INFANT MORTALITY IN AN ABORIGINAL COMMUNITY

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Fisher River campsite (P.A.M., Fisher River 3, 1954)

INFANT MORTALITY IN AN ABORIGINAL COMMUNITY: AN HISTORICAL AND BIOCULTURAL ANALYSIS

By

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Abstract

There is little information on secular trends in the infant mortality rate (IMR) among aboriginal populations in Canada. Although the Canadian government began collecting vital statistics for Canadian Indians at the turn of the century, records prior to the 1960s have been deemed inaccurate (Romaniuk and Piche 1972; Latulippe-Sakamoto 1971).

This thesis presents an historical study of infant mortality in the Cree community of Fisher River, Manitoba during the period from 1907 to 1939. The two major purposes of this thesis are: 1) to investigate infant mortality and community health conditions at Fisher River during the early twentieth century using parish records from the Methodist mission; and 2) to evaluate microlevel parish record data (as opposed to aggregate statistics used in national studies) as a source of information on historical trends in the IMR among aboriginal Canadians.

The infant mortality rate was found to be persistently high during this time period (249 per 1000 live births). The IMR demonstrated a seasonal distribution pattern; high rates were strongly associated with winter, linked to undernutrition and airborne infectious disease. High fertility rates at young maternal ages during this period are thought to have contributed to high IMRs, although the underlying mechanisms are still elusive. There is some indication that a segment of families in the community had lower IMRs due to greater access to resources in the community. However, it is concluded that high infant mortality reflected the overall health problems of the Fisher River reserve environment during this period.

Finding studies, both historical and modern, comparable to these results is a challenge. Parish records, when used judiciously, are advocated as a good source of data for investigating aboriginal health conditions prior to W.W.II. It is suggested that future research on infant mortality in aboriginal populations be community-based.

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TABLE OF CONTENTS

LIST OF MAPS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

Introduction

The infant mortality rate[1] (IMR) among Canadian aboriginal populations was reported in 1985 by Health and Welfare Canada to be more than twice as high as that of the general Canadian population (Muir 1988; Pekeles 1988). Similar findings have been observed in a study of provincial IMRs among Canadian Indians (Morrison et al. 1986) and among aboriginal communities connected with the Sioux Lookout Project (Young 1988).

The disparity in the IMR between aboriginal and other populations in Canada is thought to be long-standing; however, the epidemiologic profile of infant mortality has changed since the 1970s. There has been a sharp decrease in the overall IMR, from 32.1/1000 in 1976 to 17.9/1000 in 1985. Nevertheless, the aboriginal postneonatal mortality rate[2] (PNMR) has been documented as high relative to the total Canadian population. Muir (1988: 11) cites an average PNMR for the 1981-1985 period of 11.1/1000 live births for aboriginals compared to 3.0/1000 live births for the total Canadian population. Deaths during the postneonatal period are highly correlated with exogenous (or environmental) factors that influence an infant's chance of survival (Bourgeois-Pichat 1951).

The IMR is cited in the epidemiological literature as a good indicator of the socio-economic status of a community and the quality of its health care (Klein 1980: 1023). There may be cultural differences among populations which influence the quality of care given to the

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[1] All deaths under one year of age per 1000 live births.

[2] The postneonatal mortality rate is defined as deaths occurring between 28 days and one year per 1000 live births.

infant. However, as Herring and Sawchuk (1986) document, the negative impact of poor socio-economic conditions on the IMR among all populations, despite cultural differences, is undeniable.

After W.W.II the Canadian government began to address the issue of health care among northern aboriginal people (Young 1988: 88). Infant mortality was not considered an important issue, judging from the paucity of data and documents concerning this topic. There was, however, one report published by Medical Services, Health and Welfare Canada on infant and maternal health of Canadian Indians (Graham-Cumming 1962). Data on maternal and infant deaths, quality of infant care and the utilization of health care services by pregnant mothers were collected at northern nursing stations by means of questionnaires completed by public health nurses. Graham-Cumming documented an IMR among on-reserve status Indians, which far exceeded that of the contemporaneous Canadian population. The disparity existed for both neonatal (0 to 28 days) and postneonatal (28 days to 1 year) periods. Graham-Cumming (1962) proposed that improvement in the utilization of health care facilities by pregnant mothers in aboriginal communities would lower the IMR. This conclusion, however, was made without reference to factors which influenced previous trends in the aboriginal IMR.

There is, in fact, a dearth of information concerning the aboriginal IMR in Canada prior to the 1950s. Although the Canadian government began collecting vital statistics for Canadian Indians at the turn of the century, records prior to the 1960s have been deemed inaccurate (Romaniuk and Piche 1972; Latulippe-Sakamoto 1971). One attempt to fill this lacuna is Latulippe-Sakamoto's (1971) M.A. thesis, in which she corrected data from the Department of Indian Affairs to estimate the progress of the national Canadian

Indian IMR from 1925 to the 1960s. She depicted a steady descent in the IMR with a marked drop after the 1940s, which she attributed to a decline in infectious disease due to post-W.W.II government involvement in providing social assistance and medical care to registered Indians. Although an important contribution to the literature, this study is limited in elucidating some of the factors that influenced the IMR because of the broad nature of the national aggregate data.

There have been only a few micro-level historic studies of mortality patterns in aboriginal communities (Herring, Driben and Sawchuk 1983; Hurlich 1983; Roth 1981). As an attempt to explore alternative data, Herring, Driben and Sawchuk (1983) investigated fertility patterns for the Fort Hope Band in northern Ontario, utilizing Treaty Annuity Lists. The authors concluded that these data can be a viable means of demographic enquiry when family reconstitution methodology is employed, and would be even more reliable if linked with other sources of data such as oral histories and parish records.

This study employs Methodist parish records from the Cree community of Fisher River, Manitoba to investigate infant mortality rates during the early twentieth century. The records have been assembled into two cohorts: an aggregate death cohort, extending from 1910-1939 and a marriage cohort, comprised of families formed from 1907 to 1930. In addition to the quantitative data, primary records such as parish histories, diaries, government documents, Hudson's Bay Company trade post journals and oral history interviews have been utilized to construct an ethnohistoric context.

This thesis, like much research, is an exploratory foray in a topic area where there is little background information. It attempts to address two questions:

1) What were some of the parameters and proximate determinants of infant mortality at Fisher

River prior to W.W.II?

2) Can a microlevel analysis utilizing parish record data provide insight into the IMR during the early twentieth century among aboriginals in Canada?

The thesis is organized into seven chapters. Chapter 2 introduces the community of Fisher River and gives an overview of the Fisher River economy, community health and childcare during the period under study. Chapter 3 describes and evaluates the materials employed in the study, and Chapter 4 outlines the study methods. Chapters 5 and 6 present results from analysis of the aggregate death cohort and marriage cohort data respectively. Chapter 7 is a discussion and synthesis of the results, followed by suggestions for future research.

It will be demonstrated that: 1) parish records are a valuable source of information for exploring aboriginal health in Canada prior to the 1950s; 2) infant mortality rates at Fisher River from 1910-1939 were persistently and astoundingly high, comparable to pre-industrial rates in western Europe; 3) microlevel, community-based studies, unlike national or provincial studies, are needed to elucidate some of the social and environmental determinants of infant mortality among aboriginal populations in Canada.

CHAPTER II

Fisher River: The Community and the People

It is important at this juncture to situate the study of aboriginal infant mortality in the context of the community of Fisher River. This chapter begins by presenting a brief history of the community and its people. The Fisher River resource base and economy are examined for the study period (1907-1940) and are related to health and disease. Childbirth and infant care are then discussed in the final section, providing a foundation on which to study infant mortality rates.

Accounts from missionaries and government Indian agents, along with oral history interviews with Fisher River community members form the basis of this chapter. At times I have attempted to contextualize the Fisher River history in what is known about other aboriginal communities in northern Manitoba and northwestern Ontario during the same era. The aboriginal people of Fisher River do not have a recorded history of their own making. However, the Band is currently working on the Fisher River History Project (pers. comm., Charles Hudson, Head of Education at Fisher River, Manitoba).

Archival documents held at the Provincial Archives of Manitoba also provide valuable information about the history of the community. It must be borne in mind, however, that those who write history determine what is deemed important in the story. Historical reports about Fisher River are oftentimes sketchy and contradict one another. When discussing the history and description of the community, I have attempted to present these contradictions and evaluate their sources.

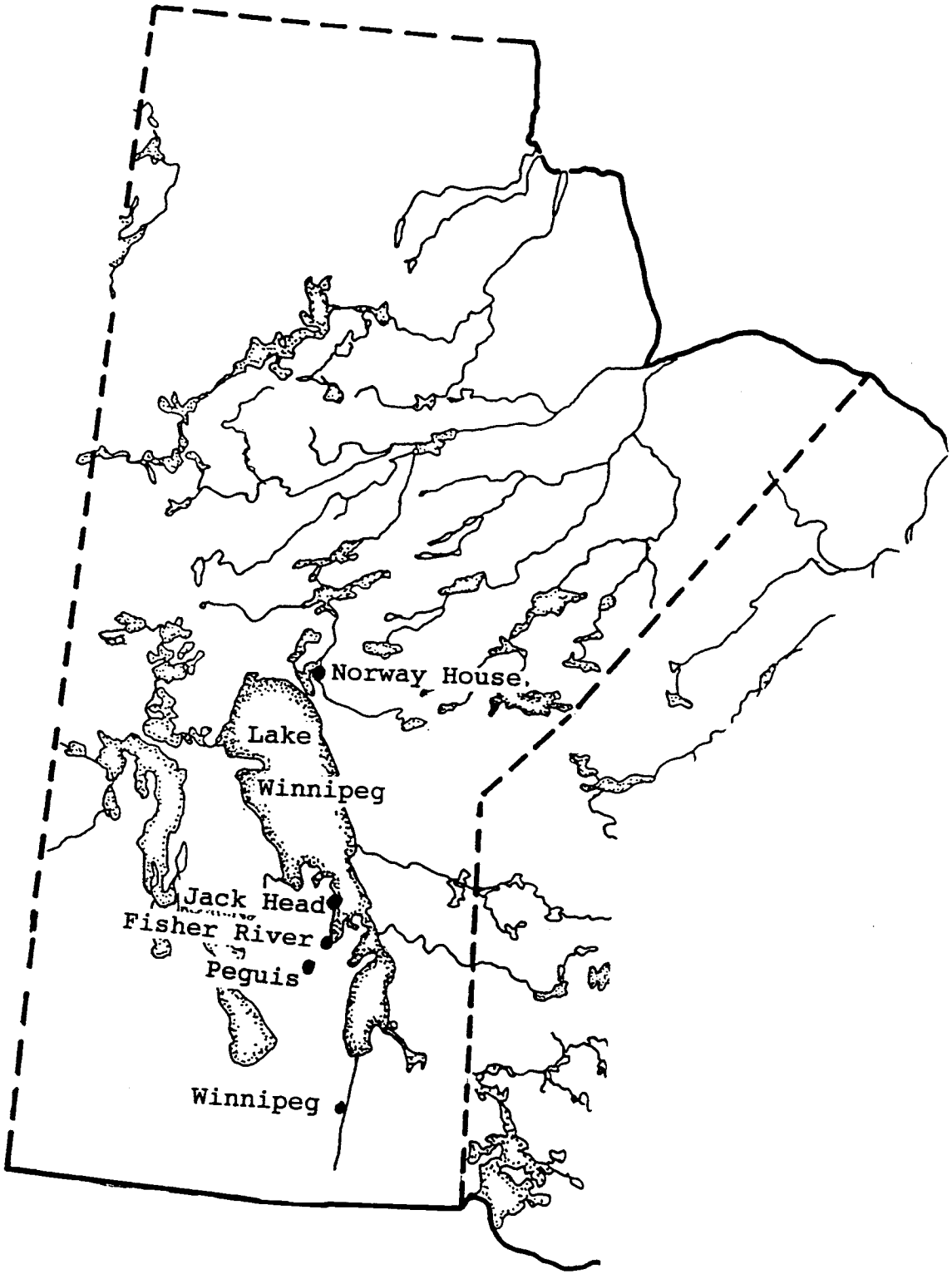
The History of the Reserve and its Founders

Fisher River is located near the mouth of the Fisher River on the west side of Lake Winnipeg, approximately 200 km north of Winnipeg (Map 2.1). The reserve was established in 1885 with an adhesion in 1908. Today the Fisher River Band occupies two reserves in this vicinity with a total size of 6,319.30 hectares. In 1990 there was an on-reserve population of 1090 (DIAND 1990).

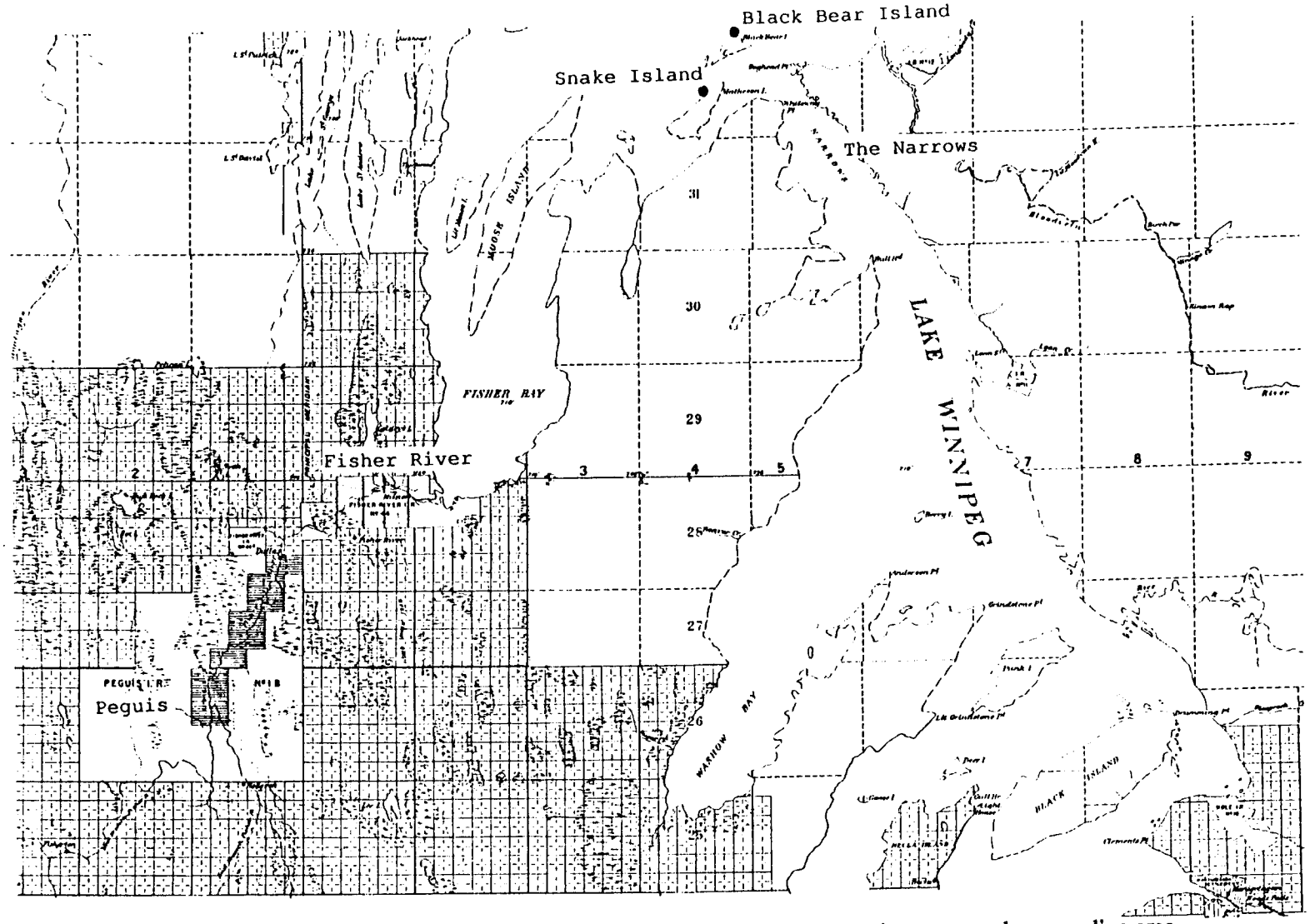
In 1875 a government party, led by the Hon. Alexander Morris, Lieutenant Governor of Manitoba and the North West Territories, travelled Lake Winnipeg negotiating Treaty No. 5. The party encountered two groups of Swampy Cree Indians at Norway House (See Map 2.1), one of which was considered to be Christian, having been converted at the Methodist mission at Norway House. The Christian group desired to migrate south on Lake Winnipeg to a location where they could farm and fish (PAM, MG12B1, LB/J #298, p.192). As Tough (1984) asserts, Indian leaders were aware of the imminent encroachment of white settlers and its accompanying economic privations. Furthermore, the Norway House Indians could no longer get employment in boating for the Hudson's Bay Company because of the development of steam navigation on Lake Winnipeg (PAM, MG12B1, LB/J #298, p.192). Hence, in 1876 the Indian Agent surveyed 9000 acres near the mouth of the Fisher River in lots of frontage on either side of the river (UAC, Church History File) (Map 2.2).

Led by Rev. J.H. Ruttan and Thomas Hope, an Indian who was to serve as teacher and preacher, ninety Swampy Cree families migrated from Norway House to Fisher River in the fall of 1876[3] (ibid.). There were, however, other immigrants who came to Fisher River

[3] Rev. John Semmens wrote in 1876 that there were 62 children, 80 church members, in total 150 souls who came to the Fisher River mission (PAM, MG12E1, p.4630).



