human mobility in the spread and impact of this virgin soil epidemic. They sought to determine the relative importance of issues of contact (e.g., isolation, involvement in the fur trade, and distance from the trade route), in comparison with socio-economic issues such as seasonal subsistence patterns. Investigating the communities of God's Lake, Oxford House and Norway House, all north of Berens River and Poplar River (see map 2.1), Sattenspiel and Herring (1998) used: parish register data to determine the number of burials; HBC post journals to estimate human mobility; and, a mathematical disease model for influenza to run various epidemic simulations. It was found that mobility played a role in the spread of the disease through the region, but it had very little impact on the severity of the epidemic in the communities. That is, once the first case appeared, other factors governed how many individuals would fall ill and die. Contact rates (interactions) within a community were found to be more important than contact rates between communities in the outcome of the epidemic. Their results suggest that the winter pattern of social organization was a key factor in determining the impact of this epidemic in these communities (Sattenspiel and Herring 1998).

In summary, what is known about the 1918 flu in Aboriginal communities in Canada is limited to studies for the prairies and subarctic. The epidemiology of the epidemic at the community level is just beginning to be understood. It is clear that communities varied significantly in the extent to which they suffered as a result of this epidemic. In attempts to determine why this was so, researchers have uncovered various factors which may have been important determinants in each of the communities' mortality rates. Factors relating to a community's participation in the fur trade, their seasonal subsistence pattern (Herring 1994a, 1994b; Sattenspiel and Herring 1998), and local

economic conditions (Lux 1992) have all been shown to have influenced the course of this epidemic.

Conclusions

The 1918 influenza virus was a virgin soil epidemic. This virulent pathogen spread swiftly around the world and across Canada. The details of its spread through Manitoba shows that public health efforts were not able to control the outbreak, partly owing to the slow implementation of counter-measures. As a result, the virus quickly spread west and north of Winnipeg along railway lines, roads and on steamboats. It struck relatively isolated Aborginal communities in the Lake Winnipeg Region that had little or no means of treatment.

It has also been shown that despite the favorable conditions for the virus to spread and to infect, there were major differences in mortality rates among Canadian provinces and between Aboriginal communities in the Lake Winnipeg region of Manitoba. The possible reasons for the differences in mortality rates in Poplar River and Berens River are explored in the remainder of this thesis.

Chapter 4

Demographic and Epidemiological Materials and Methods

Introduction

This chapter is divided into two primary sections: materials and methods. The first portion of the chapter is dedicated to the evaluation of the quantitative materials used in this research. The quality of the census data and parish register data used is assessed according to established protocols. The second portion of the chapter describes the quantitative methods used in the analysis of this material. Methods for estimating mortality rates and relationships between mortality rates in Poplar River and Berens River are explained, as well as the methods for estimating mobility patterns for the two study communities.

Materials: Evaluation of Census and Parish Record Data

This section is devoted to a discussion of materials employed in this study and to their evaluation. The quantitative data utilized in this research include mortality records for Berens River and Poplar River available from the United Church of Canada Archives (UCCA); mobility data collected from the HBC archives, and demographic data collected from the Government of Canada Sessional papers. For the purpose of this thesis I was given permission by Dr. Ann Herring (McMaster University) to use parish records for Berens River and Poplar River (UCCA, Berens River 1909-1952 and Poplar River 1886-1963) which she from the UCCA in Manitoba. The chapter is subdivided into two main sections: a discussion of quantitative materials used, and methods employed in this

research. A lengthy discussion and evaluation of the parish register data reflects the importance of this particular primary source to this thesis.

Census Data

The government of Canada published annual reports on Aboriginal communities across the country in the Government of Canada Sessional Papers. These reports include brief descriptions of the communities, their schools, churches, and economy, as well as census data. Census data were collected annually until 1918. At this time the superintendent of Indian Affairs wrote:

> Heretofore a census of the Indian population has been taken annually, but as these figures show very little change from year to year, it has been determined that henceforward a quinquennial census will suffice. [Government of Canada 1919:9]

The census data include the total number of residents in each community and their denominational affiliations. In sporadic years (1910, 1914, 1916, 1925) crude age and sex breakdowns were reported. These reports are used in this analysis to help establish mortality rates, economic activities in the communities, and religious affiliations.

Problems exist with census data in general, and specifically with Aboriginal census data. The largest problem with Aboriginal census data is under enumeration. Meister (1986:83) states, "one may assume under enumeration of American Indian populations." This is related to the difficulties in locating all of the population, especially when Aboriginal people may not want to be counted. Meister (1986:83) goes on to say that under enumeration may not occur where there is a benefit to being counted, such as annuities. In the cases of Poplar River and Berens River, the Aboriginal residents were receiving treaty annuity payments annually, and thus, it could be that under enumeration was not a problem. It has been stated in other studies on Canadian Aboriginal data that while births were likely underreported due to delays in reporting and frequent migration,

death registration could be expected to be less incomplete due to legal obligations to report deaths (Romaniuk and Piché 1972).

There are no rigorous tests for assessing the quality of Aboriginal census data. The most important control when using these data is understanding their limitations; nevertheless, there are some suggestions on how to assess this type of data: 1) collect as many figures as possible, and 2) look for discrepancies between narrative reports and population figures (Meister 1986:84).

The Government of Canada was the only agency publishing census data on Aboriginal people during my study period. While it would be possible to use treaty annuity lists to cross check the population figures, these documents are highly confidential and difficult to obtain. Therefore, the best means of checking the census data for Berens River and Poplar is to examine the population figures over time to look for anomalous figures (Tables 4.10 and 4.11).

Table 4.10: Berens River Census Data, 1909-1924 (Government of Canada 1910,1914, 1915,1918,1925)

Year	Total	Methodist	Roman Catholic	Other Christian Beliefs	Aboriginal Beliefs
1909	283	273	10	0	0
1913	283	239	44	0	0
1914	278	230	45	3	0
1917	283	227	54	2	0
1924	266	195	71	0	0

Table 4.11: Poplar River Census Data, 1909-1924 (Government of Canada 1910,1914,1915,1918,1925)

Year	Total	Methodist	Roman Catholic	Other Christian Beliefs	Aboriginal Beliefs
1909	149	149	0	0	0
1913	153	153	0	0	0
1914	154	145	3	6	3
1917	148	135	7	6	0
1924	169	132	37	0	0

In both communities the Methodist population decreases as the Roman Catholic population increases. This seems to indicate vigilant recording. The population at Berens River for the 1925 census declined, whereas the figures for Poplar River increased. This is expected since there would be a population decline in Berens River following the 1918 flu epidemic. The large decline in the Methodist population exceeds the number of flu deaths, and is likely also influenced by conversions to the Roman Catholic faith since the Roman Catholic population actually increased during the same period. It is also possible that migration played a part in this decline. The fact that a population count of 283 at Berens River is repeated in three years is somewhat suspicious and may indicate that numbers were being shuffled between religious denominations, so that it would appear as if a new count had occurred each year.

In some cases it is possible to cross-check the census numbers. For example, the Roman Catholic missionaries in Berens River was writing letters to the government and reporting the number of Roman Catholic school age children and residents in Berens River. When these numbers are compared with the numbers in the Sessional Papers, some slight differences emerge. The letters give totals of 57 Roman Catholics for 1914 and 56 in 1917 (Provincial Archives of Canada [PAC] RG 10 Vol. 6228 file 501-1, 1914, 1917). The Government of Canada Sessional papers recorded 45 Roman Catholics in 1914 and 54 in 1917 (Government of Canada 1915, 1918). Therefore, cross-checking the Roman Catholic population counts did reveal some discrepancies. The calculation of 95% confidence limits around these rates, should help reduce the influence of errors in census figures.

The total population figures for both Berens River and Poplar River were also cross-checked with the narrative sections in the Sessional Papers, which usually precede

the tabular statements. This cross-check showed no discrepancies between the tabular and written reports (Government of Canada 1910:102-103).

Parish Records

Parish records are a potentially useful source of information for historical studies of communities. They contain information on lifetime events such as birth, death and marriage for individuals who were members of the church. Parish records may be used in exercises of family reconstitution and historical demography. For this research, however, the records are important for estimating mortality rates and for exploring the extent of family relatedness between these communities.

There are potential problems with parish records that call for caution. First, it must be kept in mind that records of burials and baptisms are not true records of deaths and births in a community (Willigan and Lynch 1982:57). The information is recorded by a clergyman and hence is prone to error and bias (Hollingsworth 1968:416), such as mistakes in copying, the omission of events, or neglect of certain entries (Hollingsworth 1968:417). There is some evidence that racism may have existed in Berens River. Julie Ann Asher[1], a Berens River Resident circa 1900, wrote in regards to Christmas dinner:

> A table at the top of the church was reserved for the white folk and a few of the head Indians, mostly the Berens and Everett families (they had white blood anyway). We had more and better dishes too, but we probably ate less than the other tables. [Asher 1950:94]

While it cannot be known with certainty if this racial bias affected the clergy's recording practice, it is unlikely that this attitude would result in less vigilant recording since (a) the Aboriginal people were the majority of the population, and (b) it was the purpose of the

[1] Julie Ann Asher was the daughter of a government agent in charge of Reserves on Lake Winnipeg. She served as a housekeeper and a secretary for her father (Asher 1950).

Methodist church to convert the Aboriginal people and record these conversions (i.e., Christian baptisms, marriages and funerals).

While historical demographers are aware of potential problems with their data, mission records are not abandoned as a source of information. It is understood that the source cannot be improved, but its limitations can be understood and accounted for. If the documents are used correctly they can provide much information. This notion is expressed by Whiteman (1986:38):

> Instead of being unduly wary of missionary documents that may be tainted with bias, it is more important to attempt to understand the wholeness of a document, the context out of which it was created and the configurational whole of which it is a part.

Since the parish registers are vital for the calculation of mortality rates and therefore hold an important position in this study, it is important to carefully assess their quality. The purpose of such an exercise is not necessarily to determine whether the records are useable, although this is the outcome, but to analyze them for their limitations. To do this I followed the suggestions of Whiteman (1986:38) that "the wholeness of the documents should be understood, the context in which it was created, and the configurational whole of which it is a part". To address these issues, the next section of this chapter begins by establishing context through a brief description of the mission histories in both communities. This is followed by a dissection of the registers in which each part of the register is analyzed independently according to standards set out by Willigan and Lynch (1982). Finally, the quality and limitations of the entire registers are assessed as a whole according to Drake's protocol (Drake 1974).

The Missions at Poplar River and Berens River, Manitoba

The Berens River mission, also known as the Ferrier mission (Semmens n.d., p.48), was opened in 1872 by Egerton Young (Stephenson 1925:114). In 1876, Mr. John

Semmens took charge of it for two years, after leaving the Nelson House mission (Stephenson 1925:116; Semmens n.d., p.55). During Semmens' occupation at Berens River (1876-1878), visits were frequent to Poplar River and Little Grand Rapids. He noted that although "paganism prevailed", he had received "encouraging results" from these two communities (Semmens n.d., p.55).

In 1909-1916, Joseph H. Lowes ministered at Berens River (Table 4.12). He also made trips to Poplar River, as his name appears in the register of baptisms there in 1915 (UCCA Poplar River, Register of Baptisms). In 1916, the minister who was in charge of Poplar River (Percey E. Jones) moved to Berens River where he ministered until 1920 (UCCA Berens River, register of baptisms).

Table 4.12: Chronology of Ministers at Berens River, 1909-1952

Years	Minister
1909-1916	Joseph H. Lowes
1916-1920	Percy E. Jones
1921-1938	J.W. Niddrie
1938-1942	Luther Schultze
1942-1944	F.G. Stevens
1944-1945	Jacob Lowes
1945-1946	H. Newfeld
1947-1948	J.G. Kehler
1948-1951	W.S. Cooke
1951-1952	J. Lowes
1952 -	H. Newfeld

In 1912, the Roman Catholic mission was established at Berens River under the charge of Brother Jos. de Grandière (Brown 1998). The impact of the Catholic Church was not realized until around 1918 when 19% of the population was reported to be Roman Catholic (Government of Canada 1918) and when a Roman Catholic day school was established in the community in August (Government of Canada 1920:85 footnote). This can be compared to the mere 4.7% of the population reported to be Roman Catholic in Poplar River the same year (Government of Canada 1918).

Even as late as the 1920s and 1930s, when Reverend Niddrie was in charge of the Methodist ministry, Berens River was still the central mission that oversaw several other communities, for example, Deer Lake, Little Grand Rapids, and "Pekangecum" were all visited by Rev. Niddrie. These communities reportedly did not have a resident missionary, however, they did contribute to the Berens River mission funds (Stephenson 1925:124). Niddrie also made visits to Island Lake, Gods Lake, and Oxford House in the summer months (Everett 1986:22).

Much less is known about the history of the mission at Poplar River. The parish's vital information was recorded only after 1886 when the first entries of baptisms appear in their register (UCCA Poplar River, Register of Baptisms). The information was recorded by the United Church Minister in the community and spans the time period from 1886 to 1963 (Table 4.13).

The first 10 years of recording was sketchy and was entered by three ministers: E. Langford, J.W. Butler, and J. A. Lachean. In the early 1900s, the residency of ministers is unstable, with ministers staying in Poplar River for anywhere between one to five years. By 1922 residency becomes more stable, and between 1923-1936 there are only two ministers. However, after 1936 residency of the ministers becomes unstable

again, with a number of different ministers recording for the remaining period. During the period surrounding the 1918 influenza epidemic, the minister (W. Lee) had been serving the community for four years so it could be expected that he was familiar with the parish.

Table 4.13: Chronology of Ministers at Poplar River, 1909-1943

Years	Minister
1905-1907	J.L. Blackford
1908-1914	P.E. Jones
1915-1919	W. Lee
1919-1922	W.J. Hope
1922-1926	W. Lee
1927-1934	A.E. Caldwell
1934-1937	E.M. Baird
1937-1940	J.M. Taylor
1941	H. Meadows
1942	E. Shanks
1943	Jacob Toews

Evaluation Methods

To test the quality of the registers, both the Berens River and Poplar River registers were tested according to established protocols.

1. For each community, each entry in the registers of baptism, burial, and marriage was entered into spreadsheets. I entered the Poplar River data into Microsoft Excel (5.0) spreadsheets. The Berens River data had been entered into Quattro Pro spreadsheets by

research assistants to Dr. Ann Herring (McMaster University). I converted the Quattro Pro files to Microsoft Excel for the purposes of this research. The spreadsheets included all the information in the original document and used a column designated "remarks" for any extra information provided in the register. After all the data were entered, new files were created containing only the information pertinent to the task of assessing the quality of the records.

2. I examined the quality of the records in accordance with standards set out by Williagan and Lynch (1982). This examination requires that for each community each vital event be examined independently and compared with the 'ideal' situation. This step produced a subset of the data that met the requirements of the test, which then proceeded to the next level of examination.

3. The quality of the subset of the registers derived from step 2 was assessed using methods set out by Drake (1974) (see Appendix 1). This assessment of the register requires that the registers for the three vital events (baptisms, marriages and burials) be combined into one document which then is submitted to various tests and considerations. I created a new data file containing the components necessary for Drake's analysis.

The Case of Poplar River: Evaluation and Results

The first step of the evaluation of these registers is to compare what is found in each register to an "ideal" situation described by Williagan and Lynch (1982:60) (Tables 4.14 - 4.16). Williagan and Lynch (1982:60) point out that these ideals are seldom met.

When compared to ideal standards the burial register at Poplar River is very good (Table 4.14). The only category not recorded in the burial record is the marital status of the deceased. This will not hinder this research, since this information was not necessary. If needed in future studies, it can be obtained from the marriage records.

The burial records are available from 1905 to 1954; however, not all of this time period is covered equally. After 1946 there are only four burial records for the following nine years. These four records are poor in quality as most of the information is missing. For this reason only the burial records for 1905-1946 are considered here.

Table 4.14: Poplar River Burial Register, 1905-1954

IDEAL BURIAL RECORD	POPLAR RIVER BURIAL RECORD
Age at Death	Yes
Marital Status	No
Date of Death	Yes
Date of Burial	Yes
Name of Surviving Kin	Yes
Minister	Yes
Additional:	Birthplace
	Age
	Cause of Death
	Place of Death

Table 4.15: Poplar River Baptism Register, 1886-1896; 1904-1954

IDEAL BAPTISM RECORD	POPLAR RIVER BAPTISM RECORD
Date of Birth	Yes
Date of Baptism	Yes
Infant Name	Yes
Illegitimate	Yes
Parents Names	Yes
Mother's Maiden Name	Sometimes
Minister	Yes
Additional:	Place of Birth
	Place of Baptism

All of the ideal categories are present in the baptism records at Poplar River (Table 4.15). Discrepancies do occur, however. Information about the date of birth can be as minimal as only the year born, although this occurs infrequently. The recording of the mother's maiden name is subject to large gaps depending on who officiates at the ceremony (see Drake's Analysis Section for more detail on influence of the minister). The mother's maiden name is recorded in some instances, but the recording of the mother's first name and married name also occurs, as does the designation in the form of "Mrs. Husband's-first-name Husband's-last-name", e.g., Mrs. Charlie Adams.

There is a clear break in the baptism register between 1896 and 1904. Since this gap is so significant, the baptisms before 1905 were eliminated. While the records continue until 1954, as with the burial records, they are infrequent and insufficient after 1946. For example, only one baptism occurs between 1947 and 1952. For these reasons only the baptisms from 1905-1946 are utilized here.

The marriage records for Poplar River are only missing the information: "if previously married and to whom" (Table 4.16). This is a useful category for family reconstitution. Also, the register only lists occupation for the males. In addition to being influenced by a time in history when the importance of women to society was downplayed, the lack of a record of an occupation for the females is likely a result of gender bias. It is possible that Aboriginal women's work was not considered an occupation by the clergymen since it was not seen by society as making a direct contribution to the economy, society, religion or politics (Peers 1996:39).

The marriage records begin in 1905 and are maintained until 1963. However, from 1946-1963 only three marriages were noted and in those three records of marriage not all of the information was provided. Therefore, as in the case of the baptisms and burials, only the marriage records from 1905-1946 are used here.

Table 4.16: Poplar River Marriage Register, 1905-1946

IDEAL MARRIAGE RECORD	POPLAR RIVER MARRIAGE RECORD
Name of both partners	Yes
Age of both partners	Yes
Previous marital status (widowed or single)	Yes
If previously married (to whom)	No
Occupation	Males only
Witnesses	Yes
Minister	Yes
Additional:	Place of Birth
	Place of Residence
	Date and Place of Marriage
	Parents

Analyzing the data in terms of the problems with parish records (i.e., gaps and lost data) and comparison with the "ideal" has shown that only 1905-1946 can be usefully analyzed for Poplar River. This has no consequence for this research since the year of the epidemic (1918-1919) and the years surrounding it have been deemed useful.

Drake's Analysis

The procedure for evaluating parish registers is based on Drake (1974) (Appendix 1). He sets out a strict protocol for assessing the quality of Anglican Church parish records in England (Drake 1974:83), but the method can be modified to analyze smaller Aboriginal parish records in Canada and elsewhere (Hoppa and Herring 1997).

1. The first step in Drake's analysis is to ensure that the register has at least 100 entries of vital events per year. This condition stems from the fact that Drake's analysis was intended for parish records in England. These registers could be expected to be much larger than those kept for the relatively small Aboriginal communities in Canada. The register for Poplar River has a range of two to thirty vital events per year over a 41-year period, with a mean of 11.9 and a mode of 11.

The total population in Poplar River is very small (Table 4.17) and of the total population, only the Methodist population's vital events are being analyzed here; therefore, the small population size results in few entries of vital events per year in this community. Drake notes that the number 100 is an arbitrary number and that "much can be learned from registers with fewer entries" (Drake 1974:49).