Map 2.1 Province of Manitoba with Fisher River in relation to other reserve communities on Lake Winnipeg.



Map 2.2 Map from 1914 showing Fisher River reserve, neighbouring Peguis reserve and surrounding area.

in search of a new land base. As the Morris party was travelling southwards by steamship on Lake Winnipeg after negotiating Treaty No. 5, they were saluted by a group of Indians on shore who came in canoes to meet them. One of them identified himself as "Thickfoot", an Indian from the band inhabiting the islands on Lake Winnipeg along with some Indians from the Jack Head Band of the western shore of Lake Winnipeg (See Maps 2.1 and 2.2). Thickfoot said he had cattle and wanted a place for himself and his people on the main shore, where they could live by farming and fishing. He and the other Indians were offered Fisher River by the treaty party.[4] (PAM, MG12B1, LB/J #298, p.197)

The founding families from Norway House were Swampy Cree, also called the Wood Cree or Maskegon (Skinner 1912: 9). Swampy Cree is one of four western Cree groups, each group speaking its own Cree dialect. They inhabit the region from James Bay, westward to Cumberland House, Saskatchewan (Smith 1974: 256). Many of these people were descendants of unions between Hudson's Bay traders and aboriginal women (Brown 1988), and evidence of their Scottish descent is marked by surnames such as Sinclair, Cochrane, Murdoch, and Stevenson (UCCA, Frances G. Stevens, n.d: 65).[5]

There were also neighbouring groups, Saulteaux and Metis, who most likely intermixed with the Fisher River Cree.

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[4] The first generation of Thickfoots that were listed in the Fisher River parish records were Thomas and Sarah Thickfoot born in 1902 and 1907 respectively. Their parents were recorded as John Thickfoot and Sarah Thaddeus. It is possible that John Thickfoot was the man who met the Morris treaty party.

[5] However, a Scottish surname is not always indicative of Scottish ancestry, as many Cree families changed their Cree names to Scottish names. For example, the name 'Necannie' was changed to 'McKay' (pers. comm., Raymond Beaumont, Frontier School Division).

> Out on the lake were settlements of mostly half-breeds who were engaged in fishing, fur trapping, and wood cutting. These settlements were in Fisher bay and around the Narrows of the lake and along the east and west shores. These people were principally of Anglican persuasion. Most of them had come from the Red River (UAC, Frederick G. Stevens, n.d.: 38).

As well, the Peguis reserve adjacent to Fisher River was established in 1908 after the St. Peter's band surrendered their reserve to the government and moved northward. "The St Peter's Indians were of Ojibway and Swampy Cree stock. There was also a large mixture of white blood, mostly Scots" (ibid.). Today the Indians of Fisher River call themselves "Cree-Ojibwa" (DIAND 1990), a term also used by ethnohistorians (cf. Rogers 1963).

Fisher River, then, with its majority of Swampy Cree and some Northern Ojibwa settlers (Smith 1981: 269) was a new land base with a wide spectrum of resources and greater economic opportunities.

The Fisher River Resource Base and Economy

Fisher River is the quintessential post-treaty community. It was shaped during what Bishop (1974) terms "the era of early government influence for subarctic Indians (1890-1945)". This was a period of profound changes in the lives of many aboriginal families in northern communities. Of primary significance was the introduction of wage labour to the subsistence economy. However, before discussing these issues, I will present brief descriptions of the Lake Winnipeg resource base and the subarctic subsistence economy prior to the early twentieth century.

The Lake Winnipeg region has an average temperature of 18° C in July and -20 to -25° C in January. It is geographically situated in the southern boreal forest, and the vegetation consists mainly of coniferous and broadleaf trees. The soil in the inter-lake region

(between Lakes Winnipeg and Manitoba) is classified as Gray Wooded Soil; although less than 10 per cent is under cultivation, certain grain crops can be successfully cultivated (Laycock 1972). The major animal species of northern Manitoba are woodland caribou, moose, elk, wood bison and white-tailed deer. The fur-bearing animals are beaver, mink, marten, otter, lynx, fox and muskrat (Smith 1981: 257). The major fish species of Lake Winnipeg are white fish, lake trout, tullibee, gold-eye, yellow perch, sauger, pickerel, northern pike, lake sturgeon and various members of the sucker and catfish families (Tough 1984: 314).

Even though the Woods Cree were involved in the fur trade during the 17th, 18th and early 19th centuries, the nature of the fur trade industry enabled them to maintain a modified version of their earlier hunting and nomadic way of life. The subsistence economy was regulated by an annual cycle. The regional band, which consisted of several related families, congregated during the summer for two to three months on the shores of lakes where abundant fish, game and berries allowed for population concentration. This was a time for socializing and ceremonial events. In the late summer smaller family groups left the site where they formed winter camps, hunting moose, elk and caribou. Fur-bearing animals were hunted in November and December. After a long winter, and after winter break-up of the ice, the families would travel to a pre-arranged summer location and the cycle would begin again. During the nineteenth century, the summer camp was often located at the Hudson's Bay Company posts, in order to trade furs and garner necessities for the following hunting season (Smith 1981: 260; Rogers 1963: 71; Skinner 1912: 57).

As explained at the outset of this section, after treaty was taken in the late nineteenth century in Manitoba, aboriginal communities were more affected by government and mission

influences. However, depending on the location and history of the reserve, there was wide diversity in the degree to which their economies were influenced.

In order to understand the degree to which Fisher River was affected, the community must be situated in the geographical economy of Manitoba. Fisher River is not located in the far north, as it is approximately 200 km north of Winnipeg in the transitional zone between north and south. Lithman (1992: 4) points out that Manitoba's 'North', in geographical terms, is usually designated as the region where there is little or no farming. However, he contends that this definition is narrow.

> But this in itself is not a sufficient delineation of Manitoba's North. Depending upon perspectives, it may also be defined, for example, with reference to economic pursuits, modes of communication and lifestyles.

The debate over northern versus southern location may seem academic; however, the issue is one of import when discussing the economy of a community, the daily lives of the people and the community's social conditions and environment. Classifying Fisher River as a northern reserve leads to overgeneralization with regard to 'northern Manitoba conditions'; conversely, if it is labelled as a southern reserve, some of the common circumstances which it shared with other northern communities could be overlooked.

Today Fisher River, in terms of its lifestyle and economy, is generally like other reserve communities in northern Manitoba. However, during the early period of its formation it was in many ways distinct from other northern Manitoba aboriginal communities. In terms of resources, all reports were unanimous in concluding that unlike reserves further north or on the east shore of Lake Winnipeg, Fisher River had an unusually fine land base. In his description of Fisher River, Rev. Semmens states:

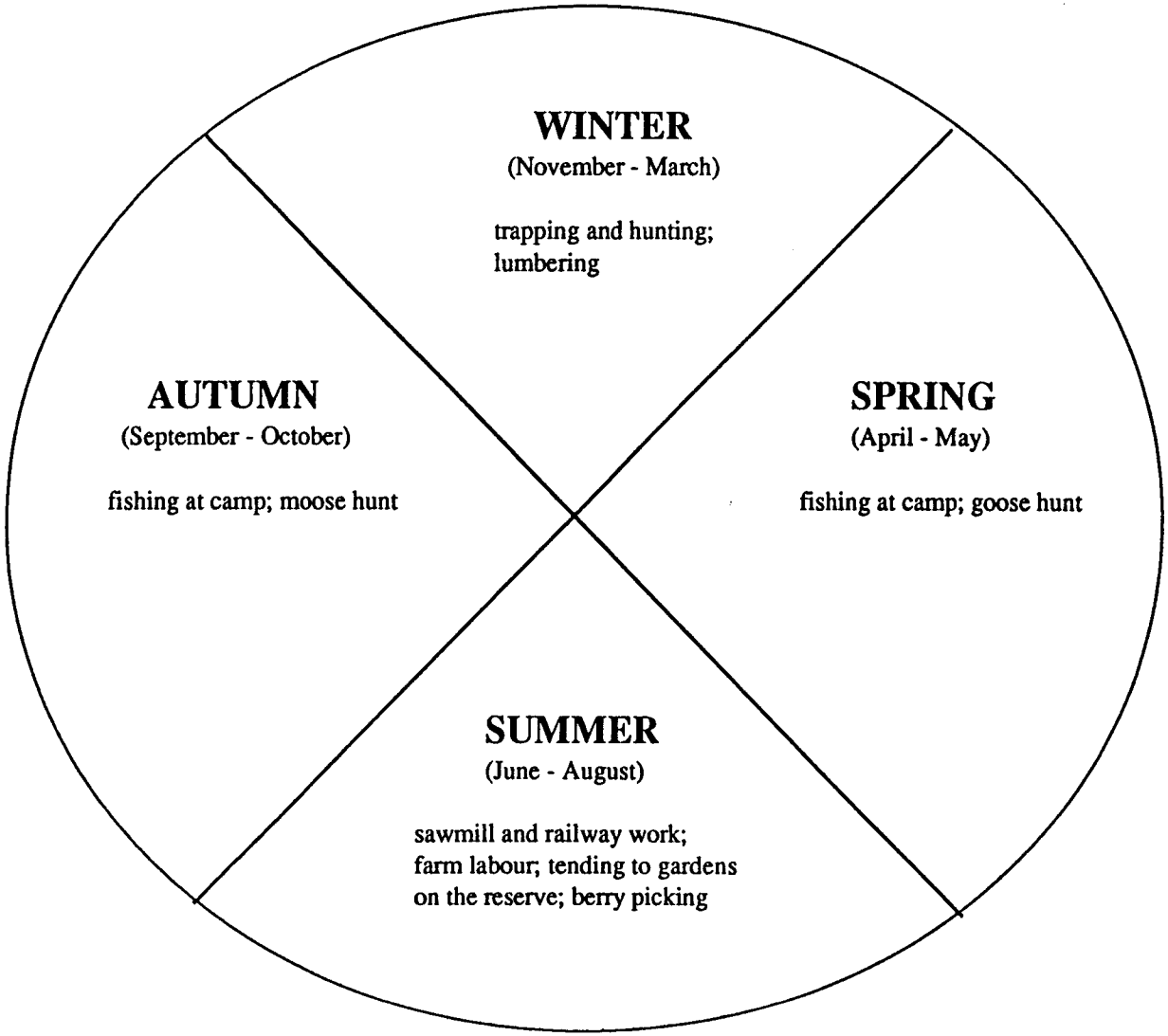
> The low and fertile banks are covered with a heavy growth of poplar trees.

> The soil is rich and easily cultivated. Natural hay meadows abound, some of which are seven hundred acres in extent. Deer and moose are found at no great distance. Fur is said to be plentiful in the immediate neighbourhood. Fish are obtainable both in the river itself and in the bay beyond where the supply is limitless. The climate is not unlike that of Red River and anything raised on the banks of the Assiniboine can in all probability be successfully produced on the banks of the Fisher river (PAM, MG12E1, p.4625).

This was echoed by Indian Agent S.J. Jackson, who said that the land was excellent, although when the water was high in the river, it flooded the lower part of the reserve (CSP, 1904, No.27, p.123). The favourable situation at Fisher River contrasted with the hardships faced by some other bands in the Lake Winnipeg region, such as the Sandy Lake people, who at the turn of the century were on the verge of starvation (UCCA, Frederick G. Stevens, n.d.).

Unlike many northern Manitoba communities, although fur-bearing animals were in plentiful supply in the Fisher River locale, trapping was never the main occupation of the Fisher River Indians (Figure 2.1). During my interview with Walter Murdoch, an 85 year old elder and long-time resident of Fisher River, he told me that he made his living as a trapper; however, he said that for most men in the community trapping was an unusual occupation. Although a Hudson's Bay trading post was erected at Fisher River in 1887, the Fisher River people were occupied with other economic pursuits. The post report of 1889 noted that the Indians appeared to be well off and many obtained employment in lumbering in the woods during the winter and at sawmills in the summer; very few devoted the whole winter to hunting (HBCA, B.279/e/1 mfim12255). Perhaps because of this, the post did not fare well and was closed between 1 June, 1892 and 31 May, 1893 (HBCA, A.74/2/fo.21). This was eventually the fate of all the interlake posts between 1900 and W.W.I; such marginal posts could not withstand the high operating costs and the low fur yields typical of the period (Tough 1990: 397).

Figure 2.1 Seasonal economic round for Fisher River community during the early twentieth century.



Beginning in the late nineteenth century the lumber industry constituted a major part of the northern Manitoba economy (Tough 1990) and Fisher River was no exception. The Fisher River Indians were renowned lumber-jacks, as stated by Captain William Robinson: "I have employed as lumber jacks, Swedes, French Canadians, Highland Scotch from Glengarry, all kinds, but the Fisher River Indians are the best I have ever employed" (UAC, Frederick G. Stevens, n.d.: 34). The 1901 Indian Affairs report listed lumber camps, fisheries, cutting cord-wood on steamboats and at saw-mills as occupations for the Fisher River Indians (CSP, 1901, No.27, p.111). Another report noted that twenty families moved to Snake Island, forty miles from the reserve (Called Matheson Island on Map 2.2), chopping wood for a Mr. Raymond, who supplied lake steamers with cord-wood (CSP, 1904, No.27, p.124). There was also a timber mill at Humbug bay, twenty-five miles from the reserve (ibid.).

Another important resource in the Fisher River region was fish. Fish had long been a significant component of the Lake Winnipeg people's diet. However, at the turn of the century, spurred on by the urban consumer demand from the South, the commercial fishing industry established itself in northern Manitoba. This was probably the most important source of wage labour for Fisher River people. Sawchuk and Herring (1990) note that from 1890-1919, 69% of the occupations listed for males in the Fisher River Methodist vital records were 'fishermen'. In my interview with Walter Murdoch, he recalled how most families at Fisher River went to fisheries during the spring and fall seasons at Snake Island and various other locations on Lake Winnipeg. At Snake Island the fishing company provided aboriginal fishermen with food and lodging, and in turn they gave the fish they caught to the company.

Another aspect of the Fisher River resource base economy that rendered it distinct from other northern reserves was the land base's potential for agriculture. However, the

actual quality of the land and the amount of agricultural production that took place during the early twentieth century at Fisher River is a somewhat enigmatic issue. This is because the opinions and statements made by government and church officials are sketchy and contradictory in nature.

Indians from Norway House and the surrounding Lake Winnipeg region ostensibly wished to settle on a new reserve further south in order to engage in agriculture and fishing. This was very much in keeping with the aims of the Canadian government at this time. In 1900 the Fisher River Band was deemed as the most "progressive[6]" band in the agency (CSP, 1900, No.14, p.104). Another report by Rev. Semmens in 1887 stated that the Fisher River Indians were very industrious with "cosy homes, comfortable and clean, and neat garden plots well-tilled and productive" (PAM, MG12E1, p.4637). However, it is clear from reports of the mission and government officials that agriculture did not blossom, as had been forecast in the 1870s and 1880s. Indian agent McKay reported that because of work in the lumber industry, the Fisher River people neglected their gardens (CSP, 1904, No.27, p.125). The Rev. Frederick Stevens of the Methodist Mission at Fisher River was even more negative about horticultural endeavours by Fisher River Indians. He writes: "Now up to 1907 some land had been cleared and spasmodic attempts at gardening had been made...When I went there in 1907 not a potatoe was to be had. Indians are not farmers" (UAC, Frederick G. Stevens, n.d.: 34). On the other hand, in 1910 Indian Agent C.C. Calverley reported that Fisher River was the only reserve in the agency where there was potential for agriculture and the people made use of it (CSP, 1910, No.27, p.101).

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[6] In the context of the Department of Indian Affairs, the term 'progressive' was defined as a way of life that emulated Euro-Canadian agricultural communities.

It is clear from the above reports that many of the opinions about agriculture at Fisher River were probably affected by expectations. For example, Rev. Stevens had established a 'model experimental farm' at Fisher River, anticipating that he would convince the aboriginal community of the benefits of farming. When agriculture did not flourish at Fisher River, he was probably bitterly disappointed. Conversely, Indian agent C.C. Calverley was most likely impressed with the vegetable gardens at Fisher River, compared to other reserves in the region, and in an effort to impress his superiors probably indulged in some hyperbole about the extent of agriculture at Fisher River.

The Indian Agents consistently noted and praised the large number of stock (cattle and horses) owned by the people on the reserve. James Crate Sr. and family were held as a laudable example, owning six horses, one bull, ten cows and thirty animals (CSP, 1904, No.27, p.125). Although this was an exceptional example, Mary Kirkness, an elder I interviewed at the Fisher River Personal Care Home, noted that most people at Fisher River had a cow or two. She remarked that there was always fresh milk to drink.

The fur trade and subsistence activities of subarctic Indians in previous centuries contrasts with the mixed wage labour activities of the Fisher River people of the early twentieth century. The annual economic round, in addition to the resource base and subsistence needs, was dictated by wage labour opportunities.

In some cases whole families would follow a round such as the one illustrated in Figure 2.1. For example, when I interviewed Mary Kirkness at Fisher River she told me that she was hardly in school when she was a little girl, because she spent much of the year in the bush with her parents. In other cases, it was just the husband who participated in the seasonal round. Walter Murdoch told me that he fished in the spring and fall and trapped in the

winter. His traplines were in close proximity to Fisher River, so he was able to go to his traplines alone for a day or two while his wife remained at home with their children.