Table 4.17: Census Data for Poplar River, 1914 and 1917 (Government of Canada Sessional Papers 1915, 1918)

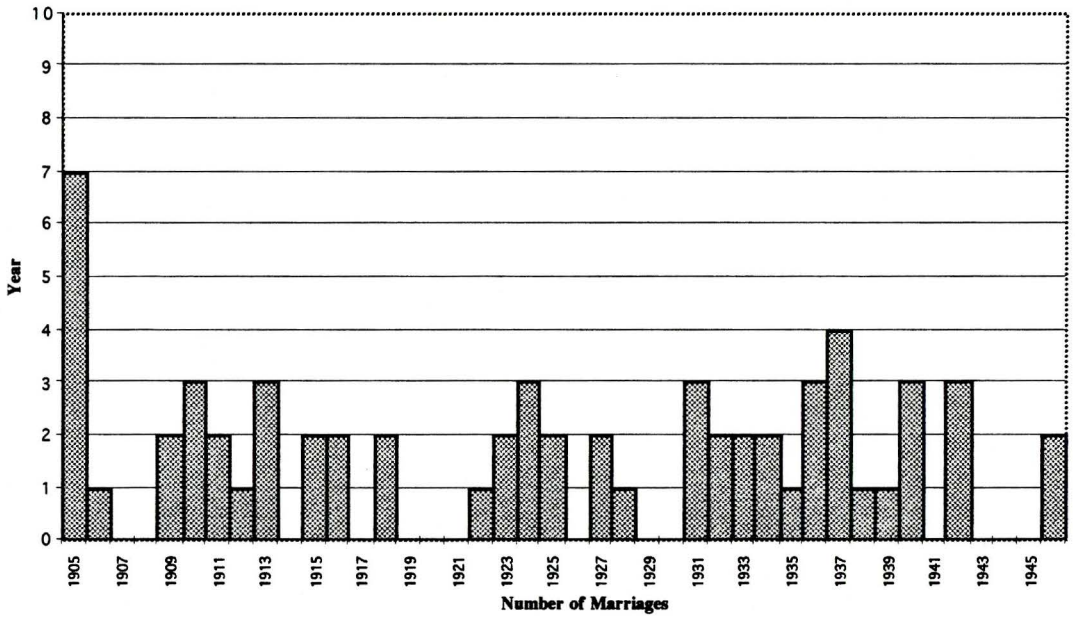
Population	1914		1917	
	f	%	f	%
Total Population	151	100.00	148	100.00
Methodist	145	96.00	135	91.20
Roman Catholic	3	1.98	7	4.73
Other Christian Beliefs	0	0.00	6	4.05
Aboriginal Beliefs	3	1.98	0	0.00

2. The next step in the analysis is to look for any obvious gaps in the register. At Poplar River vital events are registered in every year and in every month. When each portion of the register is examined separately, gaps in the marriage register appear (Fig. 4.1). All years have at least one death record and births are recorded for all but one year. However, there are 14 years throughout the 1905-1946 period without records of marriage. Six of these years occur sporadically, but there are two, three-year periods and one, two-year period when no marriages are recorded (1919-1921, 1929-1930 and 1943-1945). Drake suggests that only gaps of more than two years and gaps which are more than 10% of the years under study are significant. Eliminating the one, two-year gap, leaves two, three-year periods, totaling six years without marriage records. These periods together total 14.6% of the study period.

When faced with such a dilemma Drake's next step instructs the investigator to rethink the study. The apparent marriage boom in 1905 was analyzed for possible reasons

for its occurrence; however, the marriage register provides no clues for the boom. All of the marriages occurred between March and July of 1905, and all but one was performed in Poplar River, the exception being one marriage in Black River.

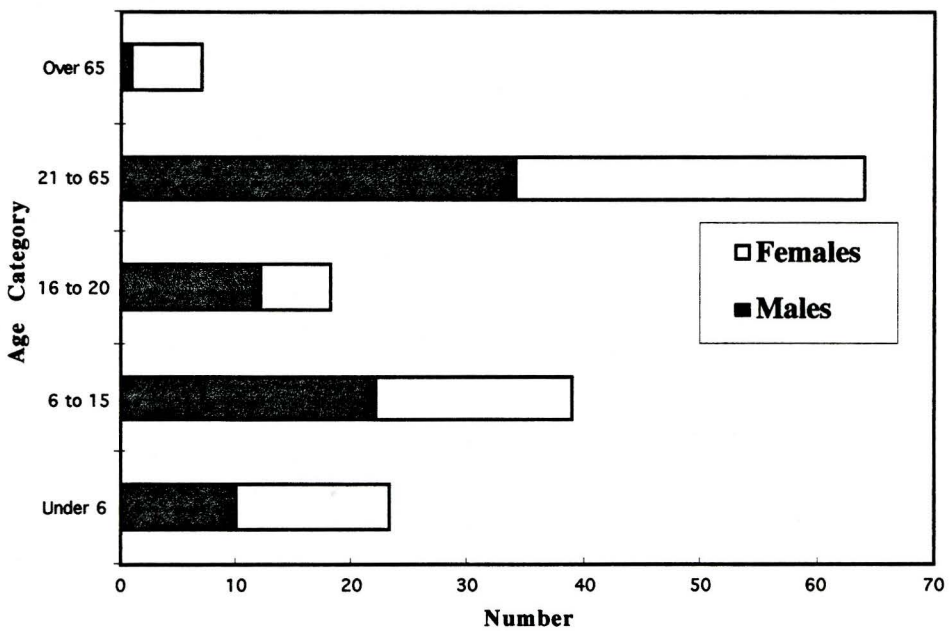
Figure 4.1
Number of Marriages Registered in Poplar River 1905-1946



Gaps in the marriages between 1919-21 and 1943-67 could be due to the absence of a permanent clergyman. From 1919-21, there were six different ministers recording baptisms and burials; between 1947-61 there is evidence of under-registration in all registers, and only the years 1952 and 1954 have a minister's names recorded. The other gaps in 1907-08, 1929-30 and 1943-45 all occur when there was a resident missionary in Poplar River and may be a reflection of the small population size in Poplar River, rather than poor or negligent recording.

A total of 67 marriages were recorded at Poplar River from 1905-1963. Of these only 58 are within the defined study period of 1905-1946. This is immediately suspicious. It seems as though only a very small number of marriages were recorded over a 41-year period. However, census data revealed that in 1915 there were only 12 males and 6 females between the ages of 16-20 and 34 males and 30 females in the 21-65 age category (see Fig. 4.2) (Government of Canada 1915). Furthermore, the census data do not indicate how many people in those age categories were already married. It would appear that the paucity of the records occurs because there was a very small population at risk of entering marriage, so it is to be expected that few marriages would occur.

Figure 4.2
Number of Males and Females in Each Age Category Living in Poplar River, 1914



The acceptance of the gaps in the marriage register can be justified due to the small population at risk of marriage. Furthermore, the other registers in the parish do not show any evidence of gaps in the same years, which would be expected if the gaps were due to negligent recording.

3. The next step of the analysis is to look for other evidence of under-registration in the register. Drake's instructions are to conduct five "tests"[(a) through (e)] on the records, to detect under-registration.

(a) The purpose of the first test is to carefully examine the data by year and month for any inconsistencies. To test the years, Drake suggests sampling every fifth year. When every fifth year is examined from 1905 to 1945, there are no apparent deficiencies in the Poplar River data (Fig. 4.3).

Figure 4.3
Total Vital Events in Poplar River Every Five Years

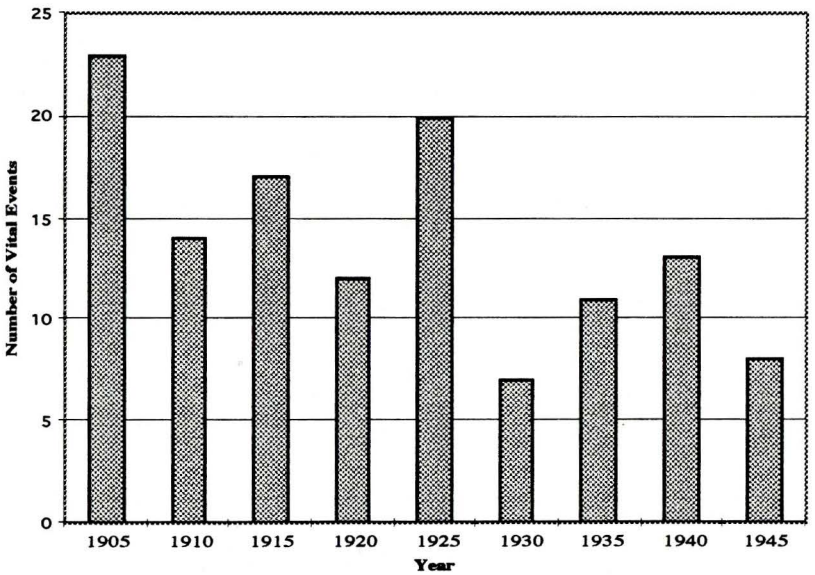
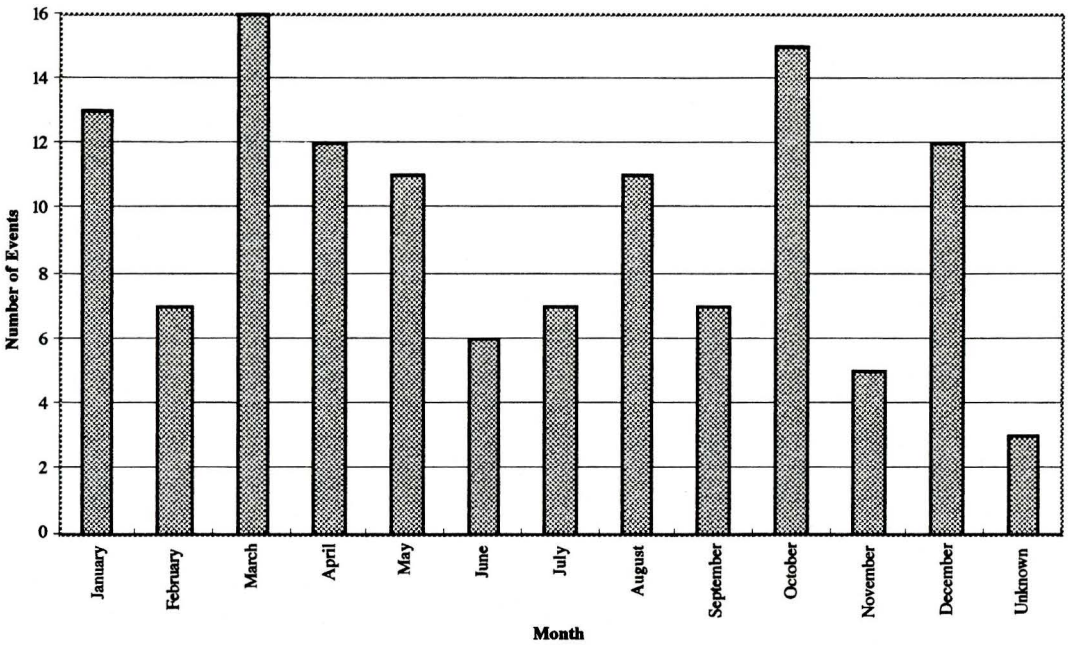


Figure 4.4
Total Monthly Vital Events at Poplar River: Five Year Interval Sample (1905-1945)

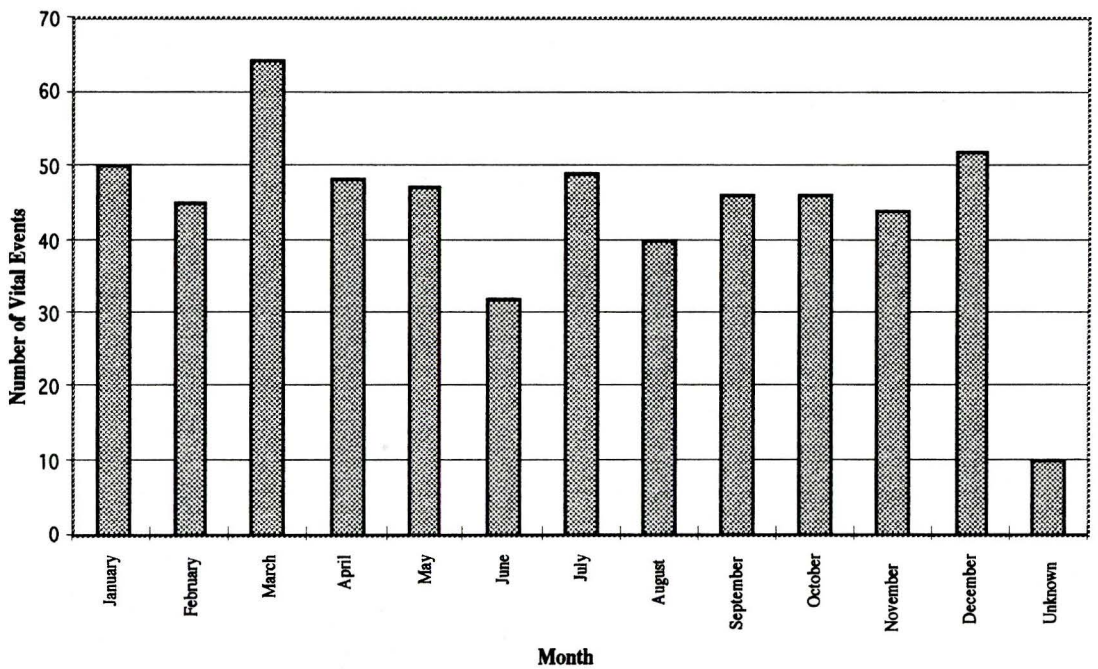


When analyzing the months (Fig. 4.4) it was discovered that there are gaps in some years. A given year can have anywhere from three to six months without a record of vital events. These occur sporadically throughout the year and do not appear to be the result of systematic or regular absences of the minister from the parish. Interestingly, the months of June and July in the summer and November and February in the winter have the lowest number of entries when the total number of entries per month for the nine sample years are added up (Fig. 4.4). This could be a result of absence of the people from the area due to seasonal movement of the band, fishing in the summer and hunting at camps in the winter (Hallowell 1992:44). However, when Drake's suggestion to look at every five years is ignored, the pattern changes (Fig. 4.5). Once all of the vital events per month for

the entire study period are added up and charted, only June appears to have any possibility of under-registration.

For such a small population with vital events spread over a 41-year period, sampling strategies should not be used; but rather, all the data should be considered. The results in Figure 4.4 will be disregarded and the results from Figure 4.5 showing a deficit in June will be accepted. This reduction in the number of events recorded in June could still be attributed to seasonal movement of either the minister or the parishioners. Ministers may have been traveling to outlying communities to perform ceremonies or may have been on vacation.

Figure 4.5
Total Number of Vital Events Per Month in Poplar River, 1905-1946



(b) Drake's next step is to consider the influence of the minister who recorded the information. It was found that the outgoing minister influences the recording of data of those ministers who followed him. In the Poplar River register, for example, if a minister stops recording an item (e.g. place of birth) then the ministers following him will not record it. Usually after a few terms a new minister will start recording the category again and reverse the trend. This happened in Poplar River in the 1940s. In 1940 there was a transition period when J.M. Taylor was outgoing and H. Meadows was incoming. There is a gap in the register during this year — births were recorded but date of baptism and name of minister were not. Once H. Meadows became minister he neglected to report the place of baptism, which up until that time had been recorded. All of the ministers that followed him failed to record place of baptism. This is important because sometimes residents of Poplar River were recorded as having been baptized at Black River. In 1943, a new minister (Shanks) neglected to record place of birth and it was not reported thereafter.

The burial register clearly shows the minister's influence on the recording of information. In this register, the early ministers (1905-1918) did not record the place of death, birth date, birthplace, cause of death, date of burial or place buried. Part way through 1918, when a new minister came in, the register gains date of burial information. It is not until Rev. Caldwell's term (1927) that the cause of death, place of death, and place buried are recorded. In 1932, part way through his appointment, he adds birth date and place of birth. In 1935 when a new minister took over (Baird), birthplace, birth date, burial date, place buried, and the name of the deceased's mother cease to be recorded. The minister who follows Rev. Baird also neglects these items. It is not until 1943 when Rev. Toews became the minister that the date of burial and name of mother were recorded once more. The Poplar River registers are not recorded on authorized church ledgers and therefore what was recorded was not governed by a strict protocol. At the Berens River

Methodist mission, however, data were recorded on church ledgers that stated which categories of information were to be provided. Therefore, it is more likely that these inconsistencies at Poplar River are the result of whimsy, rather than fiat.

To reiterate, it is clear that the minister has a large influence on the information being recorded, not only during his term, but in the ones that follow. This is likely the result of the new minister simply following the recording method of the last. For this study of the 1918 flu at Poplar River, the date of death is the most important consideration and this item is recorded diligently throughout the register. The date of burial is only present after December 1918, which is disappointing, but it does not affect this research.

(c) The next "test" of the register is to determine if the register covers the entire population for the entire time. In England, populations were growing fast, and parishes often subdivided with the result that parts of the population were recorded by a different church. In Aboriginal communities the situation was different. While the populations were growing steadily in Poplar River, the population never grew too large for the church. This is evidenced by the fact that there was only one Methodist church in Poplar River during the study period. It is possible however, that people moved between Christian denominations; that is, between Methodist and Catholic. Table 4.11 however, shows that movement between denominations was minimal.

One concern in relation to this fourth "test" was early incorporation of other Aboriginal communities vital events into the Poplar River registers; however, a careful examination of the records shows consistency. Although it appears that Big Black River, Black River, Thunder Lake and sometimes Norway House and Berens River were recorded as the place of death, place buried, place of birth, and place of baptism, this is consistent throughout the duration of the register. This observation is more indicative of social relationships and mobility of individuals between communities, rather than an

indication of problems with the data. Someone may be buried in Big Black River, for example, if that is where their parents resided.

(d) Next, Drake advises the researcher to consider possible non-conformists. In England it was common for people to boycott the church, especially by not baptizing their children. In the Poplar River population there were some individuals who did not conform to the Methodist Church. It is fortunate that the Canadian Sessional Papers have census data for Poplar River which give a breakdown of the population by denomination (Table 4.11). Most of the population was, in fact, Methodist. In 1914, the census shows only three individuals with "Aboriginal Beliefs" (Government of Canada 1915); by 1918 this figure decreased to zero "non-conformists" (Government of Canada 1919).

(e) The final "test" or consideration asks the researcher to consider delays in baptisms. In the case of Poplar River, baptisms were delayed throughout the records. This was likely a result of the role of the church as a mission. It took time to convert the residents of the community and surrounding areas, and once they were converted many older people sought baptism. For this reason, the delay in baptisms could range from 0 days to 71 years from 1905-1946. The average delay was three years, but calculating the mode for year, month and day delays in baptisms revealed that most often the delay was five days (i.e., mode for yearly delay = 0; mode for monthly delay = 0; mode for daily delay = 5). The large range and high average can be partially explained by a number of delayed baptisms occurring in 1931. For this year alone the range was 0 to 71 years with a mean of 20.3 years. It is not clear why this year had so many delayed baptisms, and the records do not include place of birth or place of baptism for these entries.

After thoroughly considering tests (a) to (e) defined by Drake (1974), I do not believe there is any evidence of under-registration in the Methodist registers at Poplar River between 1905 and 1946.

4. The next phase of Drake's analysis asks if the register shows an unbroken run of 100 entries for several items. In the case of the Poplar River registers, some do not even have 100 entries in total (e.g., marriages). Drake's method of analysis for these last points will be considered, but the designation of 100 is not applicable to the situation in Poplar River, as previously discussed. For this reason, the registers were analyzed for breaks in the categories he designates, but an unbroken run of 100 entries was not considered a necessity in accepting the validity of these records.

The first test in this section is to note whether the register shows an unbroken run of 100 age at marriages. Of the 63 marriage records there are six entries without an age at marriage for one or both individuals. These breaks occur rarely and do not appear to be the fault of any one minister. Of the six discrepancies, five are attributable to different ministers, with only H.M. Meadows neglecting to record the age on more than one occasion. These six records comprise 9.5% of the marriage register. Only two of the six (3.17%) are missing the age for both the bride and groom.

The next advice is to check whether the burial register shows an unbroken run of 100 ages at death. Of the 232 burial entries, there are only three instances where age at death was not recorded. In one of these cases the individual was designated "infant". These three instances occurred during the term of three different ministers and therefore are not the result of the negligent recording practices of any one individual in particular.

One problem observed in the register is the estimation of age at death. In many instances the family or minister did not know the exact age of the individual who had died. This is a result of cultural differences between the Europeans and the Aboriginals. It was not until the Aboriginal people had been influenced by Europeans that a birth date became relevant, since they did not use a Christian calendar.

The third unbroken run Drake suggests be considered is cause of death (Appendix 2). The records at Poplar River have cause of death only after 1927 when A.E. Caldwell took on the mission. Once cause of death started to be recorded there was absolutely no break in the register for this category. Unfortunately, the recording of the cause of death begins after the 1918 influenza epidemic and therefore I must use secondary indicators to establish whether the 1918 flu came to Poplar River in 1918-1919 (e.g., mortality rates calculated from the register using number of burials per year and census data from the Government of Canada Sessional Papers for those years).

While Drake does not discuss the accuracy of the recording of cause of death, this potential problem should be mentioned. The cause of death in both of the study communities was determined and recorded by the clergy. This means that the accuracy of the listed cause of death would depend on the knowledge of the recording minister (Moffat 1992:85). Interpretation of this data must therefore be made with caution. It could be expected that common ailments such as influenza, pneumonia and tuberculosis would be relatively easy to diagnose since the minister would be familiar with them. Further, a minister who had been serving the parish for an extended period of time could be expected to be familiar with the members of the community and would likely be aware of any chronic ailments.

Drake's next consideration is to examine the register for an unbroken run of 100 baptisms of illegitimate children. There are a total of 372 entries in the baptism register with only eight children designated illegitimate. These eight designations are made by five different ministers spread over the entire time period. In such a small community it would more than likely be common knowledge if a child were illegitimate, so one could assume that the register is not deficient in this respect.

The final consideration asks the researcher to look for an unbroken run of 100 addresses of the bride and bridegroom in the marriage register. Again, the marriage register at Poplar River has only 63 entries. In the register the addresses are recorded as "place of residence" or "place of birth." In some instances both are recorded; in others only one item is recorded. For the purpose of the study at Poplar River, either designation is useful and both will be considered a record of "address." From these 63 entries only four do not have a place of birth or place of residence, three of which lack it for both individuals. Two of these occur immediately after J.M. Taylor began his ministry at Poplar River and are likely a result of his inexperience.

These last considerations are useful in revealing some of the specific deficiencies in the Poplar River data. Overall the data has come through Drake's analysis well. Any gaps or inconsistencies have been shown to reflect the nature of the community and the context in which the data were recorded. These deficiencies should have little or no effect on this study.

The Case of Berens River: Evaluation and Results

Most of the parish register data for Berens River had already been entered into a database and some of the burial data had been analyzed (Herring 1994a). The overall quality of the data, however, had not been assessed systematically according to the standards set out by Williagan and Lynch (1982) or according to Drake's protocol (1974).

The steps taken to assess the quality of the Poplar River registers were repeated for the Berens River registers, the first step being the comparison of the registers to the ideals set out by Williagan and Lynch (1982). In this test the Berens River registers fare well. Unlike the Poplar River registers, there were no immediately obvious gaps between 1909 and 1952, therefore it was not necessary to eliminate some years. The burial registers

lack the marital status of the deceased and do not have the names of the surviving kin, two items that are considered necessary according to the ideal. However, as with Poplar River, many extra items were recorded which proved to be more important for this study (Table 4.18).

Table 4.18: Berens River Burial Register, 1909-1952

IDEAL BURIAL RECORD	BERENS RIVER BURIAL RECORD
Age at Death	Yes
Marital Status	No
Date of Death	Yes
Date of Burial	Yes
Name of Surviving Kin	No
Minister	Yes
Additional:	Date of Birth
	Birthplace
	Cause of Death
	Place of Death

The baptism register also does not meet all of the ideals (Table 4.19). There was a failure to record whether the child was illegitimate as well as the mother's maiden name. Again, there were extra items recorded such as residence and place of birth. While having the mother's maiden name and notation of illegitimate births would be important for attempting family reconstitution, they are not necessary for the purposes of this study.

Table 4.19: Berens River Baptism Register, 1909-1952

IDEAL BAPTISM RECORD	BERENS RIVER BAPTISM RECORD
Date of Birth	Yes
Date of Baptism	Yes
Infant Name	Yes
Illegitimate	No
Parents Names	Yes
Mother's Maiden Name	No
Minister	Yes
Additional:	Place of Birth
	Residence

The marriage register (Table 4.20) does not have "if previously married and to whom" recorded or occupation; however, it was possible to determine if the bride had been previously married by her surname, since it would differ from her father's last name which appears in the registers. The occupation category would have been an asset to this study, but the forms being used by the Berens River Methodist Church to record marriages did not include it. The marriage registers provide a wealth of other information not considered by Willigan and Lynch (1982). The ministers recorded residence, place of birth, religion, date of license, place married and date married. These categories could provide much information on marriage patterns (i.e., exogamous vs. endogamous) and intergroup movement.

Table 4.20: Berens River Marriage Register, 1909-1952

IDEAL MARRIAGE RECORD	BERENS RIVER MARRIAGE RECORD
Name of both partners	Yes
Age of both partners	Yes
Previous marital status (widowed or single)	Yes
If previously married (to whom)	No
Occupation	No
Witnesses	Yes
Minister	Yes
Additional:	Place of Birth
	Place of Residence
	Date and Place of Marriage
	Date of license
	Religion
	Parents

It should be noted that the "ideal" set of parish registers will differ depending on the focus of the study and the group for which the records were kept. An increased movement of people could be expected among Aboriginal populations being introduced to

new economic and social systems; therefore, items such as place of birth and residence would be important to record. Since cause of death, date of death, place of death, and residence are the most important categories for this research, the fact that all ideals are not met by the Berens River registers does not hinder this study.

Drake's Analysis

The next step was to test the Berens River registers according to Drake's protocol (Appendix 1). This was done according to the same steps followed in the testing of the Poplar River registers.

1. The first test is to make sure that there are at least a total of 100 vital events entered for each year. As was the case with Poplar River, Berens River was a small community with only 283 residents in 1914 (Government of Canada 1915). It is therefore unrealistic to expect 100 vital events per year. The range of vital events per year in the registers was 11 to 59, with a mean of 24 per year and a mode of 15. The extreme case of 59 events occurred only once, in 1921, a year when many baptisms and marriages from outlying communities appear in the registers.

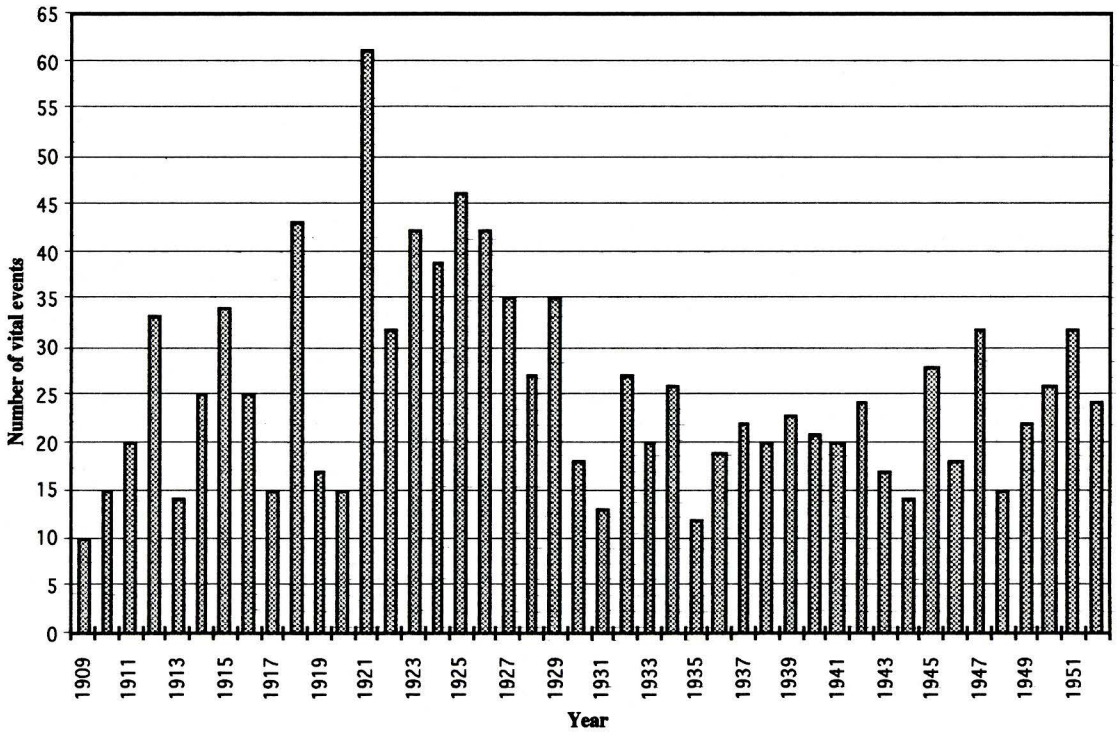
2. Next, the Berens River registers were analyzed for gaps. Unlike the Poplar River registers, there were no meaningful gaps i.e., greater than two years or more than 10% of the entries. The only gap found in all of the Berens River register's was one gap of one year (1943) in the marriage register (2.3% of the marriage register).

3. The registers were analyzed for any evidence of under registration through the following considerations:

(a) The registers were examined by year and month for evidence of under registration. Since the five-year sampling method proposed by Drake (1974) proved unreliable in the Poplar River analysis, it was not employed for the Berens River analysis. There is no evidence of systematic under registration either by particular years or months;

however, it did appear as though there may have been over registration in some years, and in the month of July. The years 1912, 1915, 1916, 1918, 1921-1929 and 1947 have many more vitals events recorded than are recorded in other years (Fig. 4.6).

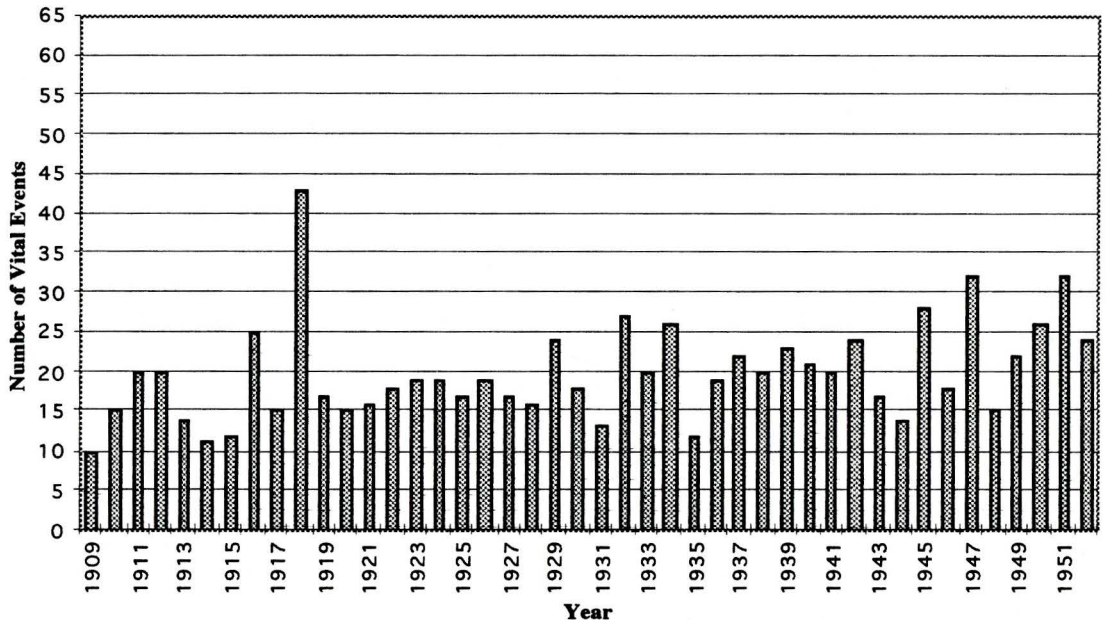
Figure 4.6
Total Number of Vital Events Recorded in Berens River



The increase in 1918 was a result of the influenza epidemic. The remaining years had no increase in burials, so the marriage and baptism records were analyzed for clues. It was found that during 1912, 1915, 1921-1929, and 1947 vital events from outlying communities were being recorded in the Berens River registers. Vital events for residents of Little Grand Rapids, Deer Lake, Poplar River, Pauingassi, and Bloodvein occur throughout the registers and actually dominate the registers in 1912, 1915, 1921-29 and

1947. When these vital events are removed, the yearly distribution of vital events is more consistent (Fig. 4.7).

Figure 4.7
Total Vital Events in Berens River, 1909-1952: Corrected for Those Events That Took Place out of Berens River



Cross checking the Berens River and the Poplar River registers revealed that in 1915 Poplar River marriages and baptisms, but not burials, were performed by the Berens River minister Joseph Lowes, and were recorded in both the Berens River registers and the Poplar River registers. This was during the first year of William Lee's tenure at Poplar River. It is curious that while William Lee did not perform the marriage and baptismal ceremonies, he served as a witness for the marriages and performed the burial services. Thus it does not appear as though absence of the minister at Poplar River accounts for the

Berens River minister performing the baptism and marriage ceremonies. Perhaps this represents a training period for William Lee and he required assistance from Joseph Lowes. While cross checking the Berens River and Poplar River marriage registers, discrepancies for this year were observed in the recording of age and the names of parents. I considered the entry in the register in the community where the event occurred to be correct since the lapse in time between the event occurring in Poplar River and its recording in Berens River could explain the discrepancy. While this had no immediate consequence for my study, this discovery served as a reminder of the potential for human error in the recording of data.

The registers were checked for potential under-registration by month by adding up the vital events in each month and then summing the total number of vital events in that month for the years 1909-1952. This process revealed suspiciously high numbers of vital events for the month of July (Fig. 4.8).

However, careful examination of the registers showed that during those years the minister traveled to outlying communities to perform marriages and baptisms, this was most often in July. When vital events for communities other than Berens River are omitted, the monthly distribution is more consistent and shows no evidence of under-registration (Fig. 4.9).

Figure 4.8
Number of Vital Events Per Month in Berens River, 1909-1952

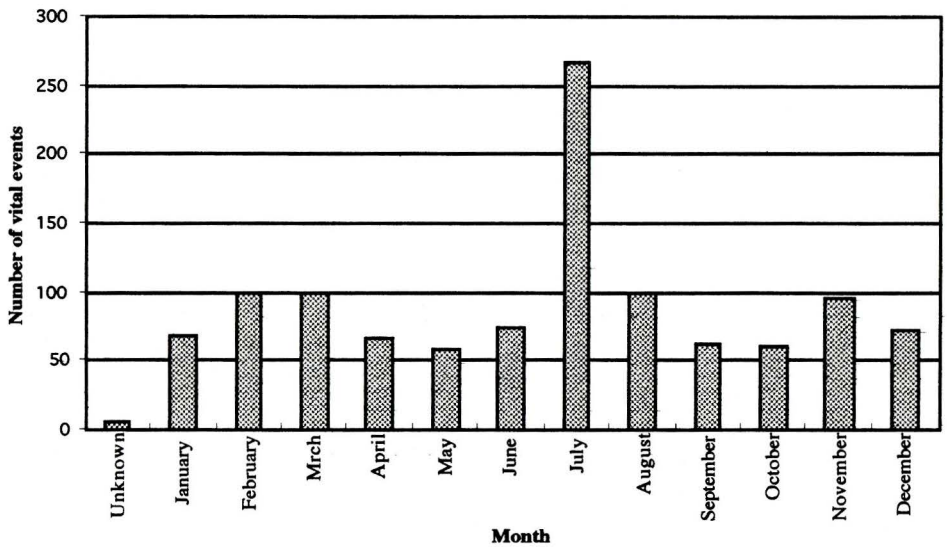
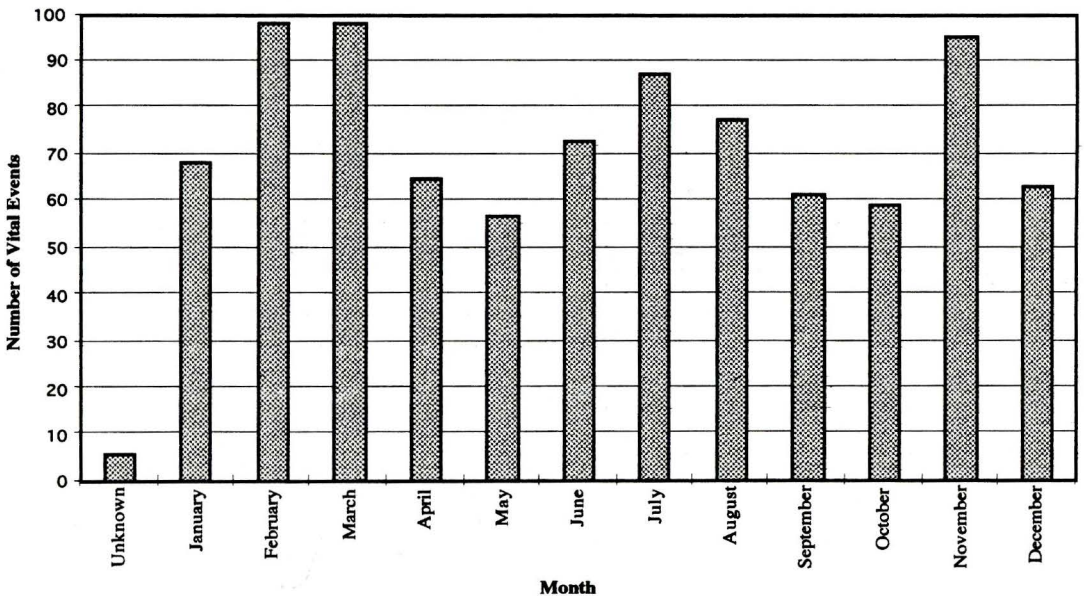


Figure 4.9
Total Corrected Vital Events Per Month in Berens River, 1909-1952



(b) The next step in looking for evidence of under registration involves evaluating the influence of the minister on record-keeping. Overall, the Berens River ministers followed the record-keeping protocol set out by their predecessor; however, deficiencies in the marriage records were noted between 1917-1937 when two ministers failed consistently to record the husband's and wife's parents names, and in 1917-20 when the minister did not always record the marital status of both parties.

The burial register has poor records of date of birth throughout the register, especially for elderly individuals. This may be explained by the fact that birth dates were not always known. In 1917-1920, when Rev. Jones presided, there is a noticeable decline in the number of recorded birth dates, making this already poorly-maintained category worse.

The baptism register also shows a deficiency in birth dates, especially notations of the day born; however, this only occurs when the baptism was performed outside of Berens River. The exact day may not have been known or important to the parents.

The only minister who influenced the recording of information consistently was Rev. Jones (1917-1920); however, there is no evidence for under registration during his tenure, just a failure to include all categories in his records. Since he always included the cause of death, date of death, and place of death, his inconsistency does not affect this research.

(c) The next consideration is to determine if the register covers the entire population for the entire time. In Berens River there was only one Methodist church during this period; therefore, the registers cover all Methodists in Berens River between 1909-1952. A Roman Catholic church was established in Berens River in 1912 (Brown 1998) and covered 17-19% of the population (Table 4.21). As previously discussed, the registers

do record vital events for outlying communities for periods of time. These entries can be identified and eliminated.

(d) Drake suggests that non-conformists be accounted for. In the Berens River population Christianity had been accepted by this time period and there were no individuals who professed to have Aboriginal beliefs (Table 4.21). It cannot be expected that Aboriginal beliefs had completely disappeared, but all residents appeared to have participated in a Christian religion. Consequently, non-conformists are not be considered a source of under-registration at Berens River.

Table 4.21 - Berens River Census Data, 1914 and 1917 (Government of Canada, 1915, 1918)

Population	1914		1917	
	f	%	f	%
Total Population	283	100.0	283	100.0
Methodist	230	81.3	227	80.2
Roman Catholic	50	17.7	54	19.1
Other Christian Beliefs	3	1.1	2	0.7
Aboriginal Beliefs	0	0.0	0	0.0

(f) The final test for under-registration is the examination of the baptism register for delays between birth and baptism. In the Berens River register it appears that delays in baptisms occur in cases where the minister traveled to other communities to perform the ceremony. In these cases the delays range from 1 to 35 years. Long delays (e.g., 35 years) can most likely be explained by older individuals converting to the Methodist religion. Long delays most often occurred from 1921-25 when the Berens River register first shows records for Little Grand Rapids and Deer Lake. By 1925, any delays in baptisms were usually less than one year, and again this would be in a case when the minister had to travel to outside communities which he would only do once or twice a year. From 1909-52, the delay of baptisms in the register range from 0 to 35 years. Calculation

of the mode for yearly, monthly and daily delays in baptisms shows that the typical delay was only one day (i.e., yearly mode = 0; monthly mode = 0; daily mode = 1).

4. The fourth test involves examining the registers for unbroken runs of 100 entries. The small size of the population at Berens River makes the requirement of 100 entries unrealistic, but the exercise does allow the researcher to evaluate the consistency of the records.

Drake specifies that one should look for unbroken runs of age at marriage, address of bride and groom, age at death, and cause of death. For both the marriages and burials there are instances where age is not recorded; however, the records are not poor. In the marriage records one run of 43 (1920-1929) and one of 67 (1931-1952) were found out of a total of 149 entries. Age was not recorded for both the husband and wife in only 4% of the entries. The burial records were also good, with three unbroken runs of 46 (1918-1924; 1930-1937; 1942-1950) out of 304 entries. The age was not recorded for 4.3% of the entries in the burial registers.

The recording of the place of residence of the bride and groom is excellent. Out of 149 entries in the marriage records, there is only one instance where residence was not recorded. Likewise the recording of cause of death is exceptionally good. Out of 304 entries in the burial register, there is only one case where the cause of death has not been recorded.

Parish Record Data Conclusions

It was found that the protocols put forward by Willigan and Lynch (1982) and Drake (1974), which were designed to assess the quality of parish records for historical communities, can be adapted to fit the size and composition of Aboriginal communities. In Willigan and Lynch (1982) the meaning of categories such as "address" and "occupation"

in the marriage records had to be broadened in order to fit the Ojibwa lifeways of the time. In Drake's analysis (1974), the small sample size meant that items such as population size and sampling methods had to be modified, as did the number of unbroken entries which should be found in a register.

The protocols set up by both Willigan and Lynch (1982) and Drake (1974) have been useful for identifying potential problems and inconsistencies in the records for both Poplar River and Berens River. This study shows that different researchers may find certain "tests" or considerations more useful than others, depending on the population they are studying. When the categories Willigan and Lynch advocate are compared to Drake's it is clear that these two sources differ in some respects. While Drake puts weight on information on cause of death and address of bride and bride-groom, Willigan and Lynch make no mention of them. They agree on many items, however, especially the role of the minister and the importance of searching for potential gaps in the data.