The Aboriginal Economy of Northern Manitoba (1910-1940)

Friesen (1992: 46) notes that this period of the aboriginal economy in northern Canada was "marked by great fluctuations in fortune". After 1910, Indian Agent reports suggest a greater reliance on hunting at Fisher River than in previous years. From 1910 on, hunting and fishing were listed as the primary occupations of the Fisher River Indians. However, it is difficult to follow this trend because after 1912, reports for ten reserves were coalesced into a single Fisher River agency report. Nevertheless, this apparent increase in hunting coincides with the regional reappearance of moose in the 1900s noted by Bishop (1974: 91) for the Osnaburgh reserve in northwestern Ontario. Furthermore, after the turn of the century, there was an upturn in the price of fur on the world market, creating a favourable economic climate for fur trappers (Tough 1990: 394). Stevens describes this period for the North as a "boom":

> Live fox pups were being bought at very high prices. Many were being caught and sold. The Hudson's Bay Railway was under construction. Survey parties were working. Prospectors were seeking gold. All the Indians were earning high wages. Some Indians were lighting their pipes with one dollar bills. Gramophones and jam were everywhere (UAC, Frederick G. Stevens, n.d.: 44).

However, there were mounting troubles for subarctic Indians in terms of government attempts to control natural resources. One Indian Agent, commenting prophetically about Fisher River, reported that Fisher River had large lumber reserves, rendering it a very valuable asset in the near future (CSP, 1912, No.27, p.98). Not surprisingly, the Manitoba

government notified the Indians at Fisher River in 1912 that the government was laying claim to the resources on the reserve (UAC, Frederick G. Stevens, n.d.: 57). The Indian agent, Mr. Arnup, and the chief and councillors sent a petition to the government charging them with reneging on obligations made during treaty (ibid., 59).

A further bid for aboriginal resources transpired in 1912, when the province opened up the district just west of Fisher River and Peguis reserves to homesteads (CSP, 1912, No.27, p.98) for mostly Ukrainian settlers (UCCA, Frances G. Stevens, n.d.: 77). In 1914 Indian agent T.H. Carter remarked that "the rapidity with which the country to the west of Lake Winnipeg is being settled will soon deplete it of game of every kind." (CSP, 1914, No.27, p.88). However, according to succeeding Indian Affairs reports, this did not happen; hunting and fishing prospered at this time and no cases of destitution were reported at Fisher River.

At the beginning of W.W.I. there was a temporary crash in the fur trade prices (Tough 1990: 394). Indian Agent, John Bunn, remarked that for the year 1915 the Indians of Fisher River Agency did not get good prices for furs; however, he noted that they were encouraged to keep hunting (CSP, 1916, No. 27, p.55). The latter years of W.W.I. into the 1920s constituted another period of prosperity in northern Manitoba, as prices for fur and fish doubled; however, its effects were counterbalanced by a comparable increase in the cost of living (CSP, 1920, No.27, p.47).

During the 1920s and 1930s, white trappers encroached on many parts of the subarctic, creating a new source of competition for aboriginal trappers as well as contributing to the depletion of fur-bearing animals. Dr. Stone, reporting from Norway House, Manitoba in 1926 wrote that the decline in fur bearing animals was a serious problem for Ojibwa-Cree

Health, Disease and Health Care

Medical anthropologists and epidemiologists have long been cognizant of the fact that there is a significant connection between the socio-economic environment and health and disease. One of the most important links is that between nutrition and infectious disease, for if the immune system is weakened by malnutrition, the body is unable to defend itself against harmful viruses and bacteria.

For subarctic peoples in the 17th, 18th and 19th centuries hunger and lack of food were wedded with cyclic changes in the resource base. The early spring-summer and summer-fall were times of plenty when fish and waterfowl were in abundance. However, once temperatures fell by mid-October, the fish sought deeper water and the waterfowl migrated south for the winter. Although large game animals such as moose were hunted during the winter months, they were not a steady source of food. Thus, winter was a period of dearth with the menace of starvation ever present (Ray 1974: 31).

In the early twentieth century the threat of starvation was mitigated by alternative sources of food. Many families stored potatoes from their summer gardens in their cellars through the winter. Food could be bought at the local store using cash wages, and during difficult periods in the 1930s, aboriginal people received rations from the government consisting of sugar, beans and bacon. Nevertheless, winter remained a difficult season for subarctic peoples of the early twentieth century. Sources of wage labour such as commercial fishing were available during the warmer months of the year. Very little trapping or lumbering was done during the coldest months from Christmas until late March (Bishop 1974: 33). And even though starvation was perhaps a past phenomenon, the quality of diet was at times substandard.

A nutritional survey done at Norway House, Manitoba in 1942 concluded that the value of the aboriginal diet had declined in the past 40 years. The main cause of depreciation was cited by the authors as being due to the greater reliance on "store food" in the form of white flour, lard and sugar. Less food was obtained off the land in the form of small game, resulting in a decrease in protein intake (Moore et al. 1946). Much of this nutritional depreciation was connected with the economic competition for resources discussed earlier (pp. 18-20).

The early twentieth century has been characterized by Young (1988) as "the struggle for survival for subarctic Indians". Like the vacillating food supply, infectious disease came to aboriginal communities in epidemic waves. The CSP health reports for this period are filled with reports of epidemic diseases such as measles gripping aboriginal communities. Steamboat routes and eventually the railway provided continuous portals of entry for infectious diseases into Lake Winnipeg communities.

It must be noted, however, that not all families were located permanently in sedentary communities. Those who made frequent trips to the bush to engage in hunting and trapping probably escaped many epidemics that afflicted the more settled families on the reserve. This phenomenon was observed by medical officer Baird, who remarked in 1908 after his health inspection of the Lake Winnipeg region that those more removed from 'civilization' had a better state of health (RG10 V4009 F249462, p.3). Thus, it must be remembered that the ensuing discussion of aboriginal health is, for the most part, germane to those families who were living semi-permanently in reserve communities.

Along with inadequate nutrition, another aspect of the reserve environment that was considered to contribute to the ill health of aboriginal peoples was housing conditions. By the

turn of the century, Lake Winnipeg Indians dwelled in log cabins. Some Indian Agents were quite complimentary about Fisher River housing. One report claimed that the Fisher River buildings were superior to any other of the reserves on the lake, with many being divided into several rooms and neatly furnished (CSP 1906: 77). However, the medical officers were often very critical of the state of hygiene of the homes. They also recognized the disadvantages associated with sedentary living, to which they ironically encouraged aboriginal peoples aspire.

> All that the first remove from the wigwam, teepee or tent to the little one-storey log cabin or hut, with its roof and floor of mud, has to recommend it, is the fact that it forms the initial stage in that fixity of abode which is the first essential step towards civilization. In so far as concerns ventilation the change is distinctly disadvantageous and the superior cleanliness secured by more or less frequent change of site, over the accumulated filth of a stationary mud floor, is obvious (CSP 1910: xxiv).

It is difficult to gauge how inimical housing conditions were to the health of the people and how much of the Indian Agent's opinions were associated with the turn of the century obsession with fresh air as a cure for diseases such as tuberculosis (Sontag 1977). Nevertheless, crowding has been associated positively with the spread of airborne respiratory infections. One medical report compared crowding in one-roomed houses on reserves to a New York six-storey tenement (CSP 1912 284). Again, however, it is hard to distinguish between hyperbole and fact in these reports.

One of the most devastating maladies for aboriginal communities at this time was tuberculosis. During the 1920s and 1930s it was endemic in northern Manitoba. Dr. E. L. Stone (1925: 77) in his report on TB among Indians of the Norway House Agency noted: "It is rare to examine a chest that does not show obvious lesions in various states of activities." Stone calculated a death rate from TB of 18 per 1000 for the year 1923 at Norway House; he

estimated that it was twenty times higher than the comparable death rate for TB in Canada at that time (Stone 1926: 246). While there were no surveys of that kind done at Fisher River, the parish records for the years 1910 to 1940 indicate that it was the leading cause of death for the community. (See Chapter 5 for a discussion of cause of death data.) Moreover, the establishment of a sanatorium at Fisher River in 1940 (ADR, 1940, p.185) indicates that there was a serious TB problem among the people of the region.

It is important to note that tuberculosis was not only problematic because of its high mortality toll. As Stone (1926: 79) astutely observed, TB rendered many individuals susceptible to other more acute infectious diseases such broncho-pneumonia; as well, it weakened and inhibited those responsible for providing the food supply. Hence, infectious disease and unmet nutritional needs formed a vicious circle that was debilitating for many aboriginal families.

Despite serious epidemics of TB and other infectious diseases among aboriginal peoples, the Canadian government's response to tuberculosis and health care in general during the first four decades of the twentieth century was one of benevolent ambivalence. Hodgson (1982) contends that this "laissez-faire" policy was linked with a view of TB as "a kind of relentless process of nature, like an earthquake" (Stewart 1936 cited in Hodgson 1982: 503). This was rationalized using racial paradigms that attributed TB resistance and susceptibility to genetic factors (McCarthy 1912). In addition, Indians were ostensibly difficult to nurse, because according to some nurses, they would not leave home or stay in bed (Hodgson 1982: 505).

None of the Treaties, except the "medicine chest clause" in Treaty No. 6, had an inclusion in it concerning provision for Indian health care services by the federal government

(Young 1988: 82). Thus, for the first two decades of the century, the government's responsibilities for health care were left to private interests. Medications were provided by the government for each reserve and dispensed by the missionary, teacher or trader (UAC, Frederick G. Stevens, n.d.: 38). The Methodist minister at Fisher River, Rev. F.G. Stevens, was not a physician; however, he had what Walter Murdoch described as an 'apartment' at the back of the mission house, where he performed various medical services, including dispensing medicine and pulling teeth.

Through the 1920s and 30s, health care for indigenous people in Canada was chronically underfunded. In 1934 the per capita cost of health expenditures for aboriginal Canadians was $9.60, whereas the per capita cost for Euro-Canadians was $31.00 (Graham-Cumming 1967: 126). There were, however, some exceptions to this discrimination. In 1903 the federal government appointed Dr. P.H. Bryce as the first medical officer for the Department of Indian Affairs. Bryce was active in collecting vital statistics and touring residential schools to expose them as breeding grounds for infectious diseases, especially TB (Young 1988: 85-86). Bryce also initiated the mobile nurse program in the 1920s, which eventually evolved into the concept of the nursing station. The first nursing station in Canada was, in fact, built in Fisher River in 1930 (Young 1988: 87).

It was not until 1940, however, that the federal government began to systematically provide health care institutions for aboriginal peoples. This was marked by the construction of the Fisher River twenty bed hospital and sanatorium (ADR 1940, p.185).

It must be remembered that although there has never been a unified aboriginal 'health care system' per se, indigenous populations of North America have always had their own understanding of sickness and well-being. The northern Cree were reputed to be great

healers, employing both herbal remedies derived from a wide range of medicinal plants (Skinner 1912: 76-77) and traditional healing techniques such as the shaking tent ceremony and sweat lodges (Smith 1981: 262).

Healing, however, is an integral part of the spiritual belief system of the Cree (Young, Ingram and Swartz 1990), and as such, was frowned upon by the Christian missionaries. Medicine men were seen as the worst foes of Christianity, because they were usually very powerful and influential in their communities; hence, missionaries attempted to quell their power. One story told by Flora Kirkness (Fisher River Oral History Project 1991) illustrates the fear Fisher River people had of participating in indigenous cultural practices.

> One thing the people of Fisher River never had anything to do with drums. One time their neighbour "Lagot" and his wife Mary "Monjore" McKay bought a drum. One evening they heard the drumming and Joe Hart sent a a messenger down to the chief that there was a drum on the reserve. So next morning the chief Dan Cochrane and his councillors and also Jim Kirkness went to Lagot's for his drum and they burnt it in the lime kiln. They didn't want anything like that on the reserve, after what they had heard happened at Jackhead.

Nonetheless, many aboriginals at Fisher River continued to practice what was termed 'Indian medicine'. As Flora Kirkness commented, "everybody knew a little about Indian medicine; the people told each other what they knew". She also noted that "Mary McKay made her own medicine and was a real good doctor" (Fisher River Oral History Project 1991). Hence, while much of the traditional healing practices in the community were suppressed by the missionaries, the community members continued to seek advice and knowledge from Indian healers.

Childbirth and Infant Care

One very necessary and respected type of health practitioner among the aboriginal peoples was the midwife. Landes (1971: 129) wrote that the Ojibwa midwife needed special skills and knowledge regarding herbal medicine, female anatomy and physiology, massage techniques and resourcefulness. This occupation was not something that all women practised, and those who were highly esteemed were rewarded by being invited repeatedly to attend deliveries.

It is not clear whether midwifery was a long held tradition among the Cree. Van Kirk (1980: 19) cites comments from 18th century fur traders that suggest that it was not necessarily a common practice for Cree women.

> Concerned at the lack of help and attention which 'the sex' received in childbirth, Samuel Hearne endeavoured to explain to Indian women the benefits of the use of midwives as in Britain. He was met with the contemptuous response that such interference was probably the cause of humpbacks, bandy legs and other deformities which the Indians observed among their English visitors. James Isham, on the other hand, found Indian attitudes commendable. After observing how soon Cree women resumed their heavy work, he was prompted to suggest that Englishwomen were too often unnecessarily pampered.

Nevertheless, by the early twentieth century, there were many aboriginal midwives at Fisher River. These women were usually older, respected women in the community, who had borne many children of their own. One renowned midwife at Fisher River in the 1920s and 30s, Mrs. Sinclair, was reputed to have delivered 300 babies (Stattin 1985: 11).

Women undergoing childbirth, however, were not always accompanied by midwives and sometimes it was quite a hazardous experience. During my interview with Mary Kirkness, she recounted one such incident on Lake Winnipeg. While she and another woman, Annie Sinclair, were out on the lake, they heard a woman crying for help from a nearby

camp because she was about to go into labour. Mary and Annie asked one of the logging bosses to help the woman, but he replied that he was sick at the sight of a nose bleed. So Mary and Annie went to the woman, but by the time they had arrived the woman had already given birth. It was a cold day, so Mary found some blankets for the mother and baby. Mary said they saved the mother and baby's lives, because they would have perished out on the lake alone.

When the hospital at Fisher River was built in 1940, the process of childbirth was medicalized and became the responsibility of federal health care agents, rather than the women in the community. Women no longer bore their children at home attended by a midwife, but were taken to the hospital to be cared for by a nurse or doctor. Mary Kirkness bore ten children; two of them were born at home and the rest were delivered at the hospital. She delivered her first baby in the hospital in 1945. Mary commented that it was easier to have children at home than in the hospital. She also remarked that they don't let women have their babies at home any more.

Unfortunately, there is less material regarding infant care practices among subarctic Indians in the early twentieth century than childbirth. The standard practice for infant feeding was nursing from the breast. As one Cree elder stated "in the old days you simply breastfed your children" (Bear 1992: 215). The duration of lactation, however, is unknown. In the 18th century Cree women were observed by fur traders to breast feed their infants for several years, until they were able to eat solid food (Van Kirk 1980: 20). It is doubtful, however, that breast feeding was as prolonged, considering that fertility was very high for aboriginal women in the twentieth century and birth intervals very short (Romaniuk and Piche 1969).

There is some evidence, moreover, that artificial feeding practices existed in some

aboriginal communities in Canada. In 1914, Dr. Peter H. Bryce, chief medical officer for the Department of Indian Affairs, reported that much of the excessive infant mortality among aboriginal was often related to artificial feeding and that mothers should be encouraged to nurse their children (CSP 1914: 302). Nonetheless, I assume that the majority of mothers at Fisher River in the early part of the twentieth century breast fed their infants. This topic will be discussed further in Chapter Five.

Another infant care custom consisted of swaddling a baby in a moss bag (Bear 1992: 223). Prior to the twentieth century, the baby was fastened in his or her moss bag to a cradle board and carried on the mother's back (Van Kirk 1980:22). The cradle board, however, was no longer prevalent in most Lake Winnipeg communities by the twentieth century (Dunning 1959).

Infant care, however, was just one of many occupations in which Cree women engaged. Women were an integral part of the aboriginal economy, as they tanned hides, fabricated moccasins and snow shoes, and provisioned and prepared food, among other duties (Van Kirk 1980). Mary Kirkness, during her interview with me, best expressed the hard work involved in her life when she stated that she had ten children and no washing machine. She described how she was responsible for cutting the daily supply of firewood, scrubbing the floors of the log house with lime and maintaining the household when her husband was away at the logging camp for extended periods of time. Thus, even if a woman was married, if her husband was absent from home engaged in trapping or wage labour, she was the sole provider and caregiver.

Conclusion

The period during which this study is set was one of economic turbulence for Fisher River as well as the whole aboriginal economy in Manitoba. Fisher River was in some ways more fortunate than other reserve communities because of its close proximity to wage labour opportunities. Nevertheless, the reserve was also the focus of intense competition among the government, European settlers and aboriginal peoples for resources such as fish, lumber and furs.

The health conditions in aboriginal communities during this period reflected their economic privations. Epidemic disease was rife, especially tuberculosis, and food at times was of low nutritional quality. Although during the 1930s there were some incipient provisions for health care in the form of mission medicine chests, nurses and small hospitals, medical care in aboriginal communities during most of the early twentieth century was negligible.

One would expect, based on what is known about health conditions during this period and estimates of national aboriginal IMRs ranging between 125 and 220 infant deaths/1000 live births (Latulippe-Sakamoto 1971), that infant mortality was of a high order at Fisher River. The remainder of this thesis tests this hypothesis and investigates some of the parameters and determinants of the phenomenon.

CHAPTER III

Materials

This chapter presents and evaluates the materials employed in this thesis. Because of the role of the Methodist Church at Fisher River in recording the community's vital events, the chapter begins with a brief history of the mission and its position in the community. It is followed by a description and general evaluation of the quality of the Fisher River parish record data.