Deficiencies in the data at Poplar River are limited and can be explained by the nature of the community. Large gaps occurred in the final years of recording (1947-1963) and these years were eliminated from study. There were a few smaller gaps within each register. Some gaps in the marriage records are most likely a result of the small population size. It would appear from this evaluation that the parish records for Poplar River between 1905-1946 can be used for the purpose of studying the 1918-1919 influenza epidemic at Poplar River.

The parish register data for Berens River are exceptionally good. There are no significant gaps in the data, recording is consistent, and many more information categories were recorded than were required. The registers for Berens River are regarded as reliable and of good quality for the purpose of this thesis.

Conclusion: Demographic and Epidemiological Materials

The protocols set forth by Willigan and Lynch and Drake are extremely beneficial for helping a researcher to determine whether parish record data will be useful for a particular study. The methods and considerations bring to the attention of the researcher potential deficiencies in the data and force them to justify their utility in light of problems, or to abandon the study altogether. Having a standard by which the quality of data can be assessed is useful in that it ensures readers of published documents that the information they are reading has been based on quality information.

While these standards are beneficial they cannot be applied rigidly or universally. The items of primary importance to any one study will vary. Differences between what Willigan and Lynch deem important and what Drake considers important support this contention. These protocols, therefore, should be used as guidelines for the acceptance of data and not as strict methods of analysis. The communities of Berens River and Poplar River are very different from what would be expected in the early 20th century in England, or even in Winnipeg. Perhaps the most useful tool the researcher needs is an intimate understanding of the context in which the documents were created, e.g., the history of the mission, the church, and the community. It is this understanding which allows the researcher to explain anomalies when they do appear.

After thoroughly considering all of the areas of potential problems I feel that the parish record data for both Berens River and Poplar River are of high quality. There does not appear to be any evidence of significant under-registration, and all relevant categories of information are present in the registers. This justifies proceeding to use these registers to study the 1918-1919 influenza pandemic at Poplar River and Berens River.

The census data and oral history data must be viewed with caution since potential problems were uncovered in their evaluation early in this section. Cross-checking

and background information have been employed whenever possible in an effort to minimize bias, mistakes, and factual errors in the reminiscences, oral histories, and autobiographies.

Demographic and Epidemiological Methods

Mortality Experiences

This area of study is aimed at estimating and comparing overall mortality rates for Berens River and Poplar River from 1909-1929 and during the 1918 influenza epidemic. The purpose is to determine whether these two culturally similar communities shared similar mortality experiences. Since small sample size is an issue, statistical methods (e.g., sample standard deviations and confidence intervals) to account for this are employed. While the sample is small, assessing the quality of these data (reported earlier in this chapter) revealed that the records are representative of the small populations living in Berens River and Poplar River. In other words, it should be expected that the mortality sample is small since the overall population size is small.

The mortality rates were calculated using burial data contained in the UCCA registers for the two communities (UCCA Register of Burials, Poplar River 1905-1954; UCCA Register of Burials, Berens River 1909-1952) in combination with published census data obtained from the Government of Canada Sessional Papers (1910-1918,1925). The Sessional Papers provide yearly census data for each community that includes a breakdown by religious affiliation, occasionally broken down by age and sex (e.g., 1910, 1914, 1916, 1925) allowing for the estimation of specific mortality rates. It should be noted that the Sessional Papers report the census returns for the previous year.

The number of deaths each year in the Methodist populations in Berens River and Poplar River was estimated by counting the entries in the register of burials. To calculate the mortality rates, the size of the population at risk needed to be determined, i.e., the size of the Methodist population in both communities. The Government of Canada Sessional Papers were indispensable for estimating all of the mortality rates in this research because without the census information no mortality rates could be calculated and the toll the epidemic took on the communities could not be known.

The combination of these two sources of information allowed for the calculation of the mortality rates per 1000 people. The calculation is as follows:

$$\frac{\text{Number of (Methodist) deaths in burial register per year}}{\text{Population at risk (Methodist) in Sessional Papers}} \times 1000$$

In order to address the issue of whether these two communities showed similar mortality rates over time I employed Pearson's coefficient [r] to estimate the linear relationship between two quantitative variables (Moore 1995:111).[2] After graphing the two variables in a scatterplot diagram and visually gauging the extent of the relationship between the two variables, Pearson's coefficient was calculated to measure the statistical strength of the linear relationship.[3]

One potential problem with the use of Pearson's [r] is that the correlation can be strongly affected by outliers (e.g., epidemics) (Moore 1995:114). For this reason, the calculation was conducted three times; once with the actual mortality rates for both

---

[2] The requirements for this statistic are that the variables are quantitative variables measuring two numerical characteristics of a population (Moore 1995). This is appropriate to use for the mortality rates in Berens River and Poplar River, since they are two quantitative variables drawn from the larger Ojibwa population.

[3] e.g., it answers the questions: do Berens River and Poplar River show an increase or decrease in mortality rates during the same years (a positive linear relationship); do they show a negative relationship where an increase in one community is related to a decrease in the other; or is there no relationship between their mortality rates?

communities in 1909-1929, a second time with the 1918 values removed, and a third time using the number of burials (1909-1929) instead of mortality rates since mortality rates can be exaggerated by outliers. These methods aim to: (a) statistically describe the relationship between mortality rates in these two communities over a time period which allows for speculation about any relationship between the mortality rates in these two communities, and (b) eliminating the 1918 influenza pandemic allows for speculation regarding any underlying relationships irrespective of this event. The means and standard deviations of the means were calculated to verify [r] (Moore 1995:115).

Mortality Rates During the Epidemic

The next question that needs to be addressed is: did Poplar River and Berens River show similar mortality patterns during the 1918 flu epidemic? This is not immediately obvious from the data. The burial registers for Poplar River do not list cause of death before 1927 (UCCA Register of Burials, Poplar River) (for discussion see page 70 in this chapter), and therefore it cannot be known what people were dying from in Poplar River in 1918 and 1919. To address this issue, alternative indicators needed to be used in order to determine whether the 1918 influenza epidemic struck Poplar River.

The main method employed here is the comparison of Poplar River's mortality patterns for 1918 and 1919 to a community known to have had its mortality influenced by the epidemic, i.e., Berens River. Poplar River's mortality rates between 1909 and 1929 were examined to look for a spike in 1918 or 1919. Following Herring (1994a), ninety-five percent confidence limits were calculated for 1918 and 1919 to determine whether there are any significant differences in mortality rates during the epidemic years. This method allows the researcher to correct for small sample size. While the small sample size in this research was found to be a result of small community size and not to due the quality of the

data, it is still necessary to account for a small sample when conducting statistical evaluations. This method provides an upper and lower limit between which, one can be 95% confident the true mortality rate lies. To calculate the upper and lower limits the mortality rate for the community is multiplied by a predetermined number related to the number of cases (deaths) (Lilienfeld and Lilienfeld 1980:337). The 95% confidence method was used throughout this research whenever small population size was an issue.

Next, characteristics of the epidemic at Berens River were examined to compare them to the characteristics of mortality patterns at Poplar River. First, the monthly distribution of deaths at Berens River was plotted for 1918-1919 and compared to the monthly distribution of deaths at Poplar River (1918-1919) to see whether similar patterns emerged. The ages and sex of those who died in Berens River and those who died in Poplar River in 1918 and 1919 were also compared.

Potential For the Virus to Spread between Berens River and Poplar River

This last area of inquiry is aimed at investigating opportunities for the virus to spread between Berens River and Poplar River. Since influenza is spread from person to person, human mobility and factors that influenced travel at the two locations during the 1918-1919 epidemic are of concern. This portion of the research works under the assumption that Berens River would have been the most likely source of infection for Poplar River. This assumption is based on various lines of evidence drawn from the Hudson Bay Company Archives (HBCA). It is known that Berens River was supplying Poplar River with HBC merchandise in 1917 (HBCA A12/FT2734), thus it can be expected that this was also the case in 1918. The only other likely source of contact would be Norway House to the north since it was the next closest trading post. Examination of Norway House mobility data shows that in the fall and winter of 1918 no trips were made

to Poplar River and only one trip was made to Berens River in the winter (between December and February) (HBCA B.154/a/87-95). Also, during this period there is no indication that Poplar River served as a port for streamer traffic, the source for the Berens River epidemic (Pettigrew 1983). While the possibility exists that other contacts occurred besides those with Berens River, it seems that the most likely source of infection for Poplar River would be Berens River.

Human Mobility

Qualitative data in the Hudson's Bay Company post journals were used to develop quantitative data on mobility for the two communities. These journals detail daily comings and goings of HBC employees, mail carriers, and steamships; therefore, it is often possible to determine who traveled between these communities and when (Sattenspiel and Herring 1998; Sattenspiel and Herring in press). Of importance to the spread of the virus through the region was how much contact was occurring between these communities during the time of the epidemic.

I was able to acquire the HBC post journals for Berens River and Poplar River on microfilm through interlibrary loan. One limitation of these data is that only sporadic years are available for analysis. In the case of Berens River the years 1905-1940 are available, but they are not complete (1915-1926 are missing); and, for Poplar River, only 1893-1894 and 1940-1941 are available. The entries for 1918 are missing for both communities; therefore, it was necessary to extract data for the years available before and after the epidemic to estimate monthly averages of mobility. The Poplar River journals were not used for the quantitative analysis since the years available are so far removed from the epidemic. The years closest to the epidemic with complete data available for Berens River are 1906-1911, 1913, 1927, and 1929. For every month of each of these years, I calculated the number of people reported to have moved between Berens River and Poplar

River. I noted the communities most often visited in a given month. Although not a precise measure, each reference to travel was counted as one visit since it cannot be known how many people were on a boat or in a team (Sattenspiel and Herring 1998).

These calculations allowed for the estimation of the amount of travel to various destinations before and after the epidemic. It should be stated that the travel recorded in the post journals is only a small representation of actual travel between these communities, travel of the general Aboriginal population was not recorded since it was not necessarily a concern of the daily business of the post. Therefore, travel is under-estimated in these records and in this analysis.

The first step in the mobility research involved analyzing the post journals for Berens River and transcribing events of travel to and from various communities. The data were extracted and organized by month of travel, destination (departures), and place of origin (arrivals). Since travel records are not available for 1918, data from all other available years were transcribed and entered into Microsoft Excel, Version 5.0, to be averaged to be used as a proxy for travel in 1918.

Next the data were divided into two main categories: trips made to Poplar River from Berens River and from Poplar River to Berens River, and second, all other trips into and out of Berens River. Looking specifically at October through December (the months the epidemic struck Berens River), the number of trips in each month of each year were summed. This allowed calculation of an average number of trips to or from Poplar River to be estimated for each month. Once the mean was estimated the standard deviation and range were also calculated, so that variability in the data could be assessed. The percentage of trips in each category was estimated by dividing the sum of the total number of trips made in each month of each year by the sum of all trips made to and from all locations, multiplied by 100:

$$\text{percentage} = \frac{\sum \text{trips to and from Poplar River in October of each year}}{\sum \text{trips to and from all communities in October of each year}} \times 100$$

Finally, using these percentages for all months, the months of the year were ranked in descending order of amount of travel to and from Poplar River. This gave insight into which months contact was most likely to occur between people from Berens River and Poplar River.

Weather

To address the issue of mobility further, it was necessary to gain an appreciation for the environmental conditions in this area in the late fall and early winter months when the 1918-1919 influenza struck. The temperature and precipitation in the area would influence the mobility of the people.

Since freeze-up was potentially occurring around the time of the epidemic, it became important to know if this event occurred in November or December of 1918 and would have prevented travel between these two communities. Ideally it would be preferable to obtain freeze-up dates for Berens River or Poplar River; however, these data are not available. The HBC post journals occasionally make reference to freeze-up in Berens River, but the journals for 1918 are not available. The journals for the available years do, however, narrow down and approximate the range of possible dates for freeze up.

Environment Canada was able to provide information on: daily temperature for Berens River in 1918, including minimum, maximum, mean, and precipitation data (Fisheries and Environment Canada, Berens River 1918). These data were useful in estimating travel conditions around the time of the epidemic.

Chapter 5

The Mortality Experience of Berens River and Poplar River

Introduction

The two main areas of inquiry involved in this section of the research are: 1) estimating mortality rates over time and during the 1918 influenza epidemic; and 2) examining the potential for the virus to spread between Berens River and Poplar River.

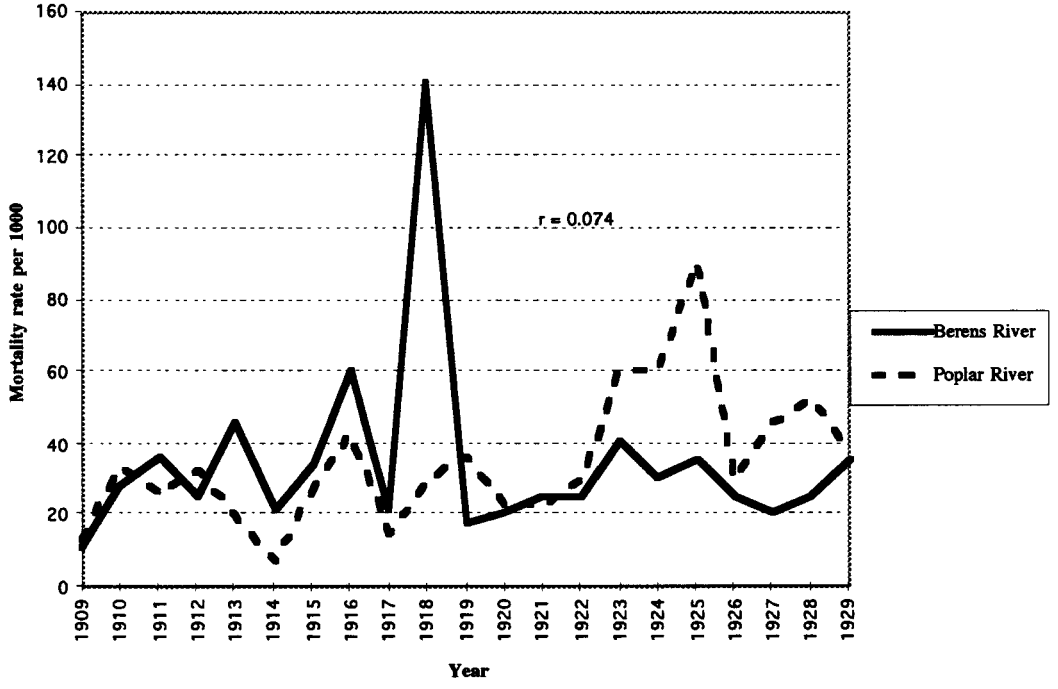
Crude Mortality Rates: 1909-1929

The crude mortality rates for Poplar River and Berens River were estimated and compared over time. The time period stretching from 1909 to 1929 was chosen for analysis since it spans a twenty year period surrounding the 1918-1919 influenza epidemic. The aim of this investigation is to determine whether these two communities show a similar pattern in their mortality for this time period and during the epidemic. This comparison revealed that the linear relationship between their mortality rates never reach 95% significance (Fig. 5.10); although, the relationship does show a weak correlation and more closely approaches significance when the 1918 influenza epidemic is excluded from the calculation. The methods used to derive the mortality rates are discussed in Chapter 4 (pages 90-91).

The first step in statistically exploring the linear relationship between these communities' mortality rates involves visually assessing them on a scatterplot diagram (Fig. 5.11). This graph shows a scattering representative of a weak positive linear relationship (Hamilton 1996:317). The calculation of Pearson's correlation using mortality

rates per 1000 for Berens River and Poplar River for each year between 1909-1929 resulted in the value r = 0.074.[1] This also suggests a weak positive to no linear relationship between the mortality rates for Berens River and Poplar River during this time period (Hamilton 1996:338).

Figure 5.10
Mortality Rates at Poplar River and Berens River 1909-1929

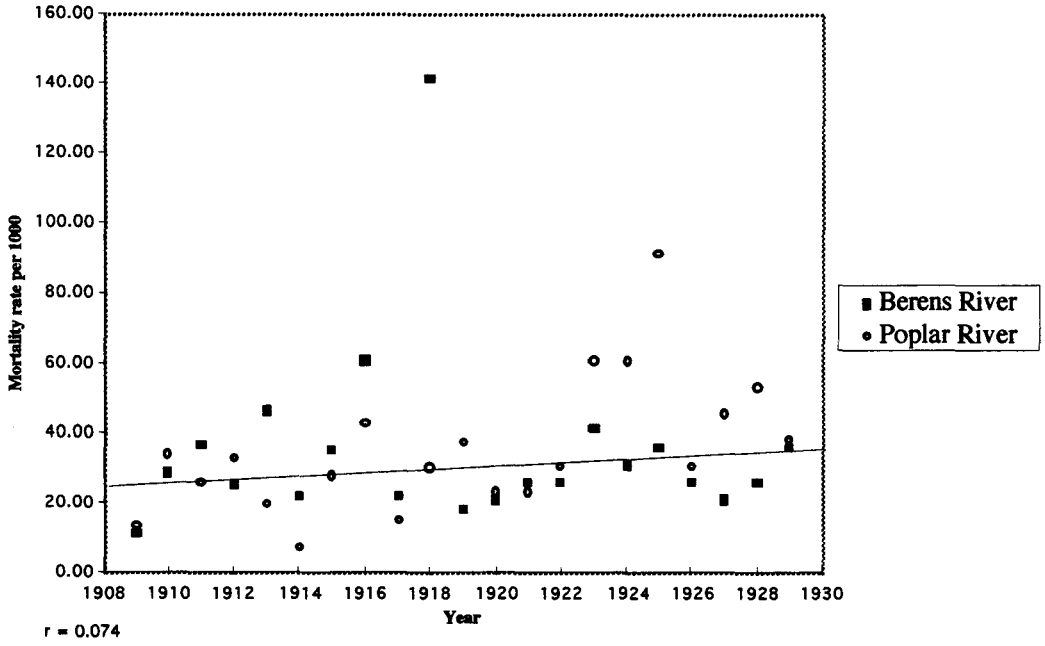


The calculation of the mean and standard deviations for the mortality rates in each community (1909-1929) further substantiates this interpretation. In Berens River the mean mortality rate per 1000 is 34.87 ±26.65; at Poplar River the mean mortality rate is 35.17 ±19.18. From these calculations it can be seen that although the two communities have a similar average mortality rate for the time period and both have high deviations from the

[1] Whenever possible the mortality rate for each year was calculated using the Sessional Paper census data collected for that year; however, this was not possible for 1918-1919 (based on 1917 census returns) and 1920-1929 (based on 1924 census returns, since no census data was returned for 1918-1923, and 1925-1929 (for further discussion see 'materials section' in Chapter 3).

mean, the deviation from that mean is higher in Berens River. This suggests greater variation in mortality rates at Berens River, supporting the interpretation of the low [r] value.

Figure 5.11
Scatterplot Diagram of Linear Correlation of Mortality Rates at Poplar River and Berens River, 1909-1929



In order to further explore the relationship of mortality in Berens River and Poplar River and to eliminate the potentially distorting effects of small sample size or the mortality rates, the calculations were repeated using the number of burials in each community for each year between 1909-1929. The results are in agreement with those using mortality rates: r=0.02, with the [r] value also indicating a weak positive to no linear relationship. Berens River has a mean of 7.71 ±6.17 burials and Poplar River has a mean of 4.81 ±2.48. The mean and standard deviations also show the same pattern as the calculation using mortality rates, with the largest deviation from the mean occurring in Berens River.

To remove the effects of the 1918 influenza epidemic from the overall [r] value, Pearson's correlation was re-calculated with the values for Berens River and Poplar River in 1918 removed (years used in calculation: 1909-1917; 1919-1929). This resulted in a larger [r] value of 0.332 and a stronger relationship between mortality in the two communities ([r] rose from 0.074 to 0.322). Clearly, this year had an important impact on the results for the full study period. In this calculation the mean for Berens River is 28.85 ±11.16 and in Poplar River 34.74 ±20.16. This indicates that much of the deviation from the mean in Berens River is explained by this single epidemic year. Poplar River's mean and standard deviation is virtually unchanged from the calculations including 1918.