The Methodist Mission at Fisher River

The British Wesleyans began missionary work in the Hudson's Bay Territory in 1840. On the invitation of Donald Ross, the Hudson's Bay factor, Rev. James Evans established a Methodist mission at Norway House, Manitoba (Swinton-Stephenson 1925: 84). It was during this time that Evans perfected his Cree syllabic system in order to provide translations of the Scriptures for the Cree (ibid.).

As mentioned in Chapter Two (p. 6), Fisher River was founded in 1876 by Cree Indians from Norway House, who were considered to be Christians. Thus, it was not long after settlement that the Methodist Church was established at Fisher River (Figure 3.1). In 1880 a school room was built and the following year a mission was erected (UAC, Church History File).

On July 2, 1894 Rev. Egerton R. Steinhauer, the son of the famous Ojibwa missionary Henry Steinhauer, and Frederick G. Stevens arrived at Fisher River. Rev.

Fig. 3.1 Departing Congregation Sunday Morning, Fisher River 1911 (From the Museum of Man, Manitoba, Samuel Gaudin Collection).

Steinhauer was to serve as minister and Stevens as school teacher (UAC, Frederick G. Stevens, n.d.: 2-3). Stevens was stationed at Oxford House in 1896 (ibid., p.5) before returning to Fisher River in 1907, replacing Steinhauer at the mission (ibid., p.33). Stevens' tenure at Fisher River lasted 33 years (See Figure 3.2). He lived at Fisher River in the mission house with his wife, Frances Stevens, and raised his six children there (Stevens 1985). During those 33 years he was the minister of the Methodist Church, which later became the United Church, after its formation in the late 1920s. The Stevens Memorial United Church exists today at Fisher River.

Stevens worked hard at his duties and was well respected by many community members. He wrote and delivered his sermons in Cree, which he had mastered quite early on in his career. When asked about Rev. Stevens, Walter Murdoch, an elder I interviewed at the Fisher River Personal Care Home, noted that Stevens was a good man and praised him for having spoken Cree. Moreover, according to Mrs. Stevens, he tended to the ill in a tireless fashion.

> My husband was on call night and day. Tooth extraction was a daily occurrence and people came miles. After many years he was allowed to use local anaesthesia and in his jocular mood would refer to himself as "Stevens, the painless dentist" (UAC, Frances G. Stevens, n.d.: 78).

Mrs. Stevens' description of Rev. Stevens' devotion to caring was corroborated by Flora Kirkness, who described how Stevens used to make visits around the community, and always visited those who were sick (Fisher River Oral History Project, 1991). Thus, in many ways it appears that Stevens was a dedicated minister who was very involved in the community. This, of course, bodes well for the quality of the vital registration data used in this study.

However, it seems that Stevens occupied much of his time outside of Fisher River.

Fig. 3.2 Photograph of Rev. F.G. Stevens at Fisher River (From the Museum of Man, Manitoba, Samuel Gaudin Collection).

He saw himself as responsible for converting and supporting the fledgling Christian movements in neighbouring reserves that did not have resident missionaries. Like many of the missionaries before him, he enjoyed the adventures of canoeing and camping, and holding prayer meetings in the war against indigenous religion (UCCA, Frederick G. Stevens, n.d.). So, in addition to going to the annual Methodist Conference in the south every summer, he was often at Berens River, Sandy Lake, and Deer Lake, among other locations (UAC, Frederick G. Stevens, n.d.). His periods of absence from the community suggest that the vital registration data may not be complete; however, this point will be discussed more thoroughly in the evaluation section of this chapter (pp.50-51).

There is no doubt that the Methodist mission influenced the daily lives of the community members. Although the Methodist Church missionaries had their own unique attitudes and opinions regarding the Indians, there was a common theme in their writings about aboriginal people.

> When the Missionaries contrasted their civilization with that of the Indians, they saw the development clearly as one of progress. The commitment to an ideal of progress compelled the missionaries to view the Indian as historically anterior and culturally and morally inferior (Carter 1984: 32).

Stevens' attitude was no different and he made every attempt to mould the Fisher River community into a stationary, agricultural and 'civilized' Christian community. When he arrived in 1907, he was critical of the Indians' attempts at agriculture and established a model "experimental" farm (Figure 3.3) (UAC, Frederick G. Stevens: 35). He delivered sermons about the virtues of gardening, in order to encourage farming in the community (ibid., 36). And he established a program with the Women's Missionary Society to send used clothing to the reserve in exchange for which the Indians were expected to labour on the

Fig. 3.3 Hennery - Growing Breeding Stock for the Indians, Fisher River 1911 (From the Museum of Man, Manitoba, Samuel Gaudin Collection).

mission property (ibid., p.34).

Despite the Stevens family's rather prominent position in the Fisher River community, it is difficult to determine the degree of commitment that the Fisher River people had to the Methodist Church. Reports from two missionaries, the Reverends Semmens and Ross, who were present at the inception of the Fisher River mission, stressed the Fisher River Indians' devotion to Christianity. In his plea in 1890 for an ordained minister at Fisher River, Rev. Semmens glowingly described the Fisher River Indians:

> In every house are found copies of the Holy Bible; and every man can read in his own tongue the wonderful works of God. Every rising sun is greeted with songs of thanksgiving, and every night-fall is hallowed with psalms of praise... (PAM, MG12E1, pp.4637-4638).

As well, the census in 1900, prepared by the Department of Indian Affairs, stated that all 339 Fisher River Indians were Methodists (CSP, No.14, p.490) and were "devotedly attached to the tenets of their church" (ibid., p.103). This contrasts with some other reserves in the Treaty No.5 region that had approximately one-half or more of the Indians listed as "pagans" (ibid., p.490). However, it is important to remember that these reports were mostly inspired by a need for Indian agents and missionaries to impress their superiors with the progress being made among the Indians. This need was even more transparent for the Reverends Semmens and Ross, who desired Methodists in the south to support the Fisher River mission and to appoint a missionary.

Nevertheless, the Fisher River Indians were identified as Christians, not only by government and church officials, but also by neighbouring aboriginal peoples. This is illustrated by Matthew Kirkness (Fisher River Oral History Project, 1991) in his account of his father's experience with a medicine man and the shaking tent ceremony at Jackhead

reserve (See Figure 2.1).

> All of a sudden the tent starting (*sic*) shaking and moaning. It was the poles making the moaning sound, because the medicine was so powerful. At first try the medicine man said it didn't work; he asked if there were any Christians there. People said "yes, they were the people from Fisher River". He then asked if anyone had a bible. Matthew's father said he had one. He thought the medicine man was going to use it, but the medicine man said he would have to leave because his medicine didn't work when he was there with his bible.

The claim that the Fisher River people were Christians, however, should not necessarily be equated with undivided loyalty to the Methodist Church. Stevens' description of the Fisher River people contrasts dramatically with the reports of his predecessors. While serving as school teacher at Fisher River in the 1890s he stated: "The men were in almost open rebellion against the Church and the Indian Department. A movement was on foot - Fisher River Indians for Indians only - missionary, teacher, trader - all Indians - no whites allowed" (UAC, Frederick G. Stevens, n.d.: 3). In 1907, on the day of Stevens' arrival at Fisher River, he recounted how Rev. Steinhauer and Mrs. Steinhauer were in tears because of the ill-treatment they felt had been given to them by the Fisher River community (ibid., p.33). Stevens relates stories of how soon after his arrival the Fisher River chief told him that he and his people would not farm because that is what Stevens wished of them (ibid., p.36).

Further trouble began in 1912 when, according to Stevens, the Indian Agent told the Indians that Stevens was colluding with the government to stop them from hunting on the reserve, so that they would become farmers. The chief, councillors and the Indian Agent tried to have Stevens removed from Fisher River (ibid., p.57). Stevens' conduct was eventually investigated by authorities in the Methodist Church; however, he was not reprimanded, nor was he removed from his post. It is possible that this event was

precipitated by a political dispute between the Indian agent and Stevens. Nevertheless, it is clear that there were community members, influential ones at that, who formed a faction against Stevens and the Methodist Church.

Dissension within the Methodist Church was manifested by allegiance to competing religions. After 1914 the Indian Affairs censuses began to list a little under one-half of the Fisher River Indians in the category of "Other Christian Beliefs" (CSP, 1915, No.27, p.16). The main contender was the Apostolic Faith, commonly known as the 'Shakers' (ibid., p.38). Stevens perceived the 'Shakers' as a threat to the Methodist Church, and reported to the Department of Indian Affairs alleged cases of child neglect and deaths due to the "religious mania". As well, Stevens claimed that Fisher River Pentecostals no longer cultivated their soil, because they were told by the 'Shakers' that they did not have to work (NAC, RG10, Vol. 3941, File 121, 698-23).

Stevens' criticism of the 'Shakers' was not appreciated by some community members. A letter written in 1919 by the Indian Agent, T.H. Carter, stated that Chief Joseph Everett and councillors David Rundle and Daniel Cochrane laid complaints against Rev. Stevens. Stevens' behaviour was described by Carter as "dogmatic interference". According to Carter, Stevens had thrown one of the members of the congregation out of the church because the member had held prayer meetings in his home (NAC, RG10 File 4136-214, Vol. 6610). These prayer meetings, although not specifically named in the letter, were probably Pentecostal prayer meetings. The Pentecostal Faith did not have a chapel at Fisher River until 1940, and thus held services in the homes of community members (Flora Kirkness, Fisher River Oral History Interview 1991).

Despite the threat of the Pentecostal Church, Stevens viewed 1916 as a highwater

mark in his career at Fisher River. "Our Church was full. We contemplated an extension" (UAC, Frederick G. Stevens, n.d.: 54). And he was commended by the Church superiors for saving the Fisher River Church from the Pentecostals (ibid., p.61). Moreover, Stevens mentioned men like "Charles Oig, George McNabb, Geordie Koostatak, Robert Sinclair, another Robert Sinclair, and others who with godly women helped to keep things steady" (ibid., p.40).

The Methodist Church maintained a high profile at Fisher River and was an integral part of the community. In 1915 a new large school house was erected by the Indian Department, but was still managed by the Methodist Church (ibid., p.53). In 1931 Mrs. Stevens formed a Women's Auxiliary at Fisher River, which organized the erection of a community hall on the reserve for meetings, dances and dinners. Although the Pentecostal Faith was a strong presence on the reserve, the Methodist Church was still the place where community members went to solemnize their baptisms, weddings and burials (Figure 3.4). The only cemetery on the reserve (Figure 3.5) was located on the Methodist mission grounds (pers. comm., Sandra Murdock, July 1992).

In summary, the Methodist Church was an institution of importance in the lives of many of the Fisher River community members. Fisher River Indians were identified by others and by themselves as Christians and took part in the rituals of the Church. Rev. Stevens and his family were a longstanding and socially integral part of the community. Thus, Stevens most likely had a good rapport and familiarity with his congregation.

Nevertheless, there were some Fisher River people who were adamantly opposed to Stevens' role in the community. This was most likely due to friction between the Methodists and the Pentecostals. Thus, some community members did not consistently register their vital

Fig. 3.4 Fisher River Wedding Picture. (Donated to the Fisher River History Project by Grenville Crate).

Fig. 3.5 The only graveyard at Fisher River, shown here with a small chapel in the center, was located on the Methodist mission grounds (PAM, Rupert's Land Coll. 74).

events with the Methodist Church, while another core of people supported Stevens and participated in the rites of the Church. The latter are the focus of this study.

Materials and Evaluation of the Data

The clergymen at Fisher River Methodist Church maintained vital registration records in the parish from 1888 to 1988. However, only the marriage entries cover this entire period; the baptismal and burial entries terminate in 1961 and 1979 respectively. The best period of registration occurred between June 1907 and December 1939, because the records are continuous and there are no gaps. As Eversley (1966: 56) points out, "continuity and homogeneity of data are more important than very long runs". The period from June, 1907 to December, 1939 also coincides with Frederick G. Stevens' tenure as Methodist minister at Fisher River.[7] Of all the clergymen at the Methodist mission, Stevens had the longest tenure and hence vital registration during his stay can be considered to be quite homogeneous.

Unlike civil registration in a modern developed country where institutions such as citizenship, marriage and the health care system oblige most people to register vital events, parish registration is contingent on the commitment of the parishioners and the diligence of the parish minister. Thus, there are differing degrees of completeness for parish records.

Flinn (1981: 9) points out that an evaluation of the quality of the parish records is not carried out by all researchers; this inevitably undermines the credibility of the study, as missing vital events will ultimately skew means and rates. The researcher must determine whether underreporting is systematic (e.g. certain families in the parish never record vital

[7] Stevens arrived at Fisher River in June 1907 and retired in 1940. He died at the age of 79 in 1946.

events) or haphazard (e.g. some of the children in a family are baptized and others are not). In many cases if the data are evaluated and deemed to be of very poor quality, they are discarded; in other cases compensations are made.

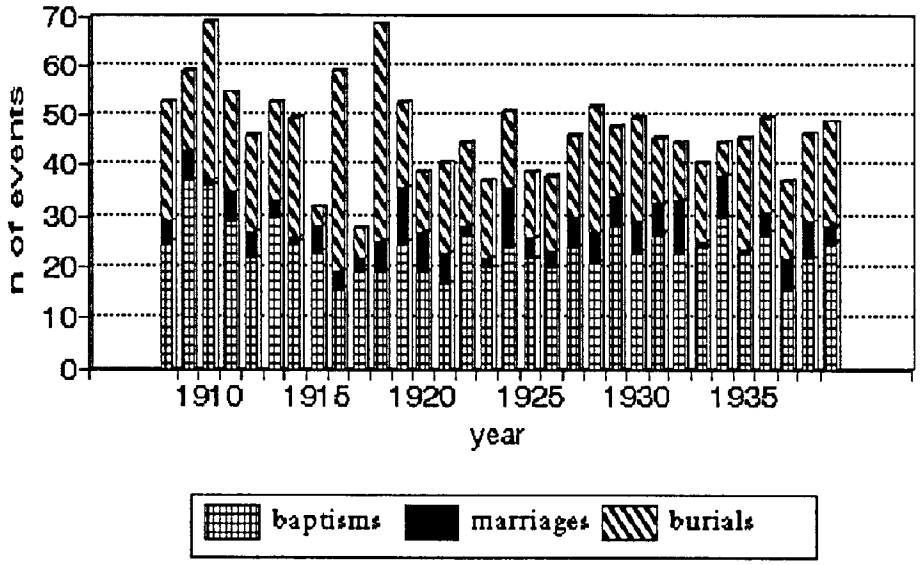
Some of the more notable causes of under-registration are: divisiveness in the parish and the presence of competing denominations (Drake 1974: 59); families who vacillate between two churches in the registration of their vital events (Levine 1976: 110); long intervals between birth and baptism resulting in infant death before baptism (Wrigley 1977); difficulty in reaching the parish church to register vital events, especially prevalent in "frontier societies" where transportation was often limited (Willigan and Lynch 1982: 62); and finally, either a lax attitude on the part of the incumbent responsible for registration of events, or disruption in registration due to a lack of continuity of ministers presiding in the parish (Drake 1974).

Drake (1974) has developed a protocol for systematically evaluating the extent of underreporting in parish data. In a series of tests he prompts the researcher to critically evaluate what vital events have and have <u>not</u> been registered in the community. The procedure to assess the quality of the Fisher River parish records, following Drake, is as follows: establish the mean number of entries per year; scrutinize the yearly entries for suspiciously long gaps; determine the extent of nonconformists in the parish; assess the reliability of the clergyman in recording events; determine whether the whole community's vital events are being registered; and finally, assess the quality of the information on individual records.

1. Establish the Mean Number of Entries per Year

As seen from Figure 3.6 and Appendix 1, the maximum total of entries per year over the study period is 69.

Fig. 3.6 Number of Vital Events
Fisher River Methodists: 1908-1939



The average number of entries per year is 47.7 (± 9.07,ranging from 28 to 69). This falls far short of Drake's (1974: 49) recommendation that the register have a mean of at least one hundred total entries per year. Although 100 is an arbitrary choice, Drake (1974: 49) argues that below this count it is difficult to determine whether the lower than average vital event counts are due to underreporting or "lack of business". Eversley (1966: 57) states that no register is worth using where the average annual number of events is less than approximately

15 to 20. However, it is clear from annual census data (Table 3.1) that the Fisher River Methodist population was quite small. Thus, the relatively low number of entries is quite appropriate for the size of a community like Fisher River, where the total population never exceeded 543 during the study period.[8]

Table 3.1 Fisher River Population: 1907-1934[1]

Year[2]	Total Population	Metho-dists	Catho-lics	Other Christian Beliefs
1907	411	411	-	-
1908	411	411	-	-
1909	420	420	-	-

1911	444	444	-	-
1912	455	455	-	-
1913	472	472	-	-
1914	472	472	-	-
1915	478	280	-	198
1916	510	290	-	220
1917	493	284	-	209
1918	501	290	-	211

1929	529	449	4	76

1934	543	475	8	60

[1] From the Government of Canada Sessional Papers, Indian Affairs Reports.
[2] Census data are unavailable for Fisher River for the years 1910, 1919 to 1928 and 1930 to 1933.

[8] It is possible that the population actually living at Fisher River was even smaller than noted in the censuses. Federal censuses list individuals who appear on band lists, meaning that people are assigned to a particular band; they remain on that band list until or unless they officially request to be transferred to another band, possibly because of marriage into a different community (Hurlich 1983: 182).

2. Determine whether the whole community's vital events are being registered.

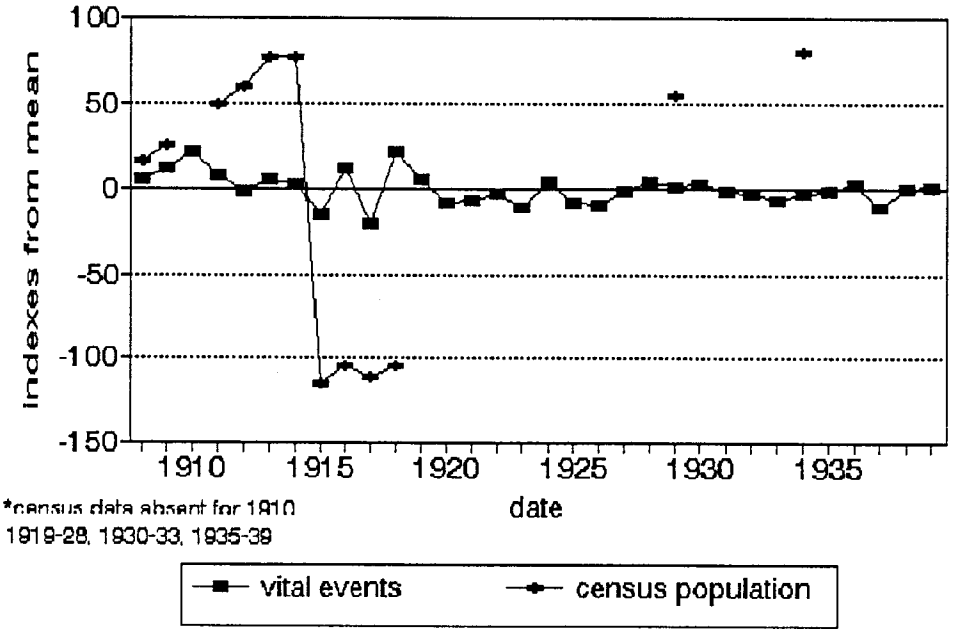
It is clear from Table 3.1 that there was a change in the religious profile of the Fisher River community after 1914 because of the establishment of the Pentecostal Church. According to the federal census, all Fisher River residents were Methodists until 1915 when the Methodist congregation decreased by a little under 50 per cent. To determine the effect that this might have had on Methodist Mission vital registration, Figure 3.7 plots census data from Table 3.1 against the vital events for the same period. The yearly count for the census population and the parish record total of vital events is subtracted from their respective averages (395.2 and 47.4) for the entire period in order to derive indexes from the mean for each count.

The parish register vital event indexes show consistent and quite small degrees of fluctuation around their mean of 47.4 events for the entire period. Significantly, they do not decrease dramatically in 1915, the year that the Methodist population apparently plummeted to a nadir because of the introduction of the Pentecostal Church at Fisher River (Figure 3.7). It seems, then, that the advent of the Pentecostal Church had little impact on the average number and frequency of vital events being registered at the Methodist mission.

This observation was in fact confirmed by Flora Kirkness, who stated that the Pentecostal chapel was not built at Fisher River until 1940 (Fisher River Oral History Project, 1991). Thus, if family members wished to have vital events sanctified in the Church, they were conducted at the Methodist Church. Flora Kirkness is a member of the Pentecostal faith; however, her first two children were baptized in the Methodist Church, and after 1940, her subsequent children were baptized at the Pentecostal Church. Moreover, as Sandra Murdoch and Theresa Mallette of the Fisher River History Project explained, there was and

Fig. 3.7 Census Data* vs. Vital Events

Fisher River Methodists: 1908-1939



still is only one cemetery on the Fisher River reserve, which is located on the Methodist mission property. Hence, people of all denominations were buried and recorded by the Methodist Church. In other words, although the arrival of the Pentecostal Church in 1915 may have precipitated a spiritual break with the Methodist congregation for some, many families continued to sanctify and record vital events at the Methodist Church until the 1940s.

3. Scrutinize the entries for suspiciously long gaps.

Drake (1974: 54) recommends that for registers with a mean total of 100 entries per year, monthly gaps extending over two to three months should not occur for more than 10% of the total registration years. I scrutinized the baptismal and burial records for gaps, as these

events occurred more frequently than marriages. Since the Fisher River register has only an average of 48 entries per year, I decided to note gaps between June 1907 and December 1939 that were greater than three months.

Analysis of the burial records revealed two years with gaps in registration extending over more than three months: June to November, 1915 and August to November, 1925. For the baptismal records there is a gap from May to August 1914. Thus, out of 33 years, there are only three years with suspiciously long gaps in burial or baptismal registration. That amounts to 9.1% of the registration time, and just slightly less than Drake's 10% mark.

Because these gaps in the burials do not coincide with gaps in the baptismal registers, it is quite possible that the gaps are due to "lack of business" and not underregistration. For example, people may have forestalled having their infants baptized until late fall after summer wage labour, fishing and agricultural pursuits had subsided.

However, there is also the possibility that these gaps do mark underreporting. The long break in the baptismal records from May to August, 1914 synchronizes with a two-month gap (May and June) in the baptismal records. Summer was the time that Rev. Stevens made his annual trip to the Methodist Conference in southern Manitoba, so it is possible that if he did not make arrangements to have someone else officiate and register baptisms and burials, some events could have been omitted. There is also the possibility that some Fisher River families could not get to the Church to register their births and deaths. Although most of the community members lived in close proximity to the Church, they may have been in the bush or at a fishing camp, too far away to register events which could have been registered in another Church or not at all.

Drake (1974: 54) discusses the use of interpolation for suspiciously long gaps.

Interpolation involves calculating monthly averages for the period under study and using those averages as the number of entries to fill in the gaps. However, as the yearly mean number of entries at Fisher River is low to begin with, and the gaps are not systematic (e.g., gaps do not occur in the register every summer), interpolation techniques are not used in this study.

4. Assess the reliability of the clergyman recording events.

> For the clergyman... keeping a parish register may have been like keeping a diary. He remembered to write the event down at once perhaps 80 per cent of the time; sometimes he forgot and never wrote it up afterwards. There was no proper check on him, and his level of enthusiasm must have been high to collect as much information as he normally did. Keeping a register in vacuo, so to speak, can have been no labour of love for many of the clergy (Hollingsworth 1968: 423).

In choosing a registration period that corresponds to one minister's tenure at Fisher River, the problem of evaluating several different recorders' capacities is eliminated. That does not mean, however, that Stevens' interest or abilities were consistent throughout the 33 year stretch of registration. Nevertheless, the fact that there are no wide gaps in registration during the period of his tenure at Fisher River indicates his steadfast obligation and ability to record vital events.

Stevens, nevertheless, spent time away from Fisher River at neighbouring reserves. He did, however, take some precautions while he was away to have substitutes maintain vital events registration. In his unpublished autobiography Stevens notes in 1919 that after returning from his trip to the east side of Lake Winnipeg, E.J. Staley (perhaps an assistant?) was in charge and awaiting his return (F.G. Stevens, n.d., p.60). This is borne out by the parish records. E.J. Staley entered three burials and one baptism in the register during 1919.

As well, there were a variety of other people, including Stevens' wife and son, who entered vital registration information, mostly burials, throughout the years. Thirty-two burials out of 590 (5.4%) were registered by others, compared to eight baptisms out of 767 (1.0%) and two marriages out of 167 (1.2%). This is probably because baptisms and marriages could be delayed until Stevens' return whereas there was a more pressing need to perform a burial soon after a person died.

5. Assess the quality of the information on individual records.

Assessing the quality of the parish record data encompasses not only the degree of underreporting but the information contained within each record. Each vital event has key ancillary information, the completeness of which indicates the quality of registration.

A short description of the type of information contained in each vital event record follows. The marriage records for 1908 to 1939 include: the names of the bridegroom and bride; their ages, marriage statuses and residences when married; their places of birth and religious denominations; their parents' names, including their mothers' maiden names; the names of the witnesses; the place and date of marriage; and the officiating minister. The baptismal records include: birth date, birth place, and name of the child; names of the parents and their place of residence; the baptismal date and place; and the officiating minister. The burial records include: name and surname of the deceased; date and place of death; sex, age, and place of birth of the deceased; cause of death; name of physician, if any; date of funeral and officiating clergyman.

In order to do a general assessment of the quality of individual records, each series of vital registration data between 1907 and 1939 was checked for the proportion of records

containing ancillary information (Table 3.2). For example, although baptismal dates are often used as a proxy for birth dates in many parish record studies, it is very helpful in an analysis of infant mortality to have the birth date in addition to the baptismal date. In the marriage records, the bride's age is useful when her birth date is unavailable. And finally, for burial registration the age and/or the birth date of the deceased is necessary for aggregate analysis of infant mortality, in order to ascertain whether the death is an infant death. The results of these tests are presented in Table 3.2.

Table 3.2 Quality of Ancillary Information for Parish Record Data. Fisher River: 1907-1939

event	ancillary information	n of records with data	total n of records	per cent of total
baptism	birth date	748	772	96.9
marriage	bride's age	164	167	98.0
burial	age/birth date or both	581	595	97.7

It is clear from Table 3.2 that the quality of the ancillary information contained in the records is excellent, with 97 to 98% of all records listing it.

Conclusion

In conclusion, although the Fisher River Methodist parish registers for 1907 to 1939 are not perfect, they definitely have merit and meet, by and large, Drake's (1974) criteria for quality. Specifically, most of the Fisher River community is included in the vital registration

data from 1907 to 1939, despite religious dissenters. The burial and baptismal registration data are homogeneous and methodical and have only three gaps which extend for more than three months. And finally, over 90% of the baptism and burial, marriage and burial records contain complete information. These qualities are all crucial for the success of the ensuing analysis of infant mortality at Fisher River.

CHAPTER IV

Methods

This chapter describes the qualitative and quantitative methods employed in this study. The qualitative work was conducted during field trips to Manitoba and consisted of archival research and oral history interviews with members of the Fisher River community.

The quantitative analysis was of two types: aggregate and family reconstitution methodologies. The former focused on the whole community as the unit of study, the latter on the nuclear family. Each quantitative method had its advantages and disadvantages. However, the two methods used in tandem in this study yielded a thorough investigation of infant mortality at Fisher River by complementing one other.

Qualitative Methods

Two fieldwork trips were made to Manitoba in the summers of 1991 and 1992 to collect qualitative material for this study. Extensive research was done at the Provincial Archives of Manitoba and the Hudson's Bay Company Archives in Winnipeg in order to obtain historical documents pertaining to Fisher River. In addition to working with archival documents, I interviewed Raymond Beaumont, an historical researcher for Manitoba Frontier School Division, because of his knowledge of the genealogical histories of aboriginal families in the Lake Winnipeg region. Using this interview, I attempted to verify and gain insight into the history of the reconstituted families in my study sample.

In July 1992 I visited the Fisher River reserve and met with Charles Hudson, Theresa Mallette and Sandra Murdock, community members who are working on the Fisher River

History Project. They kindly gave me copies of oral history interviews, which they had conducted in the summer of 1991, and historical photographs collected from community members. During the visit I interviewed two community members, Mary Kirkness and Walter Murdoch, residents at the Fisher River personal care home.

All of the data gathered during these fieldwork trips were indispensable in providing me with a profile of the Fisher River community during the early twentieth century. They aided me, moreover, in my interpretation of the quantitative results.

Aggregate Data Analysis

In most cases, parish records unaccompanied by civil censuses cannot be used to derive rates, as there is no way of determining the population at risk to make these calculations.[9] Nevertheless, aggregate vital registration data from parish records can be used to investigate temporal fluctuations in burial, baptismal and marriage events. Such fluctuations often coincide with seasons, epidemics and crop failures. Moreover, other types of data such as age at marriage, migration patterns, and illegitimacy, can be ascertained from aggregate records.

One of the main virtues of the aggregate technique, compared to family reconstitution, is that less information is wasted. With family reconstitution, a death is not used in an analysis if it cannot be attached to a family unit, whereas with the aggregate technique, almost all events are used. It is often necessary to employ the aggregate method for analysing parish

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[9] Two techniques called "inverse" and "backward projection" used with aggregate data are employed to yield vital rates. They are beyond the scope of this discussion, but the reader is referred to Lee (1974) and Wrigley and Schofield (1981) for detailed explanations of the methods.

registers in communities where the people are geographically mobile, as a large proportion of events cannot be linked to families (Eversley 1966: 45).

Unlike other age-specific mortality rates, the infant mortality rate lends itself well to aggregate methods, because the number of baptisms for a defined period (a year, a decade etc.) can be used as the population at risk (Wrigley 1977: 293 and Trapp et al. 1983: 134). The calculation used in this case is that of the standard infant mortality rate:

$$\text{IMR} = \frac{\text{n of infant deaths}}{\text{n of live births}} \times 1000$$

The data used for the numerator and the denominator of the rate are unconnected individuals. Thus, if an IMR is calculated for a decade, there are infant deaths and births in the first and last years of the period under study whose births and deaths took place before and after the beginning of the decade, and which are therefore not counted (Eversley 1966: 76).

A limitation of aggregate analysis for calculating IMRs is the difficulty in detecting inconsistent reporting of baptisms and infant burials. If one or the other or both sets of registration are underrepresented by different proportions, the infant mortality rate will be distorted, either inflated or deflated. There are, however, ways of evaluating the aggregate data in order to determine underregistration. These have been put to test by Wrigley (1977) and Jones (1976) on the Anglican registers in England, and are discussed below in terms of the Fisher River data.

Aggregate Analysis of Infant Mortality and the Fisher River Data

The parish record data for this thesis were collected by Dr. Ann Herring in 1990 from the United Church of Canada Archives in Winnipeg, Manitoba. The original, hand-written

registers were photocopied and the data contained in each register were entered by Herring and student assistants into separate Paradox data bases. Three Fisher River data base files were created: baptisms (1888-1961), burials (1888-1979) and marriages (1888-1988). Only the baptism and burial files were used in this aggregate analysis of infant mortality.

In order to accurately assess the ages of the infants, entries in the baptismal and burial files were cross-checked and compared using Paradox's linkage capability. In this way birth dates contained in the baptismal records, but missing in its corresponding burial record, were located and thus it was possible to compute exact ages at death. The date of birth was subtracted from the date of death to calculate the exact age in days. All individuals who died less than 365 days after birth were considered to be infant deaths. No birth date was available for 12 cases out of 182 infant deaths (6.6%); in these cases, the age at death in months recorded in the register was used.

The baptismal and burial records were then scanned to ascertain whether infants born and dying elsewhere were contained in the Fisher River register. All infants whose deaths were recorded in the burial register were buried at Fisher River. However, some of the registered baptisms took place in communities outside of Fisher River proper. Stevens' diary indicates that he visited other aboriginal communities where he probably baptized infants. Many of these places were neighbouring localities used for hunting, fishing and commercial wage labour. For example, some Fisher River families temporarily moved to Snake Island, the Narrows, and Black Bear Island in order to obtain wage labour in the lumber and fishing industries (See Map 2.2). Stevens made regular visits to these locations so that his parishioners could continue their participation in the Methodist Church. Thus, these families can be considered as members of the Fisher River community. However, there were other

baptisms performed in communities such as Blood Vein, Deer Lake, Jack Head River, and Loon Straits which cannot be considered extensions of Fisher River. These were reserves in the Lake Winnipeg area which did not have missions of their own. From 1910 to 1939 there were 25 baptisms from these communities out of a total of 665 infant baptisms (3.8%). As their effects would be negligible, the baptisms were not removed from the baptismal data.

In addition to having extra baptismal entries in the register, it is very likely, especially in a spatially mobile community such as Fisher River, that there was some underreporting of baptisms and burials. Clearly, the pattern of infant death that best facilitates calculation of the IMR is one in which the infant remains in a parish throughout his or her lifespan and is baptized and buried there. Obviously there was a portion of the infant population who did not follow this process, since Fisher River was not a closed population.

Movement in and out of the community resulted in partial registration of segments of the infant population, potentially undermining the estimation of the 'true' IMR. For example, there were most certainly cases when an infant was baptized, after which the parents went to a camp or moved to another community and the infant died without being registered at the Fisher River Methodist Church. The omission of these deaths would result in an underestimate of the IMR. Conversely, there were 65 infants who died at Fisher River but who were never baptized or were baptized in another parish; the inclusion of these infants in the calculation results in an overestimate of the IMR. Although the errors introduced by movement in and out of the community cannot be measured precisely, it is assumed for the purposes of this analysis that they cancel one another out.

However, there were also infants who were born at Fisher River and who died and were buried before they were baptized. One way of testing the potential for such missing

baptismal data is to measure the delay between the dates of birth and baptism (Wrigley 1977). Table 4.1 displays the mean number of days between the date of birth and the date of baptism for three birth cohorts from 1910 to 1939. Delays greater than 400 days were removed from the cohorts in order to prevent the mean from being skewed upwards.

Table 4.1 Mean Number of Days between Date of Birth and Date of Baptism. Fisher River: 1910-1939

cohort	mean delay in days	± in days	range	n of outliers[1]
1910-19	45.9	50.6	0-397.0	9
1920-29	46.0	52.0	0-325.0	3
1930-39	69.7	60.2	0-294.0	11

[1] An outlier is considered to be a delay greater than 400 days.

The mean delay at Fisher River for each decade is greater than one month (Table 4.1). Clearly, the Fisher River people did not baptize their infants immediately after birth. With a long delay between birth and baptism, there was more opportunity for the infant to die without being baptized.

One way of assessing this type of underregistration is by attempting to link the infant burial records to their corresponding baptismal record (Jones 1976). Of the 182 infant burials, 65 could not be linked to a corresponding baptismal record. As Table 4.2 shows, the proportion of unlinked infant burials is relatively consistent in each decade from 1910-1939. Two thirds or more of the unlinked burials were born in Fisher River; only one third of them were registered as born elsewhere (Table 4.2). Moreover, 49 per cent of the unlinked infant burial records were accompanied by the notation 'unbaptized' in the burial register.