This analysis demonstrates that the correlation value reaches a higher level of significance when the 1918 influenza epidemic is removed; however, the [r] value still did not reach the critical value of 0.444 required for 95% significance (Sokal and Rohlf 1969: 333). These results were independently confirmed by Dr. Larry Sawchuk, University of Toronto.[2]

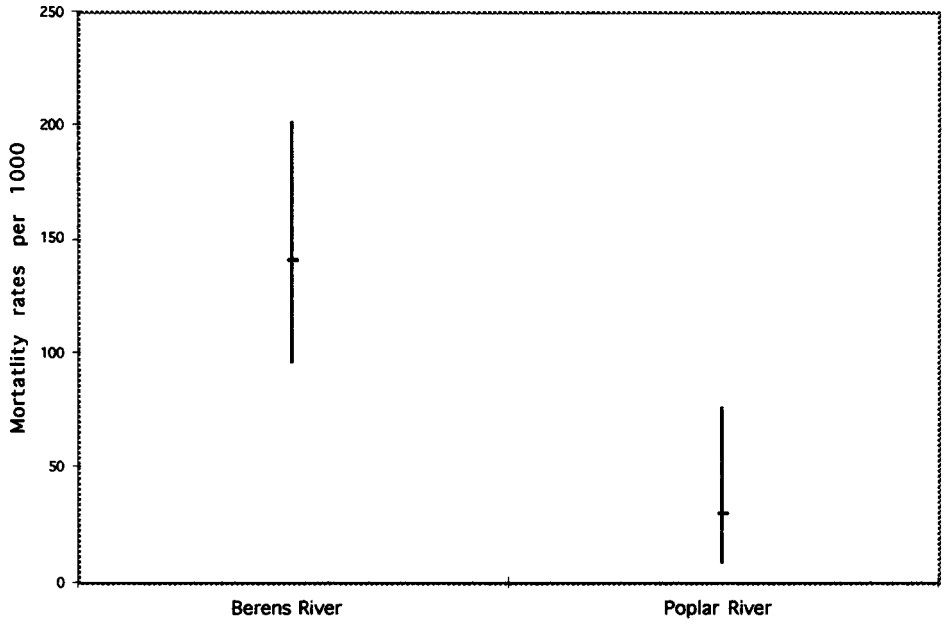
Mortality Rates: 1918-1919

The calculation of the mortality rates during the epidemic years (1918-1919) serves a dual purpose. First, it allows for further characterization of the mortality patterns in these two communities, supporting the idea that large differences in mortality patterns could occur during an epidemic. Second, the statistical analysis of mortality rates allows for speculation regarding whether the epidemic ever reached Poplar River. This second objective involves calculating the crude mortality rates and the sex and age specific

[2] Dr. Larry Sawchuk analyzed these data using Pearson's coefficient to assess the degree of the relationship between mortality rates in Poplar River and Berens River. He found no significant relationship between the mortality rates in these communities at the 95% level when using the critical value of 0.444 with 18 degrees of freedom when all years were included or when 1918 was excluded - although the exclusion of 1918 did strengthen the relationship.

mortality rates with 95% confidence intervals so that statistically meaningful comparisons can be made between these communities' mortality patterns.

Figure 5.12
Crude Mortality Rates with 95% Confidence Intervals: Berens River and Poplar River, 1918



The estimation of crude mortality rates for Poplar River and Berens River indicates that during the 1918 epidemic these two communities had substantially different experiences (Fig. 5.12). The mortality rate for Poplar River in 1918 was 29.6 per 1000 while at Berens River it was 141 per 1000. As figure 5.12 shows, the 95% confidence intervals for the mortality rates do not overlap, indicating that the mortality rates are statistically different. Further, it was necessary to investigate the possibility of an influenza epidemic in Poplar River in 1919, since the 1918 pandemic spanned from the spring of 1918 to the spring of 1919. To do this, the mortality rate for Berens River in 1918 was compared with the mortality rate in Poplar River in 1919 (including 95% confidence intervals), to determine if the mortality pattern in Poplar River in 1919 represented an

epidemic mortality rate for this disease. The result shows that the mortality rates are statistically different in Poplar River in 1919 compared with that in Berens River 1918 (Fig. 5.13).

Figure 5.13
Crude Mortality Rates with 95% Confidence Intervals for Berens River, 1918, and Poplar River, 1919

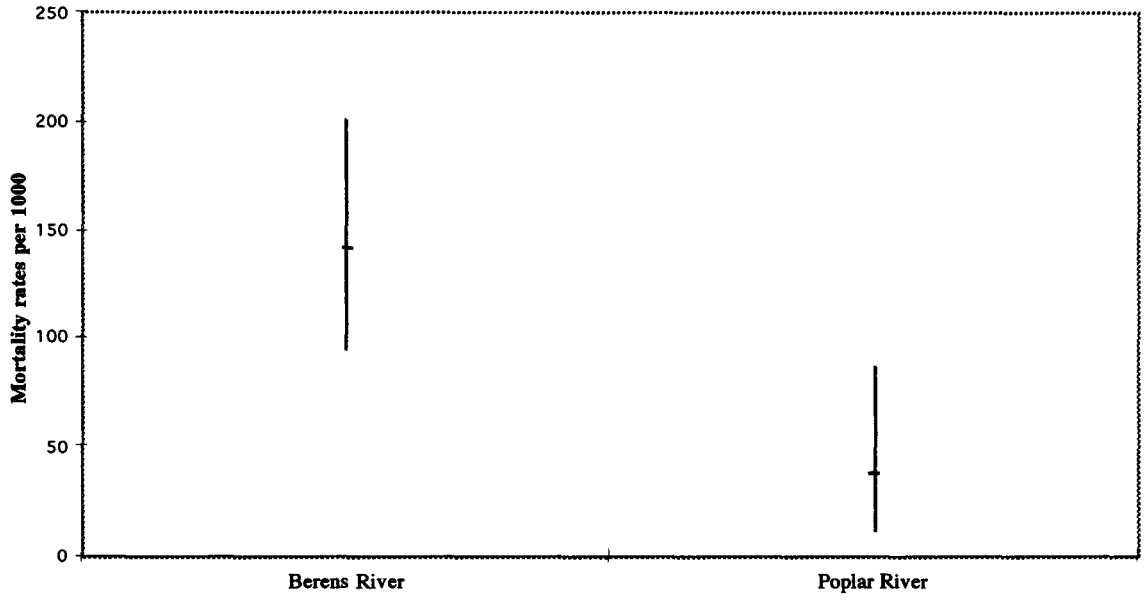
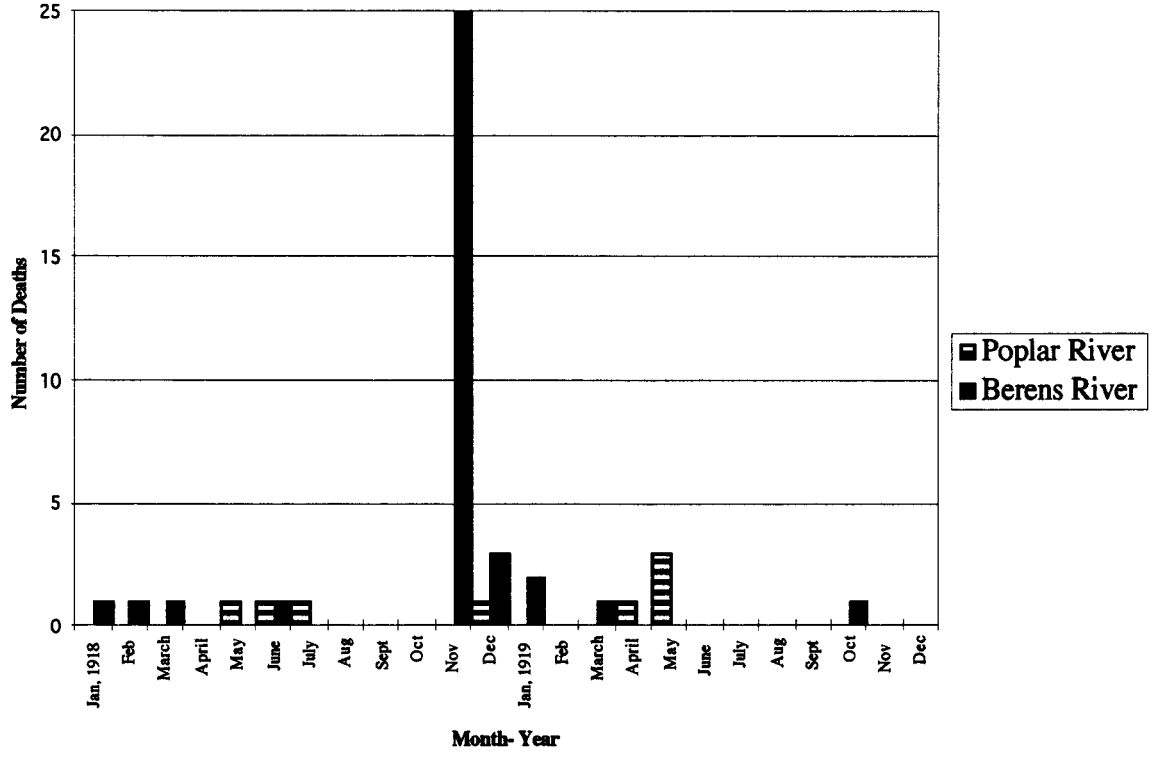


Figure 5.12 and 5.13 indicate that, in contrast to Berens River, Poplar River did not experience an epidemic either in 1918 or 1919, supporting the notion that Poplar River escaped this epidemic.

Comparison of the monthly distribution of deaths at both locations in 1918 and 1919 shows that the month of November, 1918, accounts for the difference in the number of deaths (Fig. 5.14). It was in November 1918 that the influenza epidemic struck Berens River (Pettigrew 1983:70). In Berens River, there is an obvious peak in the monthly mortality in November, which, according to the burial register, was attributed to the

"Spanish Influenza" epidemic. Poplar River shows no similar mortality pattern in either of the epidemic years. The small peak in mortality there in May of 1919 is attributable to the deaths of three Poplar River residents at Thunder Lake (UCCA Register of Burials, Poplar River).

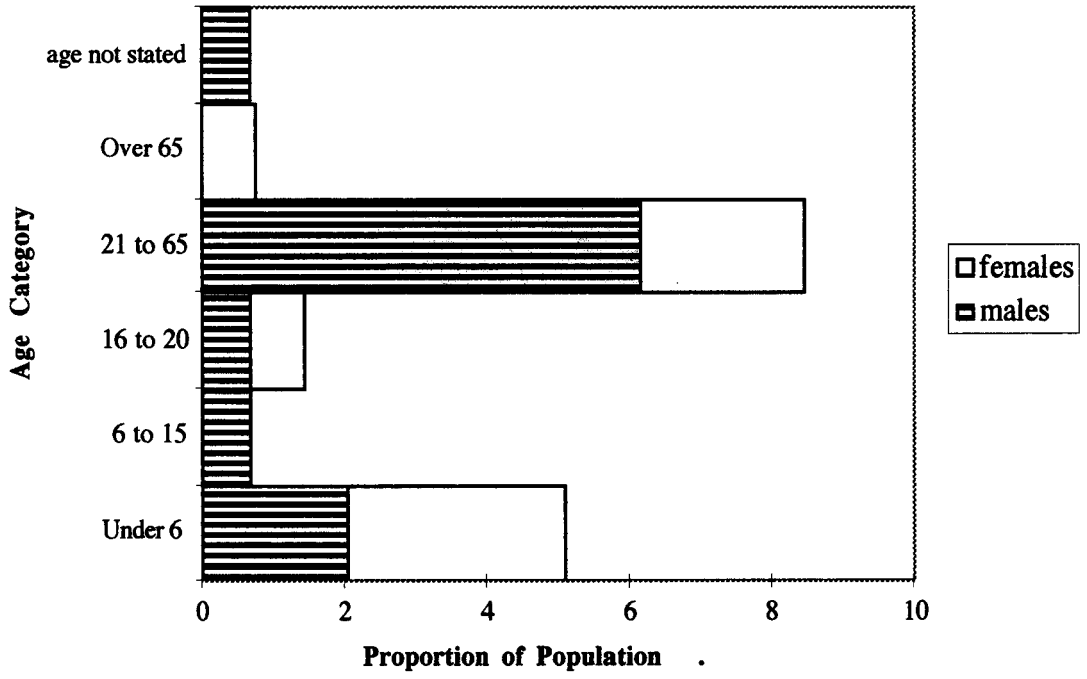
Figure 5.14
Monthly Distribution of Methodist Deaths at Berens River and Poplar River, 1918-1919



Comparisons of the age and sex distribution of mortality further support the notion that Poplar River escaped the epidemic. The age categories used for the calculation of proportions in this section reflect the age breakdown in the Government of Canada Session Papers (1916). In Berens River (1918), most of the deaths occurred in the under 6 and 21-65 age categories (Fig. 5.15). In Poplar River all deaths (n=4) occurred in the under 6

age category. Likewise, in 1919 the deaths in Poplar River mainly occurred in the under 6 age category (n=5).

Figure 5.15
Percentage of Deaths in Berens River By Age and Sex, 1918



Sex-specific mortality rates appear to vary considerably in Berens River, with an estimated male mortality rate of 102.73 per 1000, compared to 68.16 per 1000 for females; however, the 95% confidence limits for the sex-specific mortality rates shows that there is no difference between male and female mortality rates during the 1918 influenza epidemic. This is likely owing to the small sample size of 15 male deaths and 9 female deaths (Fig. 5.16).

Figure 5.16
Sex-Specific Mortality Rates with 95% Confidence Intervals for Berens River, 1918

Age-specific mortality rates demonstrate that those under six, and those 21 to 65 suffered the greatest loss at Berens River (Figure 5.17)[3]. While this is in agreement with the notion that those 20-40 suffered the most (or in this case 21-65) (Manitoba Free Press, Winnipeg, October 23, 1918; Journal of the American Medical Association 1918:1677; Mulder and Hers 1972: 242), it stands in contrast to the notion that those aged 5-14 also suffered the most (Walters 1978). The age category 6-15 actually has the lowest mortality rate in Berens River. Also, it was surprising to find such a high mortality rate for those in the under 6 years of age category (all of those who died in that category were actually under 4 years of age).

[3] The age-specific mortality rates were calculated using the 1915 census which is the census closest to 1918 with an age breakdown (Government of Canada 1916:16-17).

Figure 5.17
Age Specific Influenza Mortality Rates in Berens River, 1918

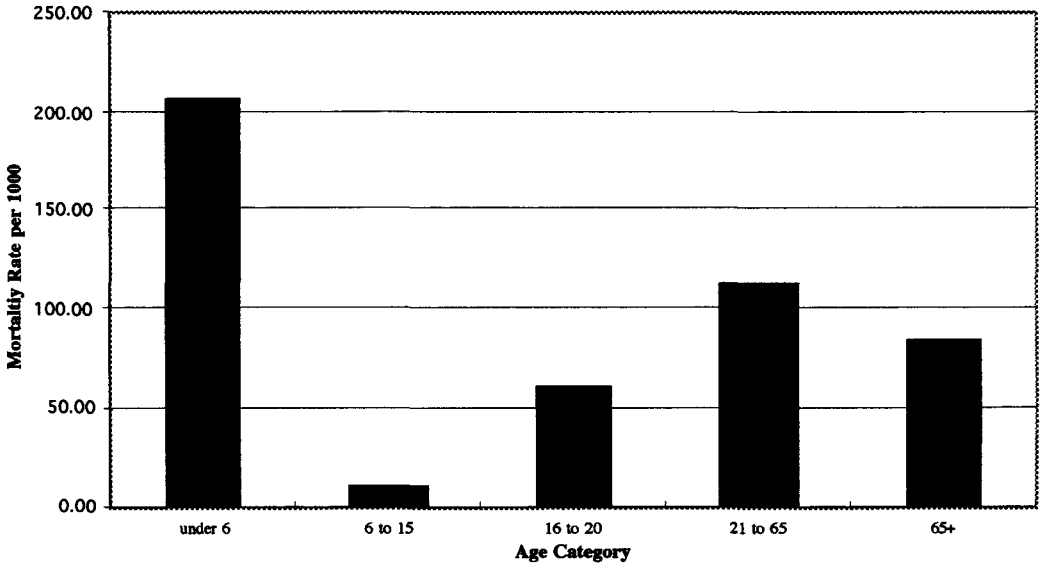
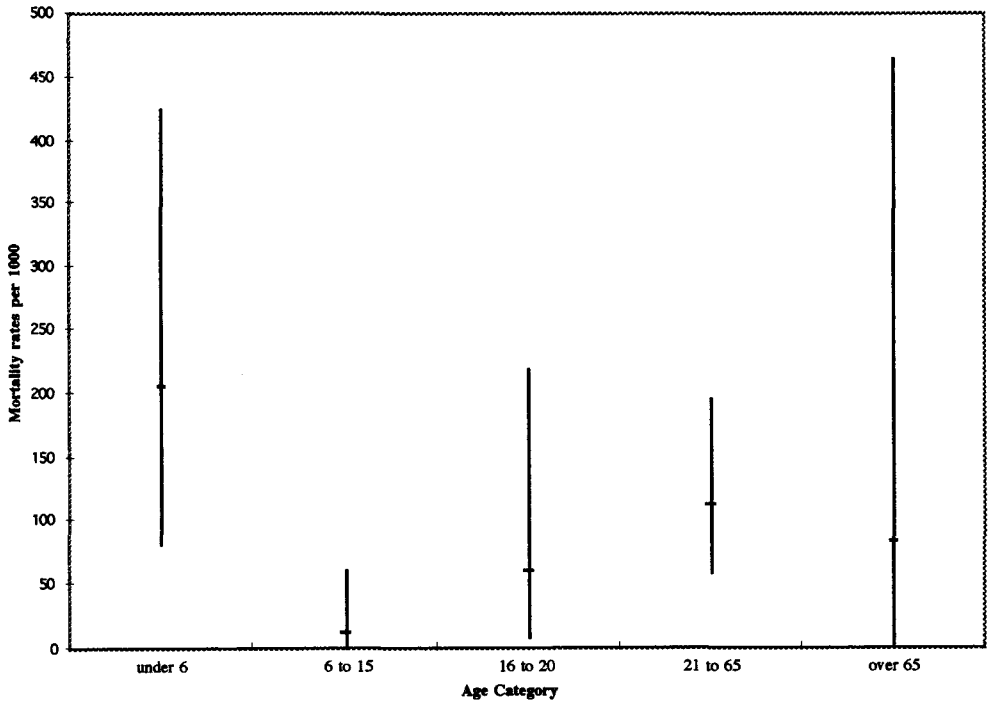


Figure 5.18
95% confidence intervals for Age and Sex Specific Mortality Rates: Berens River 1918



Since the findings are unexpected and contradict existing literature, it was necessary to again calculate 95% confidence intervals to determine if these findings remained true after small population size had been accounted for. It was found that the only statistically significant differences are between the under 6 and 6-15 age categories (Fig. 5.18). This means that the unexpectedly high mortality rate in those under 6 and the lower mortality rate in those 6-15 are significantly different from each other.

Conclusions: Mortality Rates

It can be concluded that there is a weak to moderate positive linear relationship between mortality rates in Berens River and Poplar River over time (1909-1917; 1919-1929), that is, when the 1918 epidemic is excluded from the calculation. In 1918 the two communities have statistically different mortality rates. The mortality rate evidence indicates that Poplar River did not experience an epidemic in either 1918 or 1919 since these years show statistically different mortality rates compared to Berens River. There is no mention of the flu in the Poplar River burial registers and there does not seem to be a significant peak in mortality rates for 1918 or 1919. In fact, the mortality rate in 1918 was 29.6 per 1000, close to the average for the whole series (1909-1929), and almost half of the people buried in Poplar River in 1918 and 1919 were reported to have died in Thunder Lake and Black River (UCCA, Poplar River, Register of Burials). Either the flu was never brought to Poplar River or, if it was, other circumstances interfered with its transmission.

The absence of an epidemic at Poplar River is further supported by a quote extracted from the HBC Annual Report for the Keewatin District 1918:

> As you are aware, the epidemic of Spanish Influenza raging throughout the country last year also reached into the far north and Norway House, Berens River and Cross Lake Posts were severely hit. The other posts in the district fortunately escaped. [HBCA A.74/48]

Berens River suffered greatly from this epidemic. The Spanish flu arrived in Berens River at the end of October, 1918, when the passenger steamer *Wolverine* made its last trip to the area for the year. Three days after its arrival people began to fall ill (Pettigrew 1983:79). In Berens River, deaths from influenza began only six days after the virus was introduced (UCCA Register of Burials, Berens River), and the mortality rate among the Methodist population was high at 141 per 1000. The epidemic was swift, with 23 deaths occurring mainly between November 4 and November 18, 1918, with one death on December 11, 1918 (UCCA Register of Burials, Berens River). While most of the deaths occurred within three weeks of the introduction of the virus, it could be expected that illness continued in the community long after the deaths ceased to be reported, given the nature of influenza, and also because one death was recorded in mid-December.

At Berens River, there were few differences in age and sex specific mortality rates. The only statistically significant difference occurred in the under 6 age group which showed a statistically higher mortality rate than the 6-15 age group. The small number of deaths in Poplar River in 1918 and 1919, coupled with the lack of statistically significant age and sex mortality rates at Berens River, meant that no meaningful comparisons could be made between who was dying in Berens River during the epidemic compared with who died in Poplar River in the years in question. The lack of deaths in the 16-20 and 21-65 age categories in Poplar River suggests they did not suffer from this epidemic since the 1918 flu is known to have produced a high mortality rate among young adults.