Table 4.2 Unlinked Infant Burials for Fisher River: 1910-1939

decade	N of infant deaths	n of unlinked burials	% of total burials	n born in Fisher River	% born in Fisher River
1910-19	74	29	39.2	20	70.0
1920-29	52	15	28.8	12	80.0
1930-39	56	21	37.5	17	81.0

One of the reasons for the high proportion of unbaptized infant deaths may have been that the infants died too soon after birth to be baptized.[10] However, as shown in Table 4.3 this is not necessarily true in many of the cases. Only approximately 40% of the unlinked infants died in their first week of life; the other 60% of the infants died after the first week, and roughly 50% of the infants died after the first month, leaving ample time in which they could have been baptized. This pattern corroborates the long mean delay between births and baptisms (Table 4.1).

Table 4.3 Age Distribution of Unlinked Infant Burials. Fisher River: 1910-1939

age at death in days	n of unlinked infant deaths	% of total unlinked burials
0	14	21.5
1-6	14	21.5
7-27	5	7.7
28-182	12	18.5
183-364	20	30.7
total	65	100.0

[10] The other possibility is that the infants born in Fisher River were being baptized privately at home, as is the case in England. These infants' home baptisms would be marked by 'domi-baptizatus' in the register (Wrigley 1977: 283). However, there are no such notes in the Fisher River baptismal or burial registers.

For each infant burial which lacked a recorded baptism (n=65), a birth was added to the total number of births for the calculation of the rate. In using 'dummy births' one is compensating for underregistration of baptisms and the resulting inflation of the IMR. One is assuming that if the child died in the parish it would have been buried and registered (Wrigley 1977). In other words, underregistration is estimated to be greater for births than deaths. This has been concluded by researchers employing English parish registers, who usually assume that registration of births was five per cent less than that of deaths (Lee 1974: 508-509).

In summary, the aggregate method used to calculate the IMR employs series of Methodist baptisms and infant burials. Because the individual burial records are not all linked to baptisms, there is potential for over-estimation of the rates. The long gap between birth and baptism means that some infants died before they were baptized. An attempt to compensate for underregistration of births is made by adding 'dummy' births to the baptismal data. As a result, the final sample of births and infant burials used in the analysis are 730 and 182, respectively.

Family Reconstitution Methodology

Family reconstitution methodology, simply put, consists of linking individuals from the aggregate series of baptismal, marriage and burial records to reconstruct nuclear families (Fleury and Henry 1965). This is done through nominative linkage, that is, by using surnames as the common indicator for the individuals in the families. Once these families are concatenated, they are partitioned into marriage cohorts. A marriage cohort consists of marriage unions formed during the period chosen for study.

The method, of course, is not without its drawbacks. It is often difficult to trace families due to underregistration or high rates of migration in the parish (Thestrup 1972). Thus, much of parish record data must be discarded, as vital events for individuals which cannot be linked to a family are not used in the analysis. Most studies rarely find satisfactory evidence for a sample of families greater than ten per cent (Hollingsworth 1969: 181). And because only a small proportion of families can be reconstituted, the marriage cohort usually has to cover a long duration of time to obtain a large enough sample size. This means that, unlike aggregate data analysis, short-term changes cannot be measured (Wrigley 1966: 104).

The benefits of family reconstitution, however, are numerous. The method is more precise than the aggregate technique because the reconstituted family members are known to have resided in the community throughout a defined period, usually consisting of the duration of the marriage (Fleury and Henry 1965). In addition, the reconstituted families comprise a population at risk, when there is no census or at best an inaccurate estimation of population size. As well, family reconstitution reveals the number of events and number of years of exposure to risk to whatever phenomenon the researcher is studying (Knodel 1988: 5). The method, moreover, allows the researcher to ask new kinds of questions about family structure and its effects on the phenomenon under scrutiny. Some examples of family structure analysis are: the sibship size (size of the family); a woman's age at the beginning and end of her reproductive period; and birth intervals. Without family reconstitution this type of analysis can be done only if there is household census material.

A discussion of the process of constructing the sample of families from Fisher River analysed in this study follows.

Family Reconstitution Analysis of Infant Mortality and the Fisher River Data

The Fisher River Methodist parish records were concatenated into a marriage cohort by Ms. Carol DeVito[11] following standard methods of family reconstitution (Fleury and Henry 1965) and using Paradox data base software. A brief description of this process follows. All marriages were alphabetized according to the groom's name and given number codes which corresponded to each family's surname. Because the Fisher River baptismal records have complete information regarding parents' names, it was relatively easy to connect the offspring with the marriage units. Each marriage was assigned a family work sheet and all information garnered from the vital registration records concerning the married couple and their children were recorded on the sheet.

The preceding description, of course, is a simplified summary of the process; in reality it was a slow and often painstaking procedure. There were instances when surnames had been recorded using slight variations in spelling; missing or incorrect information in the records made it difficult at times to forge links.

There are 1774 individuals and 459 families in the Fisher River reconstituted family file based on marriages formed between 1888 and 1988. As noted in the evaluation of the data, the best series of records fall between June 1907 and December 1939. For the purposes of this study, a subset of the marriage cohort was selected, consisting of all marriages formed between July 1907 and December 1930. 1930 was chosen as the upper limit because couples formed later than this date potentially bore offspring after 1939 when only sporadic burial registration existed.

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[11] Ms. C. DeVito was employed through funding to Dr. A. Herring and Dr. J. Sawchuk under SSHRC Grant #410-89-0683.

There are 122 families formed by marriages between 1907 and 1930 in the Fisher River database. From this marriage cohort a further subset was chosen for the purposes of analysis. The criteria used to choose a sample of families depend on the aims and rigor of the researcher (Knodel 1988). For example, a study of fertility would necessitate a sample in which the marriage survives until the wife reaches the age of 45, marking the end of her fertile period. However, the main criterion for all samples in family reconstitution research is that the families be chosen independently of the phenomenon being measured. This is a way of ensuring that the sample is not being skewed in favour of what is being measured.

In choosing a sample, then, I ensured that the parents of the offspring used in the analysis were "in observation" (i.e. resided in the parish) at least one year after the child was born. This was applied even to children who died before one year, since the sample would otherwise contain relatively too many children who died under one year (Thestrup 1972: 23). Based on Wrigley's (1977) methods for choosing a sample for studying infant mortality in the pre-industrial parish of Colyton, Devon, England, I used two rules to choose families:

1) The death date of the first parent marks the date of passage from observation for the family, if both parents have recorded death dates.

2) The birth of the last child marks the date of passage from observation if the death date of neither parent is recorded or one is known but the other is not known to survive his or her spouse.

These are strict rules, yet they ensure that the observation of the families ends at the dissolution of the family and that there are no offspring being included in the sample that were not in observation during his or her entire year of infancy.

Unfortunately, the Fisher River data present a problem when the first rule is applied

to the marriage cohort, because for 65.6% of the families, death dates for the spouses are unknown. I attempted to find death dates for these individuals in Anglican parish records from the neighbouring Peguis reserve (See Figure 2.1). However, in only one case was an individual cross-linked. Table 4.4 outlines the quality of death data for the husbands and wives of the 122 reconstituted families formed between July 1907 and December 1930.

Table 4.4 Quality of Death Registration for Individuals of the Fisher River Marriage Cohort: 1907-1930

death record for husband	death record for wife	n of families	per cent of total families
absent	absent	80	65.6
absent	present	17	13.9
present	absent	23	18.9
present	present	2	1.6

In all families but two, death dates for both parents could not be found (Table 4.4). Consequently, only two of the families in the sample, according to the above criteria, could be considered to be a complete sibship. Thus, Wrigley's second criterion, the birth of the last child, was used in this study as the point at which the family was no longer in observation, and the penultimate child was the last child counted as being "in observation".

As a way of understanding why the vital registration data for the spouses are so sparse, Table 4.5 compiles the ages at which wives lacking death dates were lost to observation.

Table 4.5 Summary of Ages at Which Wives in the Marriage Cohort are Lost to Observation. Fisher River: 1907-1930[1]

Age	n with at least one recorded offspring	%	n with no recorded offspring	%	total	%
15-19	6	10.2	13	59.1	19	23.5
20-24	18	30.5	5	22.7	23	28.4
25-29	9	15.3	1	4.5	10	12.3
30-34	14	23.7	0		14	17.3
35-39	6	10.2	1	4.5	7	8.6
40-44	4	6.8	2	9.1	6	7.4
45-49	1	1.7	0		1	1.2
50-54	1	1.7	0		1	1.2
Total	59	100.0	22	100.0	81	100.0

[1] Only first marriages for women are included.

As can be seen from Table 4.5, 82 % of wives in the cohort were lost to observation before they reached the age of 35. These families either discontinued registration of their vital events with the Methodist Church or emigrated from Fisher River.

The latter explanation is most probable as historical aboriginal populations had flexible movement patterns. This was the case even during the early twentieth century when they were becoming more sedentary. After marriage Ojibwa and Cree couples often settled with the wife's kin. However, after several years of "bride service" the couple would usually return to the husband's band (Dunning 1959: 98; Steinbring 1974: 250; Smith 1974: 260). This is borne out, as seen from Table 4.5, by the large number of women (41 %) who had at least one or two offspring at Fisher River and then were lost to observation before they reached the age of 25. A large proportion (59 %) of women who had no offspring recorded left the community before age 19; they probably married at Fisher and then left immediately

to their husband's band location. This latter pattern supports Steinbring's (1974: 250) comment that the period of bride service has been shortened in the twentieth century among the Saulteaux people of the Lake Winnipeg area.

However, this flexibility in location could continue throughout the couple's marriage depending on the resources available to them. For example, a couple and their children who were settled in Fisher River might return to the wife's kin and birthplace during a food shortage. Hence, although Fisher River could be considered to be a "missionized" community in which some of the families were fairly stable, there was still a great deal of movement, which hampers the task of creating fully reconstituted families in a single community.

In order to choose the final sample of families from the marriage cohort, an additional set of criteria were used: 1) all children born after June 1939 were removed from the sample, as there was no longer adequate burial registration after this date; 2) only couples with at least two offspring were used; 3) only first marriages of wives were used in order to make the sample homogeneous in terms of women's age at marriage and fertility patterns. For some analyses of family structure the criteria were modified to suit the needs of the tests. These are outlined in Chapter 6 where the results are presented.

Of the 122 families reconstituted between 1907 and 1930, 52 were deemed acceptable for the sample. Of these 52 families, 239 of their offspring were considered to have lived their first year of life "in observation". Of these 239 offspring 139 were lost to observation; that is, there was no death or marriage recorded for them. However, for the purposes of calculating infant mortality these infants were considered to have survived their first year of life.

Representativeness of the Reconstituted Family Sample

One of the most serious charges laid against the family reconstitution method is the question of representativeness. Is the marriage cohort a good sample of the parish community? In fact, although the term sample is used to describe the marriage cohort, it is not a sample in the strict sense of the word, as the families which are reconstituted are not chosen randomly. One of the obvious biases of the method is that if a family can be reconstituted, it is necessarily geographically immobile. Therefore, one is sampling the sedentary families living in the community and excluding the migrant families who may marry in another parish but live the rest of their lives in the study parish. This has ramifications in terms of the characteristics of the families being studied.

Thestrup's (1972) study of Danish rural parishes compared census data to reconstituted family data in order to test the representativeness of his marriage cohort samples. He found that the parish samples were socially skewed in favour of farmers over cottager and lodger families (Thestrup 1972). In a similar study of late 18th and early 19th century parish and census data from Massachusetts, Norton (1980) concluded that families which could be linked were approximately 15% more fertile than unlinked families. This was probably tied to the fact that linked families were more likely to be sedentary agriculturalists.

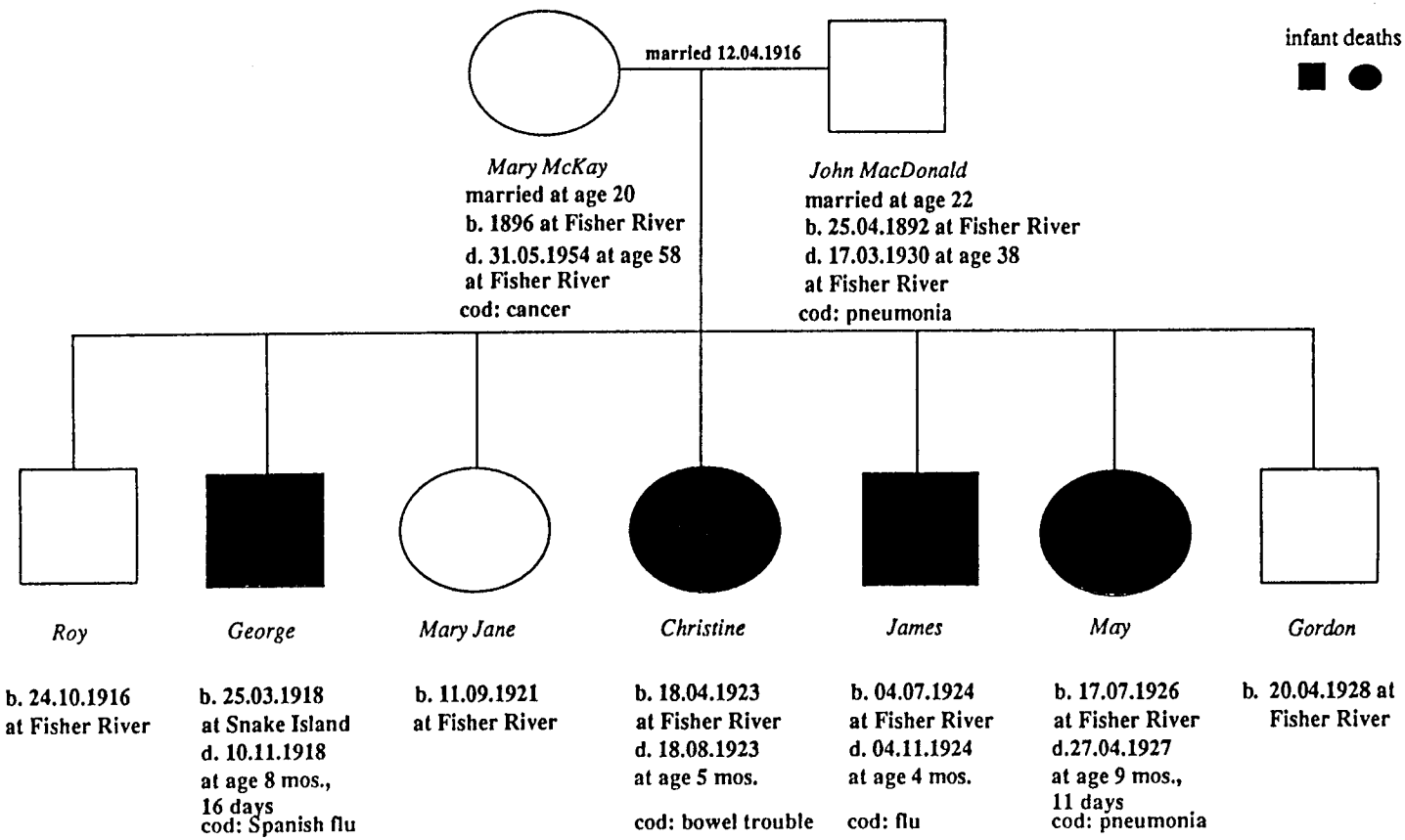
In order to address the representativeness issue for the Fisher River marriage cohort, I examined the birthplaces of the men and women who formed marriages during the study period. Thirty-eight out of 52 (73.58%) of the mothers and 40 out of 52 (77.36%) of the fathers in the marriage cohort were born in Fisher River. This compares to 63 mothers and 63 fathers who were born in Fisher River out of 122 couples (51.6%) for all families reconstituted for the period. A chi-square test comparing the proportions of men born in

Fisher River for the marriage cohort and for the total group of reconstituted families showed that the proportions were significantly different ($X^2 = 9.65$, d.f.$= 1$, $p = 0.0019$). Thus, it seems that those couples who were more completely recorded and selected for the marriage cohort were more likely to be a result of spatially endogamous marriage unions. This may be because those without extra-community family ties had less motivation to leave Fisher River during their lifetimes.

Figure 4.1 illustrates a genealogy for one of the complete families in the study sample. Both parents were born, married and died in Fisher River. All of their children except one was born in Fisher River. George was born on Snake Island (called Matheson Island on Map 2.2) and was baptized at Fisher River. By contrast, Figure 4.2 illustrates a family which at this point has an incomplete reproductive history. The father was born in Fisher River; however, there is no baptismal record of his birth. His wife was born in Berens River and they married in Fisher River. Their first two children were born in Fisher River, after which they are lost to observation. It is possible that the family did not, in fact, leave Fisher River, but simply stopped recording vital events with the Methodist Church. However, considering that neither parent's burial was recorded, the family most likely moved away from the reserve. The fact that the wife originated from Berens River supports the previous point that kin in neighbouring locales facilitated post-marital movement.