While this investigation suggests that the 1918 influenza epidemic never reached Poplar River, it is still possible that there were isolated cases of the flu in Poplar River.

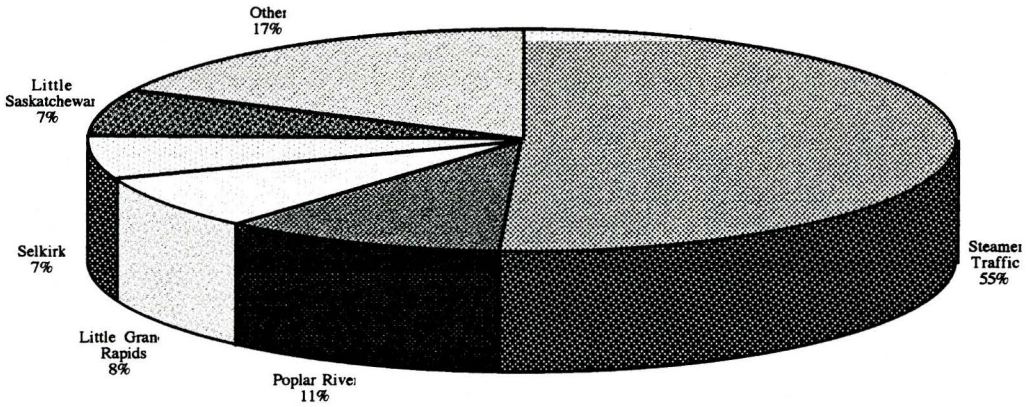
Potential for the Virus to Spread Between Berens River and Poplar River

The potential for the 1918 influenza virus to spread between Berens River and Poplar River was evaluated for two key factors which center on mobility: how much travel could be expected based on travel in other years, and what other factors may have influenced mobility? Such factors include the biology of the virus, weather, and social responses to the epidemic.

As discussed in Chapter 4 (Methods section), it is likely that Berens River would have been the primary source of infection for Poplar River. Investigations into Norway House as a possible source of infection revealed that no trips were made to Poplar River from Norway House or from Poplar River to Norway House from October 1918 through February 1919 (HBCA B.154/a/87-95). This increases the probability that Berens River would have been the most likely source of infection for Poplar River during the influenza epidemic, with the understanding that there may have been other potential contacts.

The Hudson's Bay Company post journals for Berens River (1906-1911, 1913, 1927, 1929) provided a proxy measure of how much travel could be expected between Berens River and Poplar River during the epidemic (HBCA B.16/a/12-20). The months of main concern were October through December 1918 since these are the months in which Berens River experienced deaths from influenza. In October, Poplar River accounted for 10.4% of all travel in and out of Berens River (Fig. 5.19). The mean number of trips which could be expected was 1.1, with a standard deviation of 1.3 and a range of 0-3 (Table 5.10). Further examination of the records showed that most of the visits (50.5%) recorded in October to and from Berens River were steamer traffic. Poplar River proved to be the most frequently visited community based on the HBC records.

Figure 5.19
Percentage of Total Travel To and From Berens River in October (HBCA B.16/a/12-20, 1906-11, 1913, 1927,1929)



Trips to and from Poplar River in November accounted for 11.6% of all trips made, a slight increase of 1.2% from October (Fig. 5.20). However, the average number of trips to and from Poplar River decreased to 0.42 (there were no trips in some years), with a standard deviation of 0.92 and a range of 0-2 (Table 5.10). Examination of other destinations revealed that in November Poplar River was the fourth most often visited community; it was exceeded by Leaf River, Pigeon Bay and various camps, in that order. Leaf River is approximately half way to Poplar River and Pigeon River is about one-quarter the distance to Poplar River, but to the south of Berens River.

Table 5.10: Data and Calculations for Travel Patterns, Berens River and Poplar River (HBCA B.16/a/12-20, 1906-11, 1913, 1927,1929)

Month	Travel	Total[4]	Percentage[5]	Average[6]	Standard Deviation	Range
October	Into BR	51		5.67	1.73	5
	Out of BR	45		5.0	1.87	6
	Total	96		10.67	2.45	8
	From PR	5	9.80	0.56	0.73	2
	To PR	5	11.11	0.56	1.13	3
	Total PR	10	10.42	1.11	1.20	3
November	Into BR	30		3.0	2.26	6
	Out of BR	39		3.90	3.84	13
	Total	69		6.90	5.88	19
	From PR	5	16.67	0.50	0.71	2
	To PR	3	7.69	0.30	0.48	1
	Total PR	8	11.59	0.80	0.92	2
December	Into BR	54		4.91	2.39	8
	Out of BR	53		4.82	1.89	7
	Total	107		9.73	3.85	12
	From PR	12	22.22	1.09	1.04	3
	To PR	8	15.09	0.73	0.65	2
	Total PR	20	18.69	1.82	1.60	5

Trips to and from Poplar River in December accounted for 18.7% of all trips to and from Berens River (Fig. 5.21). Again, this is an increase from October (8.3%) and November (7.1%). The average number of trips was 1.8 with a standard deviation of 1.3 and a range of 0-5 (Table 5.10). In December, most trips involved mail carriers (25%); trips to and from Poplar River (18%); trips to and from Norway House (18%); and trips to and from Icelander River (10%). According to the post journals, many of the trips to and from Norway House and Icelander River also involved carrying mail.

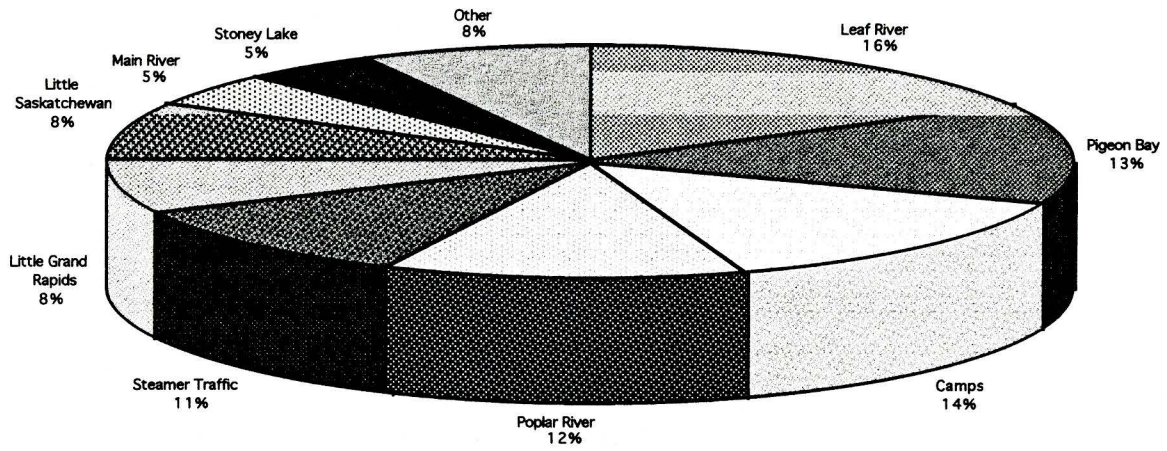
---

4 Total trips based on 1905-1913, 1927,1929

5 Method to calculated percentage: $\frac{\text{number of trips}}{\text{total \# arrivals and departures from Berens River}} \times 100$

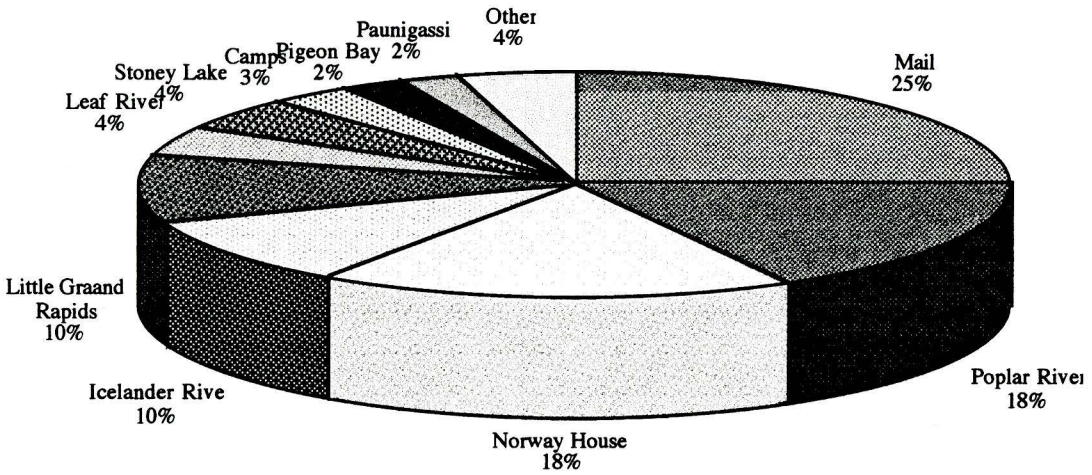
6 Average = $\frac{\text{total trips per year}}{\text{number of years}}$

Figure 5.20
Percentage of Total Travel To and From Berens River in November (HBCA B.16/a/12-20, 1906-11, 1913, 1927,1929)



While these results provide an idea of monthly travel, they cannot be used to predict contact during the epidemic. This is because the range of recorded trips in each month is large. When the standard deviation is used in conjunction with the mean, it shows that it would also be possible for no trips to have occurred between Berens River and Poplar River during the epidemic (Table 5.10).

Figure 5.21
Percentage of Total Travel To and From Berens River in December (HBCA B.16/a/12-20, 1906-11, 1913, 1927,1929)



It is clear that the travel pattern to and from Poplar River differs from the overall pattern of travel to and from Berens River (Table 5.11). For example, while Poplar River was visited with greatest frequency in February, April and March the greatest frequency of travel overall occurred in March, February and January.

As a percentage of all trips, trips made to Poplar River ranked highest in May, April and February (Table 5.11). Interestingly, May and April were difficult times to travel since the ice was thawing and the snow was melting. It could be that since Poplar River was fairly close to Berens River, a trip there would be risked before a trip farther afield. December, interestingly had a high percentage of travel to and from Poplar River, but also overall. This is likely due to an increase in mail and package delivery during Christmas, as

well as individuals returning home from their camps for the holiday. It was noted by Asher (1950:94) that Christmas day was "Visiting Day" and New Year's Day was "Feast Day".

Table 5.11: Frequency of Travel Between Berens River and Poplar River (HBCA B.16/a/12-20, 1906-11, 1913, 1927,1929)

Month	Trips To Poplar River (frequency)	Total Trips (frequency)	% of Trips To and From Poplar River
January	10	110	9.1
February	22	114	19.3
March	18	136	13.2
April	20	79	25.3
May	12	41	29.3
June	11	82	13.4
July	4	59	6.8
August	8	83	9.6
September	4	70	5.7
October	8	96	8.3
November	8	69	11.6
December	17	107	15.9

The pattern of travel to and from Poplar River differs from overall travel to all communities (Fig. 5.22). Overall, most travel occurs in the coldest winter months (December-April), followed by the summer months when treaty annuities were paid (June-August), and finally the freeze and thaw months (November and May). Figure 5.22 shows an obvious constriction in travel during the freeze and thaw months. Travel between Poplar River and Berens River follows a completely different pattern; significantly, freeze and thaw months show no diminution of travel (Fig. 5.22-5.23).

In summary, these estimations of travel suggest that travel between Berens River and Poplar River did occur in October through December. The frequency of travel between these two communities increased as the months progressed. Also, in all three months Poplar River represents a large proportion of all trips being made; it is the second most frequent contact in October and December and the fourth most frequent contact in November.

Figure 5.22
Average Proportion of Travel per Month: Poplar River Vs. All Travel

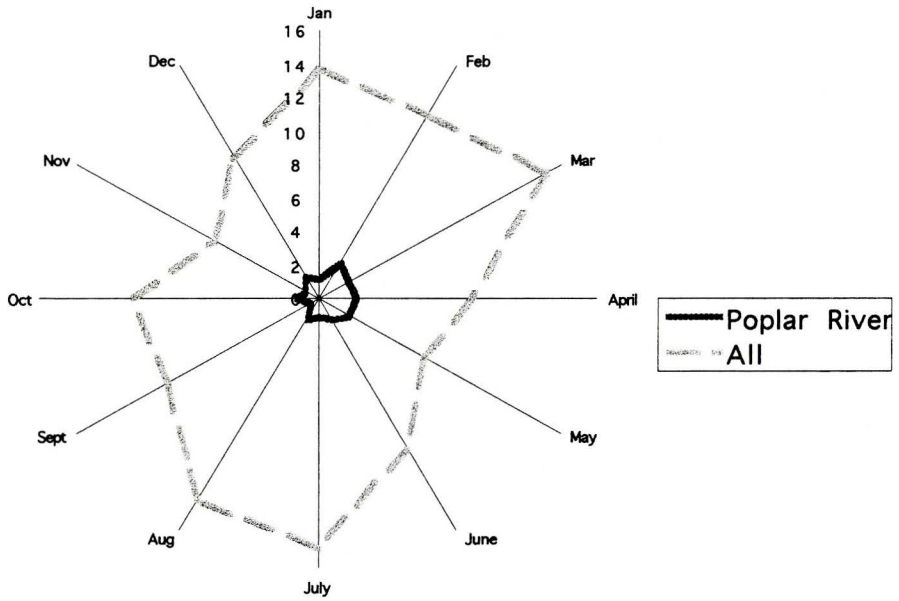
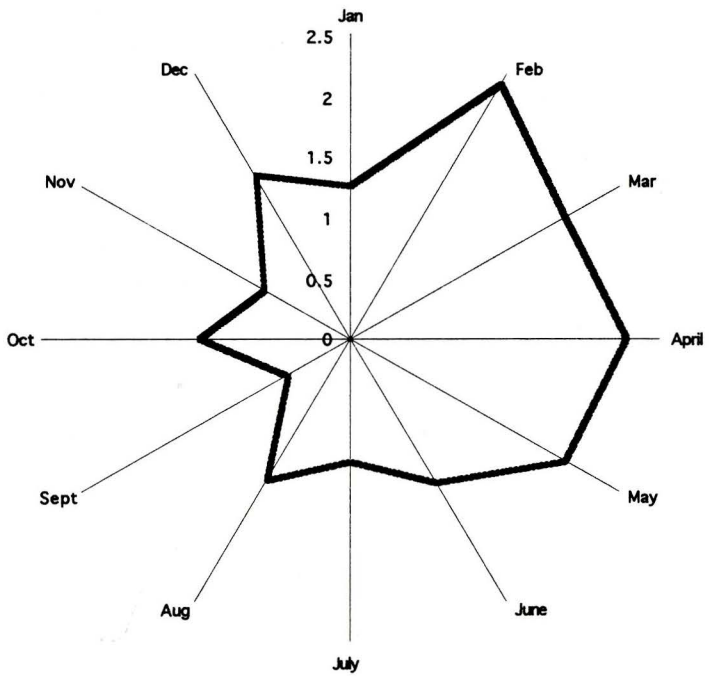


Figure 5.23
Average Travel per Month Between Berens River and Poplar River



The Epidemic

After addressing the question of communities in contact with Poplar River and the frequency of that contact, the next stage of the research was to determine what factors could have influenced human mobility and the spread of the virus between Poplar River and Berens River.

The first factor that could have influenced the spread of the virus between these communities pertains to the properties of the virus itself, particularly its incubation period. The incubation period of the influenza virus is one to two days (Beveridge 1977:12) and travel time from Berens River to Poplar River at that time of year (i.e., October-December) was 12 to 15 hours (HBCA, B.16/a/12-20, fo. 2,3,7). It would therefore have been possible for the virus to be introduced to Poplar River. It is also known that the 1918 strain of influenza was new, so once introduced, everyone should have been susceptible to it (Herring 1994a:366; Mims et al. 1995).

A second mechanism influencing the potential for the virus to spread to Poplar River is social and individual responses to the epidemic, which might have affected mobility. Qualitative data suggest that mobility from Berens River to Poplar River may have been reduced or even stopped in response to the outbreak of flu there. A quote from an Aboriginal resident living in Berens River at the time of the epidemic suggests that it is possible that no one was able to travel out of Berens River, either due to illness or because of responsibility to other family members who were ill:

> It was during this period when everyone was sick with the Flue (sic) that my dad had the most work. At one time there was only Jim McKay and my dad that were not sick and they had to make the rounds looking after the fires and carry the dead people out the houses. They turned all animals loose as they could not feed them. It was three or four days this went on before some were well enough to help. Some went too soon and got cold and died [Henry Everett, 1986:20]

This was supported by the comments of a missionary in the area, Frances Stevens' (n.d. p.107):

> At Berens River thirteen bodies lay in the mission store house because there were not a sufficient number of men able to dig resting places.

These testimonies suggest that once people in the community fell ill, the likelihood of travel out of Berens River decreased.

It must also be considered that rumors of the epidemic (Herring 1994b) may have prompted Poplar River to isolate itself, or decide to limit contact with Berens River during this outbreak. While quarantines were attempted elsewhere (e.g., Norway House) (Herring 1994a:337), there is no mention of any quarantine efforts in either Berens River or Poplar River.

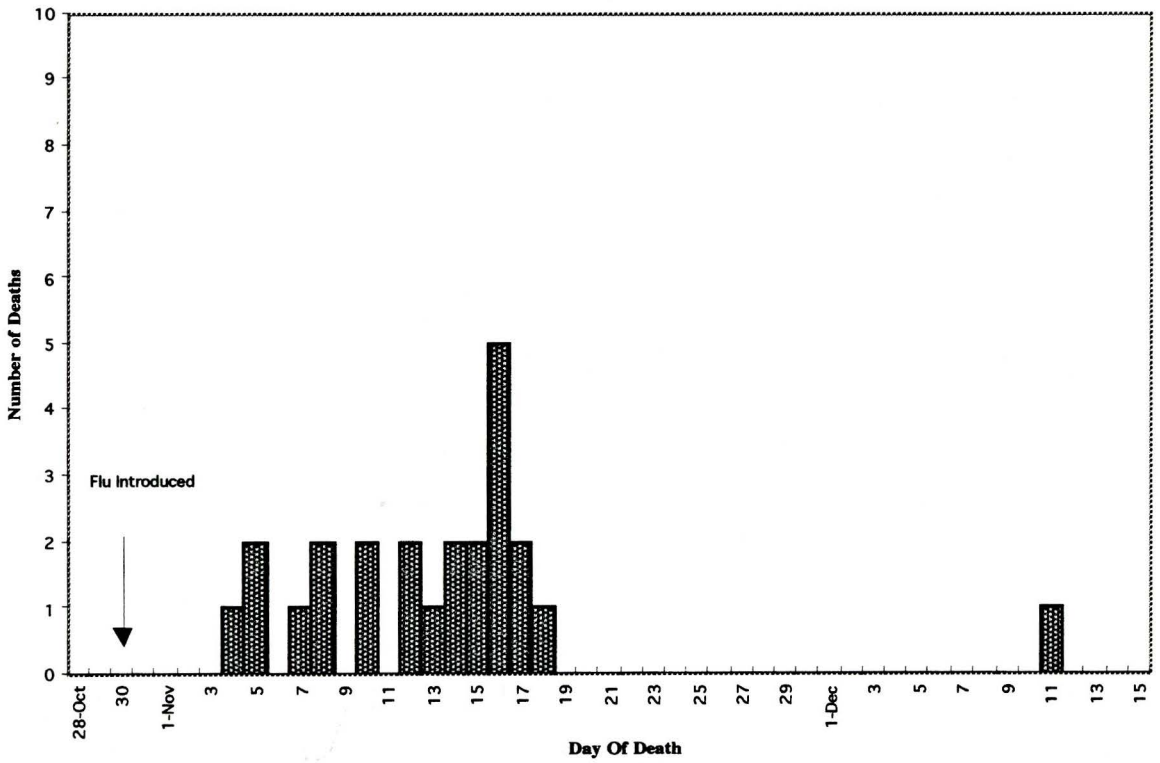
Weather

Another factor influencing mobility in the subarctic is weather. The HBC post journals provide qualitative information on how the climate may have affected travel in and out of Berens River. Figure 5.24 shows that most of the flu deaths at Berens River occurred between early to mid-November (UCCA Register of Burials, Berens River), beginning six days after it was introduced to the community (Pettigrew 1983). Knowing the weather pattern in the month of November would be an asset for evaluating the potential for travel during the time of the epidemic. Examination of the HBC post journals for both communities revealed that mid-November was a difficult time to travel, either by boat or by foot, since the lakes and rivers were freezing (HBCA B.16/a/12-20; B.331/a/1). However, late October (when the flu arrived at Berens River) was never reported to be a difficult time to travel since the waterways were still open. So, it is possible that before the deaths occurred (end of October and the beginning of November), travel was still possible. Further, it should be noted that even in times when travel was reported to be difficult, contact with other communities was still possible. For example, in November 1905, it was

reported that travel was difficult due to weak ice and poor inland travel; however, in the same month six arrivals and 13 departures were recorded at the HBC post at Berens River (HBCA B.16/a/12-20).

Freeze-up played a key role in the amount of travel. The radar graphs indicate that during November, when freeze-up most often occurred, travel was limited (Fig. 5.23). The difficulty in traveling during this period was twofold: first, travel over water was risky due to the possibility of ice forming while en route — a person could be stuck until firm ice formed; second, travel overland was difficult since wet snow and rain made walking and the pulling of any sleds through the bush difficult.

Figure 5.24
Chronology of "Spanish Flu" Deaths in Berens River, 1918



Examination of the climate in 1918 and knowing when freeze-up occurred in Berens River will not determine the amount of travel that occurred, but it will at least provide insight into the possibility of traveling around the time of the epidemic. It is likely that since freeze-up was in process around the time of the epidemic that it played some role in preventing the spread of this disease through the area.

Freeze-up times were not recorded diligently in the HBC post journals. Entries in the post journals provide a range for freeze-up of the Berens River between November 4 to November 11 (HBCA B.16/a/12-20, fo. 46-47, 60-61, 90-91; HBCA B.331/a/1, fo. 12). However, the range provided by these four entries is not sufficient to infer freeze-up dates in 1918. To complement the HBC data, climate data from Environment Canada were utilized. Scrutiny of the climate data revealed that November and December in 1918 were relatively mild. This suggests a late freeze-up date for that year. In fact, in mid-November Berens River was still receiving precipitation in the form of rain; the first snow for the month did not occur until November 29th (Environment Canada, Berens River 1918).

The results from the weather analysis are inconclusive. The mild fall and winter months would have made it possible for travel by boat to occur, but people may have been reluctant to travel since they knew from past experience that freeze-up could occur while en route. The overall travel patterns for Berens River suggest that shorter trips (like a trip to Poplar River) may have been attempted in a thaw month (May), and in fact trips to Poplar River represented a large proportion of all trips in May. The possibility remains, therefore, that travel to Berens River from Poplar River, or to Poplar River from Berens River, could have been attempted during the 1918 epidemic.

Conclusions

The data on mobility must be interpreted with caution. The lack of HBC post journals for 1918 resulted in the dependence on a proxy measure of travel between Poplar

River and Berens River for that year. From these calculations it appears that on average there was substantial contact between Poplar River and Berens River in October through December. Of these three months, contact was greatest in December, the month the epidemic was waning in Berens River.

While travel could be expected between these communities at this time of year, factors such as quarantines, and social and familial obligations may have restricted travel out of Berens River. The role of the weather in restricting mobility is difficult to assess since it is impossible to know how people responded to the later freeze-up date.

The timing of the outbreak seems to have been fortuitous, as was the case in many subarctic communities (Herring 1994a). The outbreak occurred in Berens River after the steamer traffic made its last stop before the winter (Pettigrew 1983). The epidemic reached its height during the freeze-up period when there may have been a reluctance to travel and it waned before the busy Christmas traffic began.

Chapter 6

Discussion and Conclusions

The three primary aims of this research were: 1) to demonstrate that within sub-populations variations in disease experience exist at the community level; 2) to determine what factors were influencing the spread of disease in Berens River and Poplar River during the 1918 influenza pandemic and to uncover the forces governing those factors; and 3) to demonstrate the usefulness of using an holistic model in health research. The analysis of these results and conclusions drawn from them will be discussed in the remaining pages.

Variations in Disease Experience

The first goal of this research was to demonstrate that within sub-populations variations exist in disease experience. The Aboriginal people in Canada are a sub-population living among the diverse Canadian population; and the Ojibwa are a sub-population within the larger Aboriginal population. Berens River and Poplar River are two Ojibwa communities. This research has shown that not only was there variation in mortality from the 1918 influenza pandemic at the provincial level for Aboriginal people, but also at the community level.

Aboriginal people in Canada experienced a mortality rate of 36.7 per 1000 during the 1918 flu pandemic. This is compared to an average of 25 per 1000 among the infected in the world population (Taubenberger et al. 1997:1793). While this could lead to the conclusion that Aboriginal people were at an increased risk of dying from the flu, this is

not the case. In fact, it was shown that Aboriginal peoples mortality rates varied provincially from 6.5 per 1000 in Quebec to 61 per 1000 in Alberta. Further, it has been shown by Herring (1994a) that there were vast differences in the mortality rates in the Aborginal communities in the Canadian subarctic, where mortality rates are estimated to have ranged from zero at God's Lake, Split Lake, Oxford House, and Island Lake, to 35 per 1000 at Fort Alexander, to 188 per 1000 at Norway House.

Using the examples of Berens River and Poplar River, this research demonstrates that even very closely situated and related Aboriginal communities in the subarctic could have had very different mortality rates during this epidemic. In the years surrounding the 1918 influenza epidemic these two communities shared much in common. They had been exposed to similar historical, economic and political forces and they shared a common culture and language. Further, it has been shown that these two communities had familial and economic connections which would have necessitated travel and communication between them. Yet, subtle differences in their lifeways, such as subsistence activities and school attendance, and in their communities (e.g., healing systems) could have prevented an epidemic from occurring in Poplar River.

Both communities had poor overall health. The most devastating infectious disease in both communities during 1909-1929 was tuberculosis, followed by influenza and pneumonia (UCCA Register of Burials Poplar River; Berens River). The average mortality rates over time are similar, 34.9 ±26.7 per 1000 in Berens River and 35.2 ±19.2 in Poplar River; however, when the 1918 influenza epidemic is excluded the averages show even less variance from one another.

The analysis of mortality rates during the epidemic and over time presented in this study seem to suggest that these two communities may have shared similar mortality experiences in some years between 1909-1929, although, the statistical relationship is weak

since the relationship was not significant at the 95% level. The calculation of Pearson's correlation with the 1918 influenza epidemic in Berens River removed showed a stronger positive correlation (weak-moderate) than did the calculation with the epidemic included. This suggests that much, but not all, of the difference in mortality rates for these communities could be explained by this epidemic.

These results suggest that Berens River and Poplar River may have shared some common mortality pattern, but the relationship was not predictable. It could be that the common histories and geography shared by these communities resulted in their susceptibility to similar diseases. For example, both communities would experience the same weather conditions, which could in turn affect hunting, trapping and fishing yields. In years when the weather conditions were not conducive to subsistence activities, both communities would suffer from poor nutrition and would therefore be more susceptible to infectious diseases. This would also result from their common history of reliance on the HBC goods.

This investigation suggests that although these communities share much in common, and show some similarities in mortality patterns over time, in the case of the introduction of a virgin soil epidemic (i.e., new, emerging or re-emerging disease), these similarities cannot predict the course of an epidemic in a region or population.

Factors Influencing the Spread of the 1918 Influenza Pandemic in Berens River and Poplar River

There was clearly no epidemic in Poplar River; however, it cannot be known if the virus was ever introduced there. If the virus was introduced it seems that Berens River would have been the most likely source of infection. Issues surrounding the spread of the

virus were investigated to try to understand the role mobility may have played in the spread of this disease.

In the case of the 1918 flu it was found that the biology of the virus was not a factor hindering the spread of the virus through this region. With an incubation period of one to two days, a shedding period of six days, and travel time between the two communities of 15 hours, it would have been possible for a newly infected individual to leave Berens River and travel to Poplar River and shed the virus there to a susceptible individual. There would have been susceptible people in Poplar River, since no one had immunity to this virgin soil epidemic. It can be concluded that neither individual resistance, nor the incubation period of the virus, played a role in the inability of the epidemic to reach Poplar River.

Interaction between these communities during the fall and winter season is likely. Hudson's Bay Company post journals discuss the movement of supplies to Poplar River; the UCCA Registers of Marriage (Berens River and Poplar River) indicate familial connections, providing evidence that these two communities shared economic and family ties. Further, these communities were connected politically since they were represented by the same Chief who lived in Berens River. While the mobility data extracted from the HBC post journals was not conclusive, it did show that there was a tendency towards interaction with Poplar River from October through December, and to the greatest extent in December. If estimates of average travel can be used to estimate travel patterns, it seems as though residents of these communities were likely to have been in contact during this time.

There are other factors that can affect whether travel will occur. One mechanism influencing travel to Poplar River could be social responses to the epidemic. Mobility from Berens River to Poplar River may have been reduced or even stopped in response to the outbreak of flu there. It could be that no one was able to travel, either due

to illness or responsibility to other family members who were ill. The testimony of Harry Everett (Chapter 6) suggests that this may have been the case. In his memoirs, he describes a situation where all hands were needed to tend to the sick.

It must also be considered that rumors of the epidemic (Herring 1994a) may have prompted Poplar River to isolate itself, or decide to limit contact with Berens River during this outbreak. While quarantines were attempted elsewhere (e.g., Norway House) (Herring 1994b), there is no mention of any quarantine efforts in either Berens River or Poplar River.

Weather should be considered to be a major limiting factor on the potential spread of the virus. Weather patterns can change human mobility patterns, which in turn pattern the diffusion of the virus. An examination of climate data and freeze-up data for the area revealed that the weather would have permitted travel between the communities. The evidence presented suggest that freeze-up was late in 1918 and travel by boat would have been possible well into the month of November, and thus, during the height of the epidemic. However, travel may have been restricted by personal reservations. It is possible that people may have been reluctant to travel with the possibility of freeze-up in the near future, so that they could avoid being stranded en route. Based on the climate evidence evaluated, it must be concluded that travel was physically possible and the virus may have been introduced to Poplar River.

Mobility would have been an important factor in introducing the virus to Poplar River, but after a virus' introduction to a community local factors become more important in determining the course an epidemic will take (Sattenspiel and Herring 1998). Since the possibility exists that the virus was introduced to Poplar River, but did not cause an epidemic, the question of what local factors could have prevented an epidemic at Poplar River and what factors may have promoted it at Berens River must be considered. As

stated, Berens River and Poplar River shared macro-level characteristics, so community level differences were the likely reason for Poplar River's apparent escape from the flu.

These two communities were found to be only superficially similar during the time of the epidemic. There were many differences in the lifeways at these closely situated locales, most of which can be traced back to their experiences with early traders and missionaries in the region.

Berens River had more intense contact with traders at an earlier time than Poplar River. Early on, trading companies in the region decided that Berens River would make a better location for a trading post than Poplar River since its river was more easily traversed (Lytwyn 1986:145). Thus, Berens River was located on the main steamer route. This early and intense contact with Europeans also eased the introduction of missionaries and new political and economic systems into the community.

These same events took place at Poplar River, but they happened later than at Berens River. Further, the HBC post established at Poplar River was abandoned before the turn of the century, after only six years of sporadic operation (Lytwyn 1986:40). The result of contact with European economies, regions, and politics were similar for both communities; however, Poplar River had not felt the full impact of these events by 1918.

Many factors related to the introduction of the European economy, religions, and politics may have contributed to the spread of the epidemic. One such factor is health resources. The presence of missionaries in Berens River had undermined traditional ceremonies and beliefs there by the time the epidemic struck. There was an increased reliance on missionaries and treaty doctors for medicine that greatly reduced their ability to deal with the epidemic using Aboriginal healing ceremonies and remedies. It could be that Aboriginal healing practices reflected the spirituality, faith and adhesion in a community. In the Berens River region the common initial treatment for illness was confession of

wrong-doing to a shaman. It was only after a confession was given that treatment and curing could begin (Hallowell 1939). This healing ceremony served the purpose of healing the individual, but also the community:

> "Social control was a function of this personalized illness/guilt/confession complex: in the absence of tribal government, police and other external or hierarchical means of maintaining order, a theory of disease based on each individuals internalized sense of responsibility and guilt was a potent substitute. [Brown 1995:225]

Whether Aboriginal medicine could have cured or prevented illness, as has been suggested for the community of Paungassi, cannot be known; however, the psycho-social benefits of Aboriginal medicine and healing should not be underestimated.

In Berens River, the Midewiwin saw its last performance around 1870 (Hallowell 1992:12), suggesting that the decline of such ceremonies had begun there before the turn of the century. In Poplar River shamanism was reportedly practiced until at least the 1930's when Hallowell conducted fieldwork in the region (Hallowell 1930-32). Therefore, Poplar River may have been better prepared psychologically and socially for an epidemic if it had struck.

The epidemic could have also been shaped by political policy concerning health since neither community was serviced by a health clinic, doctor or nurse. This meant that the residents of Poplar River and Berens River were not privy to the vaccinations and nursing care available in Winnipeg. Likewise, they could not obtain suggested treatments. One of the primary treatments mentioned was nourishment (e.g., milk, lime, lemonade) (Wetmore 1919:1079; Dever et al. 1919:265; Manitoba Free Press October 31, 1918:7). Yet, it was noted that Berens River rarely had fresh foods in the HBC store, and what was there was expensive (Asher 1950). It was also recommended to residents of Winnipeg that the sick be isolated and upon recovery their clothes and bedding be burned (Manitoba Free Press October 12, 1918:4). In Berens River, isolation was not possible since those who

were healthy were the only people available to nurse the sick. It would also be unreasonable to consider burning their possessions of which they likely had few.

Therefore, one key factor in the spread of this epidemic may have been health care. Without a governmental or Aboriginal healing system in place the residents of Berens River were not equipped to deal with this epidemic. The inadequate health care being provided by the government was useless if an epidemic occurred any time other than at treaty time. The lack of medical provisions and primary nursing facilities and staff were major contributors to the spread of the epidemic in Berens River. If the epidemic had reached Poplar River, the people there might have been better able to deal with its effects since they at least, reportedly, had Aboriginal healing practices in place.

Perhaps a more significant factor contributing to the spread of the epidemic was the local economy. The Hudson's Bay Company, government and missionaries had affected seasonal subsistence patterns and economies in the region. Investigations into community-level differences in this study reveal one major difference between these communities namely, Poplar River continued to have a seasonally mobile population, whereas the people at Berens River had become more sedentary. This is reflected in the ethnographic data collected by Hallowell (n.d. [b]; 1955), the testimony of Stephenson (1925), and the reports in the Government of Canada Sessional Papers (1900), as well as in the school attendance rates (Gray 1995). It can be hypothesized that the poor attendance rates at the Poplar River school were a reflection of the degree to which European culture had been adopted there. With few alternative employment prospects, the people at Poplar River continued to follow a seasonal subsistence cycle which included the movement of entire families to fall fishing settlements and winter hunting camps. This was reflected in the poor attendance in the school records, since the children were not in the community to attend school in October and November, but were away both fall fishing and winter

hunting. Consequently, few people actually could be expected to be living in Poplar River during this time of year and if the flu virus was introduced, it may not have had a large enough population at risk to sustain an epidemic.

This stands in contrast to Berens River where economic development led to job opportunities in sawmills, fisheries, HBC trading posts, and on steamers. As noted by Hallowell, this resulted in Berens River being more continuously occupied year round than other communities (n.d. [b]; 1955:119).

The Holistic Health Perspective

This thesis has touched on many factors that might have been influencing health in Berens River and Poplar River: the biology of the influenza virus; local health care and economy and how they were influenced by macro-political and economic factors; and, factors influencing mobility, such as the weather and social obligations. If any one of these factors had been ignored an incomplete picture of the nature of this outbreak would have been created.

Methods used in this research included the collection and analysis of mortality statistics, demographics, ethnographic, and historical information for the study communities. An analysis of local and population level factors was conducted to examine the socio-political and economic forces that shaped the communities. It became apparent that macro-level forces trickled down to communities in various ways. An ecological approach allowed for the incorporation of the influence of the subarctic environment on the spread of disease. This was an essential part of this research since human mobility is key to the spread of influenza, and the former is very much dictated by weather.

It is clear that the omission of any one of these methods would have changed the conclusions of this investigation. Exclusion of a macro perspective, for example,

would have eliminated the discussion of the influence of colonialism, the HBC and the European market economy. Failure to incorporate an ecological perspective would have missed the importance of environmental factors hindering or helping mobility during the time of the epidemic. The exclusion of the community level investigation would have overlooked key factors, such as local subsistence activities and health perspectives, that were central to how the epidemic would have unfolded. Finally, without the quantitative data, no meaningful analysis could be made regarding mortality patterns over time and during the epidemic — the qualitative data on the health of these communities created the illusion that they were experiencing similar disease patterns around the time of the epidemic.

Conclusions

The three aims of the research support the notion that health studies and disease prevention and intervention models must occur at the community level. There is no reason to expect that communities that share a similar culture and history will be equally susceptible to disease.

The investigations into the first objective shows that even very closely situated and connected communities can have differing experiences during an epidemic. It was found that the Aboriginal population in Canada varied from province to province in the extent to which it suffered from the outbreak, but also from community to community in the same region. This seriously questions the appropriateness of health strategies aimed at sub-populations or populations as a whole.

Using Berens River and Poplar River and the 1918 influenza pandemic as an example, exploration of the second objective reveals many possible variables that can influence the experience a community may have during an epidemic. It was found that

local social and economic differences likely played important role in the spread of the 1918 influenza epidemic.

Finally, by incorporating as many possible perspectives and as many lines of evidence that were available, the results from the investigations into the first two objectives show that research at the community level must be holistic. Reductionist approaches to health would not have revealed the complexity of factors influencing the course of the epidemic. In order to gain insight into differing community-level mortality experiences, investigations into many aspects of the lifeways and histories of the communities are necessary.

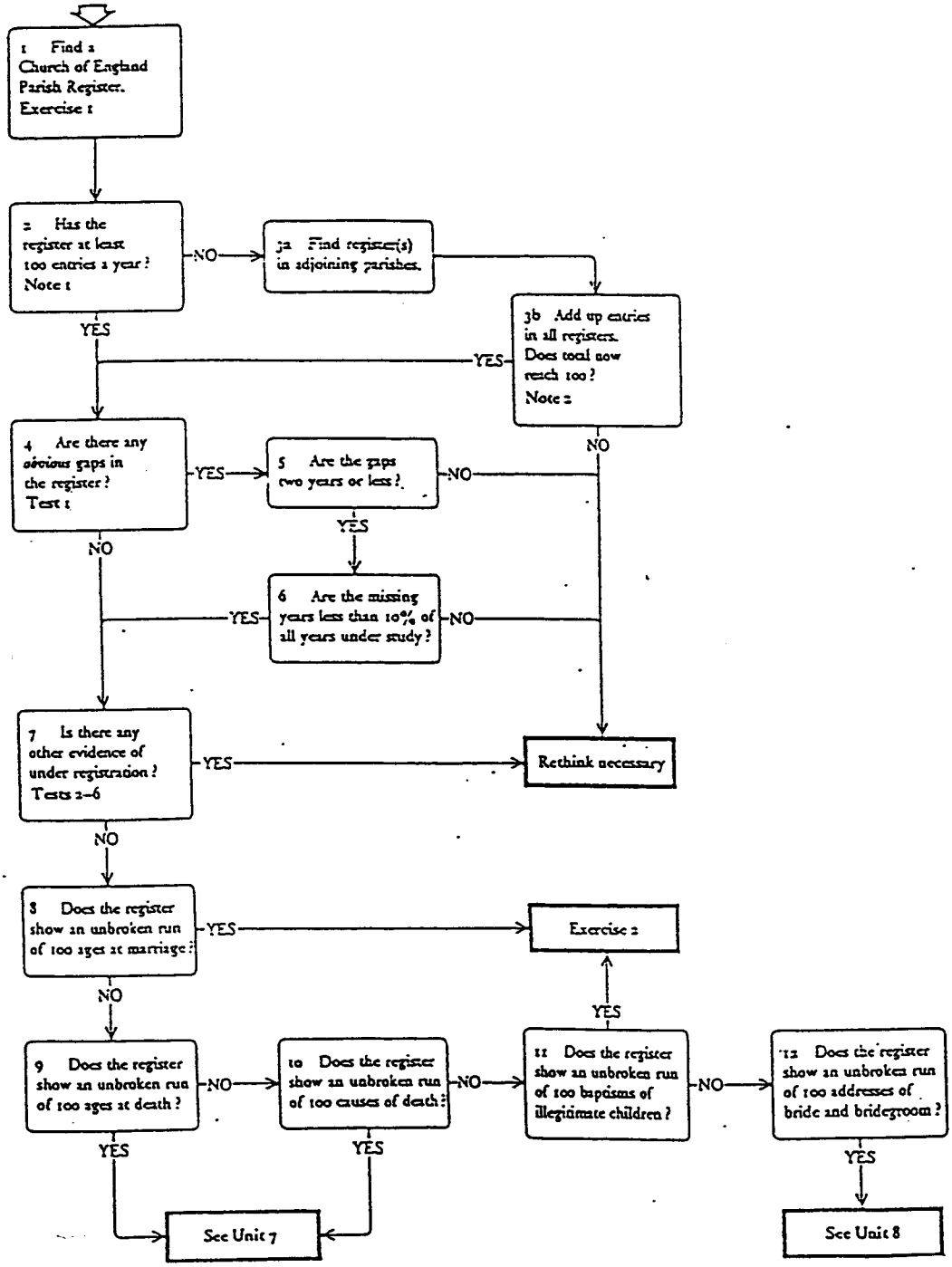
> Generally, we think of science as the establishment of elegantly simple, universal truths....This vision is so seductive because its elegance, its simplicity, and its universality allows us to forget the many ways in which diseases are expressions of particular cultures in particular social and ecological settings...Many health problems in both rich and poor countries are still best explained by multiple weakly sufficient causes...This demands a different kind of science, one based on local knowledge of social organization, cultural beliefs and values, and patterns of behaviour, rather than simply universal knowledge of the behaviour of viruses and GNP per capita. [Kunitz 1994:187-188]

As the world faces new and emerging diseases and continues to battle old and re-emerging diseases, we need to remember the complexity of disease and illness, and, we need to understand that prevention and intervention strategies will need to be adapted and made appropriate for each community targeted.