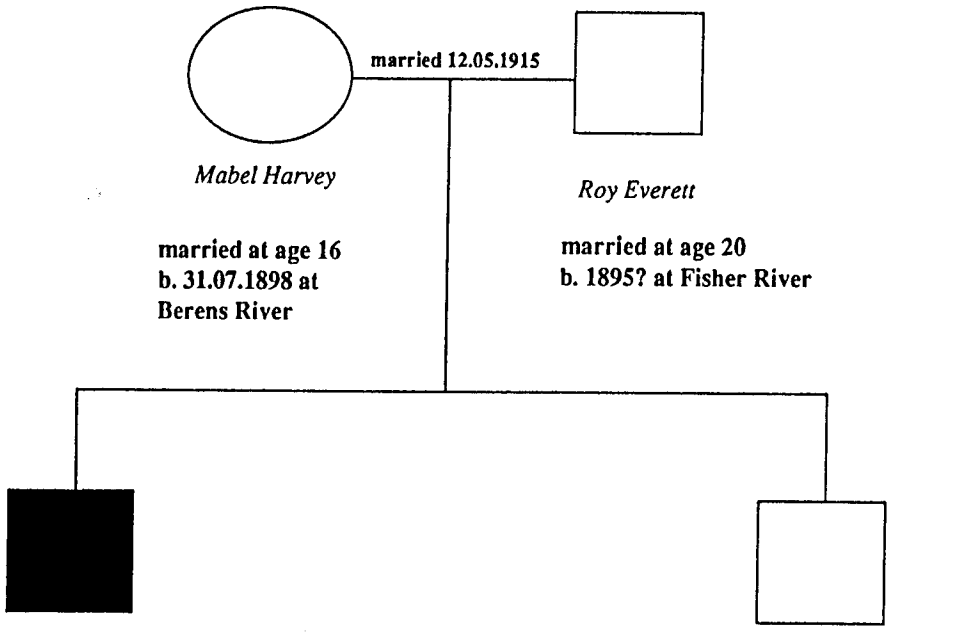
Hence, like other reconstituted family samples, the Fisher River families are more sedentary than their counterparts who were not included in the sample. Unlike other family reconstitution studies mentioned above, there are no family censuses available which can be compared to the parish record data. Hence, it is difficult to determine whether the sedentary quality of the married couple affects other family characteristics. Nevertheless, it is important

Figure 4.1 An example of a family with a complete reproductive history. Fisher River marriage cohort: 1907-1930.



All names are pseudonyms.

Figure 4.2 An example of a family with an incomplete reproductive history. Fisher River marriage cohort: 1907-1930.



to keep this bias in mind during the subsequent analyses of the reconstituted family sample in Chapter 6.

Conclusion

In order to compensate for some of the deficiencies in the records due to the spatially mobile nature of the community, the aggregate and family reconstitution methodologies were modified somewhat. The two methods produced complementary results as is apparent in the results described in Chapters 5 and 6.

CHAPTER V

Results: Aggregate Analysis

The purpose of this chapter is to investigate infant mortality from the parish records for Fisher River using aggregate methods. Estimates of IMRs for the 1910 to 1939 period are presented along with examinations of: the age structure of infant mortality; causes of infant death; the seasonal patterning of infant mortality; and, infant mortality relative to the community's overall mortality profile.

Estimating the Infant Mortality Rate at Fisher River

As discussed in Chapter Four, there are some grounds to believe that infant baptisms were underrecorded in the Fisher River parish records. To partially correct for this, 65 'dummy births' were added to the total baptisms (denominator of the rate) in order to compensate for infant deaths which lacked a record of baptism. Table 5.1 presents corrected and uncorrected IMRs derived from the registers. 'Dummy births' were added to the "births" column for the corrected IMRs, depending on the number of unlinked infant deaths for the particular death cohort in question. (See Table 4.2, p.59)

Table 5.1 Estimated Infant Mortality Rates per 1000 Live Births. Fisher River: 1910-1939

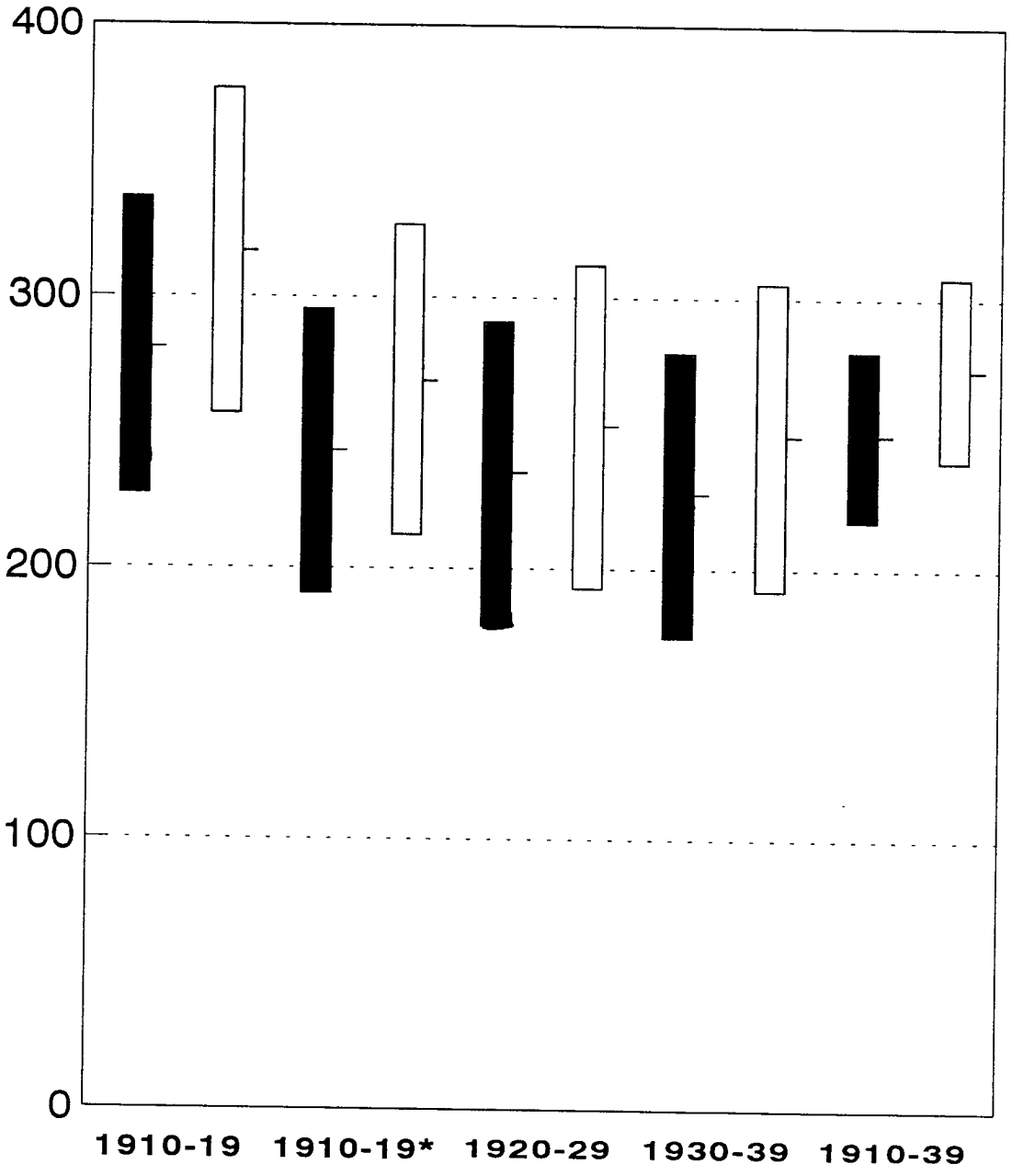
year	deaths	corrected births	IMR	burials	uncorrected births	IMR
1910-19	74	263	281.4	74	234	316.2
1910-19[2]	63	259	243.2	63	234	269.2
1920-29	52	221	235.3	52	206	252.4
1930-39	56	246	227.6	56	225	248.9
1910-39	182	730	249.3	182	665	273.7

[2] Infant mortality rate for the decade excludes 11 deaths caused by the Spanish Influenza pandemic of 1918.

Figure 5.1 plots the 95% confidence intervals (Lilienfeld and Lilienfeld 1980: 333-336) around the corrected and uncorrected point estimates of IMRs for each decade and the overall period. It appears from Table 5.1 that the corrected rates are lower estimates of the IMR than the uncorrected rates. However, as Figure 5.1 illustrates, the corrected IMRs lie within the lower range of the 95% confidence intervals surrounding the uncorrected IMRs. The proportions of infant mortality for the corrected and uncorrected rates were tested using z-tests for differences in proportions (Chiang 1983: 55-61), but no significant differences at alpha = 0.05 were found. The corrected rates are the more conservative estimates of the IMRs; however, the uncorrected estimates are not beyond the realm of the 'true' IMRs for the period.

The fact that the corrected and uncorrected IMRs were not significantly different from one another indicates that baptisms were not severely underregistered. Another check for underrecording of both baptisms and burials is the difference in IMRs by sex (Table 5.2). The sex of the infant was either noted on the baptismal record and/or was identified using

Fig 5.1 95% Confidence Intervals for IMRs



■ indicates corrected IMRs

*deaths from Spanish Influenza epidemic have been removed

first names.

Table 5.2 IMRs by Sex of Infant. Fisher River: 1910-1939

sex[1]	years	burials	baptisms	IMR
male	1910-19	34	128	265.6
female	1910-19	27	104	259.6
male	1920-29	27	98	275.5
female	1920-29	19	101	188.1
male	1930-39	32	107	299.1
female	1930-39	22	118	186.4
male	1910-39	93	333	279.3
female	1910-39	68	325	209.2

[1] The sex of the infant could not be identified for 21 of the death records and 7 of the birth records.

The baptismal sex ratio for the study period 1910-1939 was roughly equal with a male to female ratio of 1.02 (Table 5.2). The average sex ratio of human births is approximately 1.05 (Cavalli-Sforza and Bodmer 1971); thus, there does not appear to be any bias in the recording of baptisms according to sex.

A break down of Fisher River IMRs by sex show higher IMRs for males than females. A chi-square test to detect differences in the level of male and female infant mortality for the period 1910-1939 is significant at the level alpha=0.05 ($X^2 = 4.37$, d.f.=1, $p = 0.037$). Standardized residuals showed that this difference was due to the cumulative effects of a higher male IMR and a lower female IMR, although neither residual was significant at the level alpha= 0.05. IMRs listed by sex for each decade show that the male

IMR was consistently higher than the female IMR; however, chi-square tests show no significant differences between the rates per decade. The IMR for males is higher than that for females in many human populations (Cavalli-Sforza and Bodmer 1971; Chen 1983), a phenomenon thought to be explicable in terms of higher male susceptibility to environmental stress (Cavalli-Sforza and Bodmer 1971). As well, the discrepancy may have been due, in part, to higher frequencies of burial and registration of male infant deaths.

The estimated IMRs for Fisher River for the whole period 1910-1939 listed in Table 5.1 range between the lower and upper estimates of 249.3 and 273.7 per 1000 live births. The IMR for the decade 1910-19 was calculated with and without the deaths from the Spanish influenza pandemic of 1918-19. During the year 1918, 11 infants died from Spanish flu alone, and it was reasoned that this epidemic may have inflated the IMR for that decade. However, a z-test for difference in proportion between the two rates for the decade is not significant. There seems to be a decrease in the IMR per decade from 1910 to 1939. Again, however, z-tests for differences in proportion are not statistically significant.

The IMRs estimated for the study period seem extremely high relative to modern standards. For the years 1980-85 the World Health Organization reported worldwide IMRs of 88 and 16 per 1000 births respectively for less developed and more developed regions (WHO 1988). Between 1981-85 the IMR for Canada as a whole was 8.6 per 1000 live births and 18.8 per 1000 live births for the Canadian Registered Indian population (Muir 1988).

In historical terms, however, the IMRs estimated above fit well within the parameters of those derived from aggregate parish data. Pre-industrial populations are widely reported to have IMRs between 150 and 250 per 1000 live births (Jones 1976). Trapp et al. (1983) report IMRs for parishes in Aland, Finland from 1840 to 1904 that range between 120 and

240 per 1000 live births. Bradstrom (1988) reports rates between 250 and 380 during the first half of the 19th century for the nomadic Lapps of the Jokkmokk parish in Sweden. Cook and Borah (1979) report IMRs between 270 and 320 for the 19th century aboriginal mission population of Baja, California. Latulippe-Sakamoto (1971), using aggregate data from the Department of Indian Affairs, estimates that the yearly IMR from 1925 to 1940 for Canadian Aboriginals ranged between approximately 125 and 220 infant deaths per 1000 live births.

Why the IMR at Fisher River and among aboriginal populations in general stubbornly persisted at such a high level well into the twentieth century, when many of the world's IMRs began to decline, is one of the questions central to this thesis. However, before commenting on this, more in depth analysis of the underlying patterns and causes of infant mortality at Fisher River must be investigated.

Biometric Analysis of the IMR

The division of infant deaths into neonatal (birth to 27 days) and postneonatal (28 days to 1 year) periods is a way of uncovering the underlying causes of infant mortality. The causes of infant deaths are generally divided into two categories: those due to congenital defects arising from genetic or prenatal factors, termed intrinsic or endogenous deaths; and those directly connected with environmental exigencies, called extrinsic or exogenous deaths. Most of endogenous mortality is assumed to occur during the first month of life. However, a portion of neonatal deaths are due to exogenous causes (Bourgeois-Pichat 1951).

The biometric analysis of infant mortality was devised by Bourgeois-Pichat (1951) as a way of separating exogenous and endogenous causes occurring in the first month of life in a series of data which have missing or unreliable cause of death documentation. The method is

based on the idea that regardless of the level of infant mortality in a population, the cumulative infant deaths plotted on the y axis against the formula $[\log(d + 1)]^3$ (where d = days at death) on the x axis will ideally form a straight line. Extrapolation of the line to the intercept at the y axis gives the endogenous mortality rate; the difference between the rate at one month and that at the origin is equivalent to the exogenous death rate under one month.

Lancaster (1990: 299) argues that it is pointless to divide deaths into endogenous and exogenous causes because today deaths from endogenous causes are less than 10 per 1000 in the first month of life and before 1900, as in much of the underdeveloped world today, endogenous causes were responsible for only a small portion of total infant mortality. Even if one dispenses with the analysis of endogenous and exogenous mortality, however, Schofield and Wrigley (1979: 74) maintain that the level of endogenous mortality derived from the biometric method is a convenient way of measuring underrecording of infant deaths, assuming that most underregistration occurs during the first month of life. The Fisher River age-specific infant deaths are plotted for the aggregate data using the biometric method in Figure 5.2. The values for the data set are presented in Table 5.3.

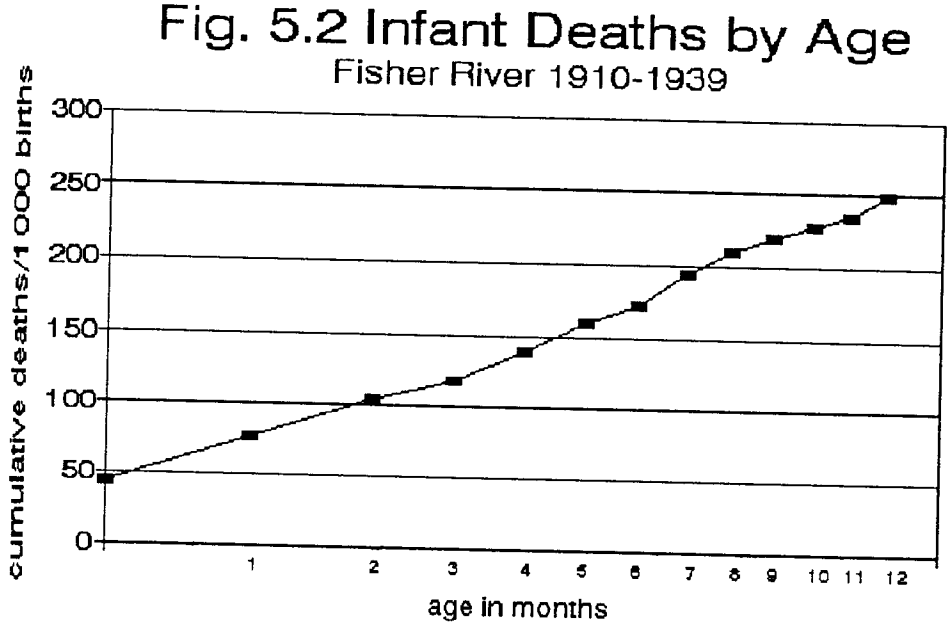


Table 5.3 Age-Specific Infant Deaths According to the Biometric Method[1]. Fisher River: 1910-39

log (d + 1)[3]	n of deaths	cumulative IMRs
0		44.0
313	56	76.7
576	20	104.1
757	11	119.2
908	15	139.7
1039	14	158.9
1154	10	172.6
1259	16	194.5
1355	11	209.6
1443	7	219.2
1528	7	228.8
1607	5	235.6
1685	10	249.3
total	182	

[1] Following Bourgeois-Pichat (1951)

The endogenous level of mortality was determined to be 43.3 per 1000 live births for the 1910-1939 cohort (Table 5.3)[12]. This compares to endogenous mortality rates for parishes in England from 1550 to 1649, which varied from 31 to 138 per 1000 (Schofield and Wrigley 1979: 78). However, Schofield and Wrigley (1979: 74) argue that serious underregistration would result in an y-intercept that cut below the origin, since infant deaths missed during the neonatal period would be subtracted from the total endogenous deaths. Therefore, this analysis suggests that there is no serious underregistration of infant deaths for the Fisher River data.

Nevertheless, there was probably some underregistration during the neonatal period. It is claimed that approximately half of total infant mortality occurs during the first month of life (Wrigley 1977: 283; Chen 1983: 205). However, only approximately one quarter to one third of all infant deaths registered at Fisher River between 1910 and 1939 fell in the neonatal period (Table 5.4).