Appendix 1

Drake's Analysis: Analysing a Parish Record

(Drake 1974)



Appendix 2

Poplar River, Cause of Death (UCCA Register of Burials, Poplar River)

tuberculosis	69
pneumonia	29
still born	6
convulsions	3
internal	2
meningitis	2
unknown	2
accident	2
decay	1
syphilis	1
anemia	1
believed heart attack	1
cancer	1
constipation	1
croup	1
deformed at birth	1
diarhoea	1
dibility	1
hemorrahge through mouth, source not acertained	1
premature birth and disease condition of mother	1
senility	1
stomach trouble	1
suspected diptheria	1
whooping cough	1
Total entries used	131
Total entries in register	227
Total years no cause of death listed	96

Appendix 3

Berens River, Causes of Death (UCCA Register of Burials, Berens River)

tuberculosis	102
influenza	40
pneumonia	18
old age	16
convulsions	15
unknown/not listed	13
whooping cough	10
cold	6
diarrhoea	6
drowing/accident	6
heart failure	4
infant weakness	4
premature birth	3
summer complaint	3
uraemia	3
blood poison	2
cancer	2
congestion of lungs	2
dropsy	2
general debility	2
inflammation of bowels	2
probably congestion	2
scrofula	2
tumor of the brain	2
weak from birth	2
angina pectoris	1
bladder trouble	1
bleeding from the navel	1
cerebral meningitis	1
chest trouble (heart)	1
childbirth	1
chronic nephritis	1
confinement	1
croup	1
debility	1
diphtheria	1
diseased throat	1
excessive vomiting	1
fluidly trouble	1
gallstones	1
gastric ulcers	1
general breaking up	1
grip & whooping cough	1
hemarrhage of the lungs	1
indian medicine	1
indigestion-debility	1
infantile paralysis	1
infection (blood poison)	1
inwardly hurt	1
irregularity of menses	1
kidney trouble	1
paralysis	1
partial paralysis	1
pernicious anemia	1
pleurisy	1
ruptured uterus	1
senility and influenza	1
spinal meningitis	1
stillborn	1
stomach complaint	1
stroke	1
sudden - unknown	1
the heart- sudden	1
ulcer of stomach	1
total	308

References Cited

Asher, Julie Ann
1950 Grandma's Childhood, Pioneer Life in Southern Alberta. Provincial Archives of Manitoba (PAM) MG8B10.

Baer, Hans A.
1996 Critical and Biocultural Approaches in Medical Anthropology: A Dialogue. *Medical Anthropology Quarterly* 10(4):451-454.

Berens, Chief William
1940 *Reminiscences of Chief William Berens* . Recorded by A. I. Hallowell 1940. American Philosophical Society (APS) No. 26, series V, Folder Saulteaux Indians - Chief William Berens Autobiography.

Beveridge, W.I.B.
1977 *Influenza: The Last Great Plague: An Unfinished Story of Discovery.* Heineman: London.

Bishop, Charles A
1970 The Emergence of Hunting Territories Among the Northern Ojibwa. *Ethnology* 9:1-15.

1972 Demography, Ecology, and Trade Among the Northern Ojibwa and Swampy Cree. *Western Canadian Journal of Anthropology* 3:58-71.

1974 *The Northern Ojibwa and the Fur Trade: An Historical and Ecological Study.* Holt, Rinehart and Winston of Canada: Toronto.

Black-Rogers, Mary
1986 Varieties of "Starving": Semantics and Survival in the Subarctic Furtrade, 1750-1850. *Ethnohistory* 33(4):353-383.

Boggs, S. T.
1952 The Records of S.T. Boggs. PAM P4989f.10.

Brock, Thomas D.; Micheal T. Madigan; John M. Martinko; and Jack Parker
1994 *Biology of Microorganisms.* Prentice Hall: Englewood Cliffs, New Jersey.

Brown, Jennifer and Maureen Matthews
1994 Fair Wind: Medicine and Consolation on the Berens River. *Journal of the Canadian Historical Association.* ns vol. 4: 55-73.

Brown, Jennifer S.H.
1998 Berens, Jacob. *Dictionary of Canadian Biography 1911-1920,* 14: 63-64. University of Toronto Press: Toronto.

1995 The Northern Algonquians: A Regional Overview. In *Native Peoples: The Canadian Experience,* edited by R. Bruce Morrison and C. Roderick Wilson, pp. 143-149, McClelland and Stewart Inc: Toronto.

1989 "A Place in Your Mind for Them All": Chief William Berens. In *Being and Becoming Indian, Biographical Studies of North American Frontiers,* edited by James A. Clifton. Pp. 204-225, Dorsey Press: Chicago.

Centers for Disease Control and Prevention (CDC)
1995 Essential Components of a Tuberculosis Prevention and Control Program; Screening for Tuberculosis and Tuberculosis Infection in High Risk Populations. *MMWR Recommendations and Reports* 44(RR-11).

Cohen, Mark Nathan
1989 *Health and the Rise of Civilization.* Yale University Press: New Haven.

Crosby, Alfred W.
1989 *America's Forgotten Pandemic: The Influenza of 1918.* Cambridge University Press: Cambridge.

Dever, Francis J.; Russel J. Boles; and Eugene A. Case
1919 Influenza at the United States Naval Hospital, League Island, PA. *Journal of the American Medical Association* : 265-267.

Dobyns, H.F.
1966 Estimating Aboriginal American Population: An Appraisal of Techniques with a New Hemispheric Estimate. *Current Anthropology* 7:395-449.

Drake, Micheal
1974 *Historical Demography: Problems and Projects.* Rustington, Sussex: The Open University.

Dueck, Susan Elaine
1986 *Methodist Indian Day Schools and Indian Communities in Northern Manitoba, 1890-1925.* MA Thesis, University of Manitoba: Winnipeg, Manitoba.

Dunn, Frederick L. and Craig R. Janes
1986 Introduction: Medical Anthropology and Epidemiology. In *Anthropology and Epidemiology*, edited by Craig R. Janes; Ron Stall; and Sandra M. Gifford, pp. 3-34. D. Reidel Publishing Company: Dordrecht, Holland.

Everett, Harry
1986 Unpublished Memoirs, Manitoba. Typescript copy in possession of Dr. Ann Herring, McMaster Univerity.

Fisheries and Environment Canada
1918 Temperature and Precipitation, Berens River (5030200) October - December 1918.

Flannery, R.
1995 *Ellen Smallboy: Glimpses of a Cree Women's Life.* McGill-Queen's University Press: Montreal.

Fleras, Augie and Jean Leonard Elliott
1992 *The Nations Within: Aboriginal-State Relations in Canada, the United States, and New Zealand.* Oxford University Press: Toronto.

Gentilcare, Louis R. editor
1990 *Historical Atlas of Canada Vol. II, the land transformed 1800-1891.* University of Toronto Press: Toronto.

Government of Canada
1900 Sessional Paper No. 14, 63 Victoria (A):99-102.

1910 Sessional Paper No. 27, 9-10 Edward VII (A):46-103.

1911 Sessional Paper No. 27, 1 George V(A):94.

1912 Sessional Paper No. 27 , 2 George V (A):20.

1913 Sessional Paper No 21, 3 George V(A):20.

1914 Sessional Paper No. 27, 4 George V(A):22-23.

1915 Sessional Paper No. 27, 5 George V (A):16.

1916 Sessional Paper No. 27, 6 George V(A):1617, 134-135.

1917 Sessional Paper No. 27-28, 7 George V(A):16.

1918 Sessional Paper No. 27, 8 George V (A):27-71.

1919 Sessional Paper No. 27, 9 George V(A):9.

1920 Sessional Paper No. 27, 10 George V(A)

1925 Sessional Paper No. 14, 15 George V (A):36.

Graham-Cumming, G.
1967 Health of the Original Canadians, 1867-1967. *Medical Services Journal Canada* 23:115-166.

Gray, Susan Elaine
1995 Methodist Indian Day Schools and Indian Communities in Northern Manitoba, 1880-1925. *Manitoba History* Autumn, No. 30, pp. 2-16.

Hallowell, A. Irving
n.d.(a) American Philosophical Society (APS) No. 26, series III, folder: Pigeon River People #4, p.1.

n.d.(b) APS No. 26, series V, folder: Saulteaux Indians-Social Customs and Organization 1930, n.d.

n.d.(c) APS No 26, series V, folder: Saulteaux Indians-Social Customs and Organization #2 1931-1940.

1930-32 APS No. 26, series V, folder: fieldnotes 1930-1932.

1930 Sin, Sex, and Sickness in Saulteaux Belief. *British Journal of Medical Psychology* 18:191-197.

1955 *Culture and Experience.* Schocken Books: New York.

1992 *The Ojibwa of Berens River, Manitoba: Ethnohistory in History.* Edited by Jennifer S.H. Brown. Harcourt Brace Jovanovich College Publishers: Fort Worth.

Hamilton, Lawrence
1996 *Data Analysis for Social Scientists.* Duxbury Press: Belmont, California.

Hanks, Christopher
1982 The Swampy Cree and the Hudson Bay Company at Oxford House. *Ethnohistory* 29(2):103-115.

Harris, Cole R., editor
1987 *Historical Atlas of Canada Vol. I, from the beginning to 1800.* University of Toronto Press: Toronto.

Harris, J.W.
1919 Influenza Occurring in Pregnant Women: A Statistical Study of Thirteen Hundred and Fifty. *JAMA* 72:978-980.

Health and Welfare Canada
1996 Guidelines for Preventing the Transmission of Tuberculosis in Canadian Health Care Facilities and Other Institutional Settings. *Canada Communicable Disease Report Supplement* 22S1.

Herring. Ann D.
1994a The 1918 Influenza Epidemic in the Central Canadian Subarctic. In *Strength in Diversity,* edited by A. Herring and L. Chan, pp. 365-384. CPS: Toronto.

1994b "There were young people and old people and babies dying every week": The 1918-1919 Influenza Pandemic at Norway House. *Ethnohistory* 41(1):73-105.

Hollingsworth, T.H.
1968 The Importance of the Quality of the Data in Historical Demography. *Daedalus* 97:415-432.

Hoppa, R.D. and D.A. Herring
1997 Differential Mortality Among the Western James Bay Cree. *American Journal of Physical Anthropology, Supplement* 24:132.

Hudson Bay Company Archives (HBCA)
1893-1894 HBCA B.331/a/1 Poplar River Post Journal

1905-1940 HBCA B.16/a/12-20 Berens River Post Journal.

1918-1939 HBCA B.154/a/87-95 Norway House Post Journal

1936-1941 HBCA B.331/a/2-3 Poplar River Post Journal

1918 A.74/48 Annual Reports from District Officers.

n.d. Post History Berens River

n.d. Post History Poplar River

1917 A12/FT273/4, List of Fur Trade Posts, Provincial Archives, Winnipeg, Manitoba.

Journal of the American Medical Association
1918 Madrid Letter: The Pandemic of Influenza. *Journal of the American Medical Association* p. 1594.

Karlen, Arno
1995 *Man and Microbes: Disease and Plagues in History and Modern Times.* Simon and Schuster: New York.

Kilborne, Edwin D.
1987 *Influenza.* Plenum Medical Book Company: New York.

Kunitz, Stephen J.
1994 *Disease and Social Diversity: The European Impact on the Health of Non-Europeans.* Oxford University Press: New York.

Landes, Ruth
1969 *Ojibwa Sociology.* Columbia University Contributions to Anthropology Vol. XXIX. AMS Press: New York.

Lilienfeld, Abraham M. and David E. Lilienfeld
1980 *Foundations of Epidemiology.* Oxford University Press: New York.

Lux, M
1992 Prairie Indians and the 1918 Influenza Epidemic. *Native Studies Review* 8(1):23-33.

Lytwyn, Victor P.
1986 *The Fur Trade and the Little North: Indians, Peddlers, and Englishmen East of Lake Winnipeg, 1760-1821.* Winnipeg: Rupert's Land Research Center, University of Winnipeg.

MacKenzie, John S.
1980 Possible Future Changes in the Epidemiology and Pathogenesis of Human Influenza A Virus Infections. In *Changing Disease Patterns and Human Behaviour,* edited by N.F. Stanley and R. A. Joske, pp. 130-147. New York: Academic Press.

Manderson, Lenore and Ruth Wilson
1998 Negotiating with Communities: The Politics and Ethics of Research. *Human Organization* 57(2): 215-221.

Manitoba Free Press, Winnipeg
1918 October-December

Matthews, Maureen (producer)
1993 *Ideas: Fair Winds Drum.* Canadian Broadcasting Corporation (CBC) May 11-12.

Meister, Gary W.
1986 Methods of Evaluating the Accuracy of Census Reports as Ethnohistorical Data: A Brief Assessment of Pima and Maricopa. In *Ethnohistory: A Researcher's Guide,* Guest editor Dennis Wiedman, pp. 77-106. Studies in Third World Societies:

Mims, Cedric; Nigel Dimmock, Anthony Nash, and John Stephen
1995 *Mims' Pathogenesis of Infectious Disease, fourth edition.* Academic Press. Harcourt Brace and Company Publishers: London.

Moffat, Tina
1992 *Infant Mortality in an Aboriginal Community: An Historical and Biocultural Analysis.* MA Thesis, McMaster University, Department of Anthropology.

Moore, David S.
1995 *The Basic Practice of Statistics.* WH Freeman and Company: New York.

Mulder, J. and J.H. Hers
1972 *Influenza.* Noordhoff Publisher: Groningen, The Netherlands.

National Archives of Canada (NAC)
1919 RG 29 Vol. 2970, file 851-4-096 (2ti), Document Number 524693. Influenza Epidemic, October 1918 to February 1919. Number of Deaths in each Agency.

Notzke, Claudia
1995 Note on the Canadian Fur Industry. In *Northern Aboriginal Communities: Economics and Development*, edited by Peter Douglas Elias, pp. 142-158. Captus University Publications.

Page, Bryan J.
1986 The Use of Reminiscences and Oral Tradition in the Study of Ethnohistory. In *Ethnohistory: A Researcher's Guide,* Guest editor Dennis Wiedman, pp. 275-280. Studies in Third World Societies:

Peers, Laura
1996 Subsistence, Secondary Literature, and Gender Bias: The Saulteaux. In *Women of the First Nations: Power, Wisdom, and Strength,* edited by Christine Miller and Patricia Chuchryk, pp. 39-50. University of Manitoba Press: Winnipeg.

Pettigrew, E.
1983 *The Silent Enemy, Canada and the Deadly Flu of 1918.* Western Producer Prairie Books: Saskatoon.

Proulx, Jean-Francois and Fernand Turcotte
1996 Tuberculosis in Nunavik, 1980-1994. *Canadian Journal of Public Health* 87(6):395-396.

Public Archives of Canada (PAC)
1914 RG 10 Vol. 6228, file 501-1, part 1. List of Roman Catholic Families of Berens River Manitoba.

1917 RG 10 Vol. 6228, file 501-1, part 1. Statement of Roman Catholic Children of School Age in Berens River Band.

Ray, Arthur
1974 *Indians in the Fur Trade: Their Role and Hunters, Trappers, and Middlemen in the Land Of Southwestern Hudson's Bay 1660-1870.* University of Toronto Press: Toronto.

1976 Diffusion of Diseases in the Western Interior of Canada, 1830-1950. *Geographical Review* 66(2):139-57.

Rogers, Edward S.
1962 *The Round Lake Ojibwa.* Occasional Paper 5, Art and Archaeology Division Royal Ontario Museum, University of Toronto.

Romaniuk, A. and V. Pichè
1972 Natality Estimates for the Canadian Indians by Stable Population Models, 1900-1969. *Canadian Review of Sociology and Anthropology* 9(1):1-20.

Sattenspiel, Lisa and D. Ann Herring
1998 Structured Epidemic Models and the Spread of Influenza in the Central Canadian Subarctic. *American Journal of Human Biology* 70(1):91-115.

In Press Human Mobility and the Spread of the 1918-1919 Influenza Epidemic in the Norway House Region of Manitoba.

Saunders, W. B (Dictionary Staff)
1994 Dorlands Medical Dictionary 28th ed. W.B. Saunders Company: Philadelphia.

Semmens, John
n.d. Notes on Personal History. Unpublished. Typescript copy in possession of Dr. Ann Herring, McMaster Univerity.

Skinner, Alanson
1911 Notes on the Eastern Cree and Northern Saulteaux. Anthropological Papers of the American Museum of Natural History, vol. IX. New York.

Sokal, Robert R. and F. James Rohlf
1969 *Introduction to Biostatistics.* W.H. Freeman and Company: San Francisco.

Stannard, David E.
1990 Disease and Infertility: a New Look at the Demographic Collapse of Native Populations in the Wake of Western Contact. *Journal of American Studies* 24:325-350.

Stephenson, Mrs. Frederick C.
1925 *One Hundred Years of Canadian Methodist Mission, vol. 1.* Toronto: Missionary Society of the Methodist Church.

Stevens, Frances G.
n.d. *My Experience Living on a Mission.* Unpublished Autobiography, United Church of Canada Archives, Conference of Manitoba and Northwestern Ontario (PP35[A]), Winnipeg, Manitoba.

Stuart-Harris, Sir C.H.; G.S. Schild and J. S. Oxford
1985 *Influenza: The Virus and the Disease, second edition.* Baltimore, Maryland: Edward Arnold.

Taubenberger, Jeffery K.; Ann H. Reid; Amy E. Krafft; Karen E. Biwaard; and Thomas Flanning
1997 Initial Genetic Characterization of the 1918 "Spanish" Influenza Virus. *Science* 275(2):1793-1796.

Tough, Frank
1990 Indian Economic Behavior, Exchange, and Profits in Northern Manitoba during the Decline of Monopoly, 1870-1930. *Journal of Historical Geography* 16(4):385-401.

United Church of Canada Archives (UCCA), Conference of Manitoba and Northwestern Ontario, Winnipeg, Manitoba
1905-1954 MG7 H3, Poplar River United Church, Register of Burials.

1886-1896; 1904-1958 MG7 H3, Poplar River United Church, Register of Baptisms.

1905-1962 MG7 H3, Poplar River United Church, Register of Marriages.

UCCA Conference of Manitoba and Northwestern Ontario, Winnipeg, Manitoba
1909-1952, #87-4 Berens River United Church Register of Burials.

1909-1952, #87-4 Berens River United Church Register of Baptisms.

1909-1952, #87-4 Berens River United Church Register of Marriages.

Waldram, James B.; D. Ann Herring; and T.. Kue Young
1995 *Aboriginal Health in Canada: Historical, Cultural, and Epidemiological Perspectives.* The University of Toronto Press: Toronto.

Walters, John H.
1978 Influenza 1918: The Contemporary Perspective. *New York Academy of Medicine* 54(9):855-864.

Warry, Wayne
1998 *Unfinished Dreams: Community Healing and the Reality of Aboriginal Self-Government.* University of Toronto Press: Toronto.

Weidman, Dennis editor
1986 *Ethnohistory: A Researchers Guide.* Published by the Department of Anthropology College of William and Mary: Williamsburg, Virginia.

Wetmore, F.H.
1919 Treatment of Influenza. *Canadian Medical Association Journal* 8:1075-1080.

Whiteman, Darrell
1986 Using Missionary Documents in Ethnohistorical Research. In *Ethnohistory: A Researcher's Guide,* Guest editor Dennis Wiedman, pp. 25-59. Studies in Third World Societies:

Wilkins, Kathryn
1996 Tuberculosis. *Health Reports* (Summer) 8(1):33-39.

Willigan, Dennis J. and Katherine A. Lynch
1982 *Sources and Methods of Historical Demography.* Harcourt, Brace, Jovanovich Publishers, Academic Press: New York.

Wilson, Margaret E.
1986 Oral History Interviews: Some History and Practical Suggestions. In *Ethnohistory: A Researcher's Guide,* Guest editor Dennis Wiedman, pp. 253-274. Studies in Third World Societies:

World Health Organization (WHO)
1996 WHO Announces Influenza Vaccine Form for 1996-97. WHO/10 Press Release, February 15, 1996.

Young, T. Kue
1988 *Health Care and Cultural Change: The Indian Experience in the Central Subarctic*. University of Toronto Press: Toronto.