Table 5.4 Neonatal versus Postneonatal Mortality. Fisher River: 1910-1939

decade	n of neonatal deaths	n of post-neonatal deaths	total infant deaths	per cent neonatal	per cent post-neonatal
1910-19	22	52	74	29.7	70.3
1920-29	14	38	52	26.9	73.1
1930-39	20	36	56	35.7	64.3

[12] Regression analysis was employed to determine the y-intercept. However, as Knodel and Kintner (1977) point out, the fact that the cumulative IMRs do not form a straight line means that regression analysis of the points at months one and six and one and twelve result in two different levels of endogenous mortality. Thus, following Knodel and Kintner (1977) only the first four cumulative IMRs that formed a straight line were used to determine the endogenous level of mortality.

Indications of underrecording are supported by the biometric analysis, which shows that after the fifth month of life the cumulative IMRs deviate upwards from the straight line (Figure 5.2).

However, Knodel and Kintner (1977) assert that the age structure of infant mortality differs among populations, and that deviation from a straight line does not necessarily imply underregistration. They argue that one of the most important influences on IMR age structure is infant feeding practices in the community. Human breast milk is not only nutritionally crucial for infants but is important in protecting them from infection by micro-organisms and particularly from diarrheal diseases. Both colostrum, which is secreted from the mammary glands 3 to 5 days post-partum, and mature breast milk contain immunologic factors which offer protection for the newborn against infectious disease (Gershwin et al. 1985). Breastmilk, moreover, is clean compared to infant formula made from contaminated water or cow's milk served in a contaminated container (Knodel and Kintner 1977: 395). Thus, if a population is artificially fed with cow's milk or weaned at an early age (i.e. before the infant lives six months) the slope of the line will decrease after the sixth month, with more mortality occurring in the early months (Figure 5.3). Conversely, for the population in which mothers breast feed and confer some protection against infectious disease, the slope of the line will be steeper between 6 to 9 months, when the infants are being weaned from breast milk. This is due to "excess" mortality in the remainder of the year caused by digestive impairments when infants are making the transition from milk to solid foods.

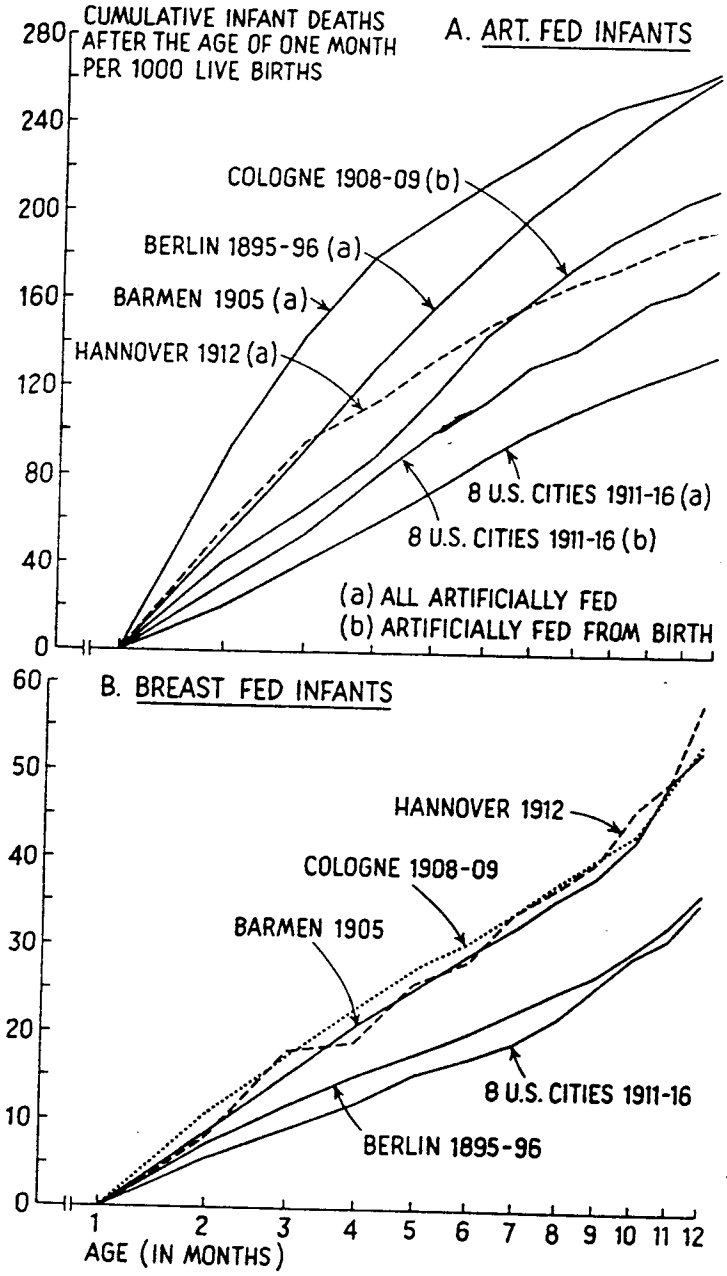


Figure 5.3 A comparison of cumulative IMRs for populations whose infants were artificially fed versus those whose infants were breastfed (Knodel and Kintner 1977: 397).

As depicted in Figure 5.2, the age structure of the cumulative IMR at Fisher River takes the form attributed to a breastfeeding population. Therefore, there probably was 'excess' mortality from the age of five months to one year in addition to some underreporting of neonatal deaths. This pattern concurs with the hypothesis that Fisher River women breast fed their infants (Chapter 2, p.28).

It is impossible to make assumptions about human infant feeding practices, since they vary cross-culturally and through time. Although I have been unable to locate ethnographic sources that discuss infant feeding practices among the Fisher River Oji-Cree Indians, Dunning's (1959) ethnography of the Northern Ojibwa of Pekangekum during the early twentieth century may give some insight into the Fisher River situation. Dunning states that the Ojibwa breast fed their infants and did not introduce solid food into their diets until they began to walk at approximately one to 1.5 years of age. Until six months of age breast milk is nutritionally ideal for infants; however, after six months breast feeding without the supplementation of solid foods will compromise the health of the infant (Chen 1983). With the weaning period somewhat delayed and an unsteady food supply at Fisher River at certain seasons of the year, nutrition was probably insufficient for some infants after their sixth month of life. It is possible that the 'excess' mortality apparent for Fisher River infants after the sixth month may not have been, as Knodel and Kintner (1977) hypothesize, a result of the vulnerable weaning period, but of inadequacy of solid food supplementation.

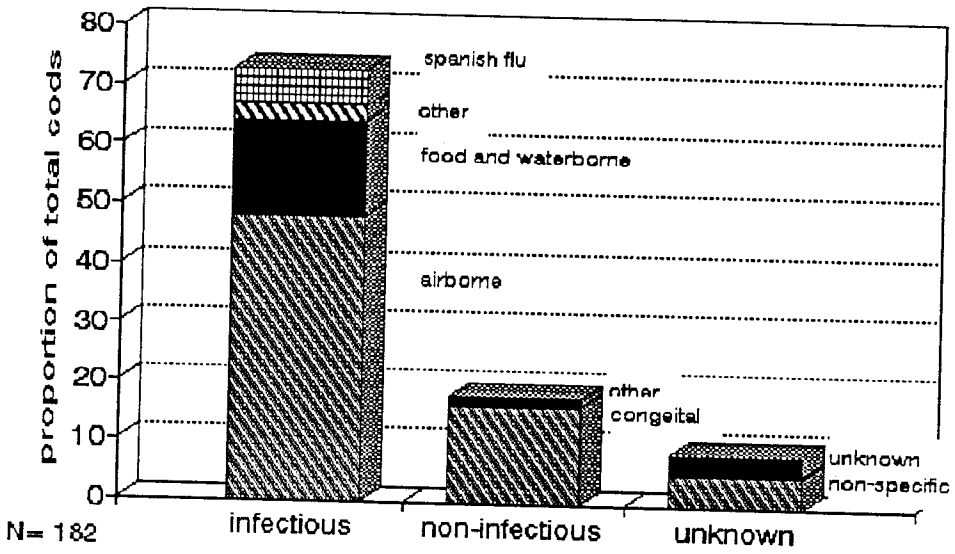
Causes of Death

As the biometric analysis indicates, there was excess infant mortality at Fisher River after the fifth month of age. The next step in understanding infant mortality at Fisher River is

to investigate the proximate causes of infant mortality. Unfortunately, cause of death information in parish record data is often of limited value, as the recording of it depended on the caprices and knowledge of the minister registering burials. During this period, apart from treaty parties visiting northern communities (Young 1988: 81), there were no medical personnel in the community. Many pathologies presently identified and categorized by biomedicine, moreover, were not well recognized or understood during the early twentieth century. Nevertheless, although Rev. Stevens was not a medical doctor, he spent considerable time tending to the ill at Fisher River, and was therefore, at the very least, familiar with some infectious diseases (Chapter 3, p. 33).

Figure 5.4 outlines cause-specific proportionate infant mortality during the study period. Of the 182 recorded infant deaths, only five deaths (3.3%) were missing cause of death information. Two deaths (1.1%) were attributed to non-specific causes, listed as "perished while travelling" and "hemmhorage" (*sic*). For the remaining infant deaths, however, the cause of death was specific enough to be organized into broad categories pertaining to their mode of transmission. Following McKeown's (1976) classification scheme, they were grouped into infectious and non-infectious diseases. The infectious diseases were further subdivided into airborne (respiratory diseases) and water/food-borne (gastro-intestinal) diseases. The non-infectious causes of death were subdivided into congenital defects and miscellaneous or other causes. (See Appendix II for detailed list and categorization of cause of death data.)

Fig 5.4 Causes of Infant Death
Fisher River 1910-1939



As indicated in Figure 5.4, infectious disease contributed to just over 70% of all infant deaths at Fisher River between 1910 and 1939. Airborne respiratory infections, especially bronchitis and pneumonia, were responsible for almost half of all infant deaths. Clearly, then, the prevalence of these diseases in the community was a major factor in promoting high rates of infant mortality.

Seasonality and Infant Mortality

In addition to causes of death, infant mortality can be analysed in terms of

seasonality. That is, if an infant was going to die, at what time of the year was the death most likely to occur. Seasonal analysis not only gives insight into the vector of disease causing mortality, but also elucidates periods during the year when the community experienced hardship.

One of the complications in investigating seasonality in infant mortality is the confounding factor of birth seasonality. Since approximately one quarter to one third of the infant deaths registered in the Fisher River parish occurred within the first month of life (Table 5.4), a preponderance of deaths in a month could be an artifact of a preponderance of births in the same month.

One way of circumventing this problem, devised by Knodel (1988: 60-61), is to include both the months of birth and death in the analysis of seasonal infant mortality. The 664 infants born between 1910 and 1939, for whom there was a complete birth date, were classified by month of birth. For example, 59 infants during this time period were born in the month of January. Each of the infants born in January who died within the year was assigned to a calendar death month based on his or her age at death in months.[13] The probability of dying in a particular month was then calculated for all infants born in January. Thus, if two infants died in March, the probability of two infants dying in March if they were born in January was two out of 59. The risk of dying in one of the twelve months was calculated for each group of infants born in a particular month. The monthly death risks were then combined to produce total monthly IMRs for a calendar year. (See Appendix III for a matrix of the data).

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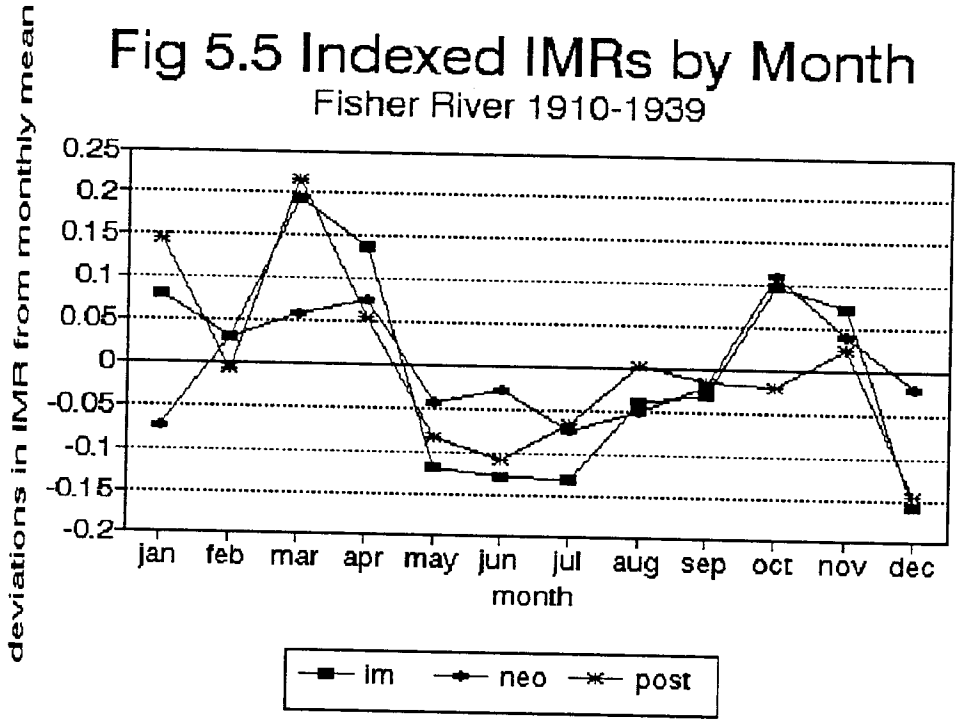
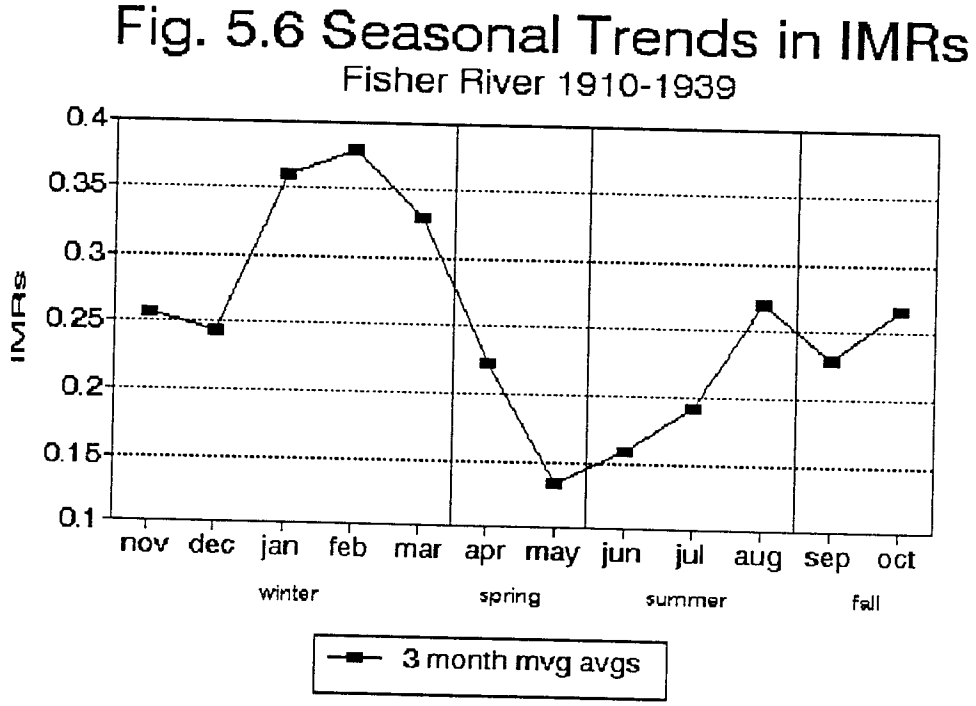
[13] The age at death in completed months was calculated using the age at death in days and dividing it by (365.5/12) or 30.43 (Knodel 1988: 61).

The mean monthly IMR was calculated for the period 1910 to 1939. The actual monthly IMRs were then subtracted from the mean, resulting in index deviations from the monthly mean IMRs. Figure 5.5 graphs the index deviations from the mean monthly IMR, showing that there are many monthly fluctuations in the IMR with a significant decrease in the IMR during the months of May, June and July.



In figure 5.6, three-month moving averages of IMRs plotted against the seasons - winter (November, December, January, February, March), spring (April and May), summer (June, July, August) and fall (September and October) - show distinct seasonal patterns. There are low rates of infant mortality in the spring and summer and high rates during the winter.



One could argue that the deficit during the summer may be an artifact of recording; that is, people were away from the reserve during the summer and not recording vital events. If this were the case, however, there would be a paucity of baptisms during the summer. However, of the 665 baptisms recorded for the period, 183 (27.5%) occurred during the summer months. This amounts to just over one quarter of the baptisms for the four seasons of the year; hence, underrecording during the summer can be ruled out. This is corroborated by Dunning's (1959: 84-85) accounts of the northern Ojibwa of Pekangekum reserve, in which he states that most trapping groups returned to the reserve from June to September. Furthermore, Fisher River people were most likely to absent the community during the spring

and fall fisheries (Chapter 2, pp. 15-16).

Wrigley and Schofield (1981: 297-298) report a seasonal distribution of infant deaths in English parishes which is very much like the Fisher River pattern: that is, high numbers of death in the spring and winter, reaching a nadir in the summer. The authors assert that in northern European countries peaks occur during the winter and spring months, whereas in southern countries the peak occurs during the summer months. This, they speculate, reflects the difference in importance of respiratory diseases in the northern climates versus gastro-intestinal diseases in the southern ones. This is certainly borne out by the Fisher River data in which the highest proportion of infant mortality (Figure 5.4) is due to respiratory infectious diseases.

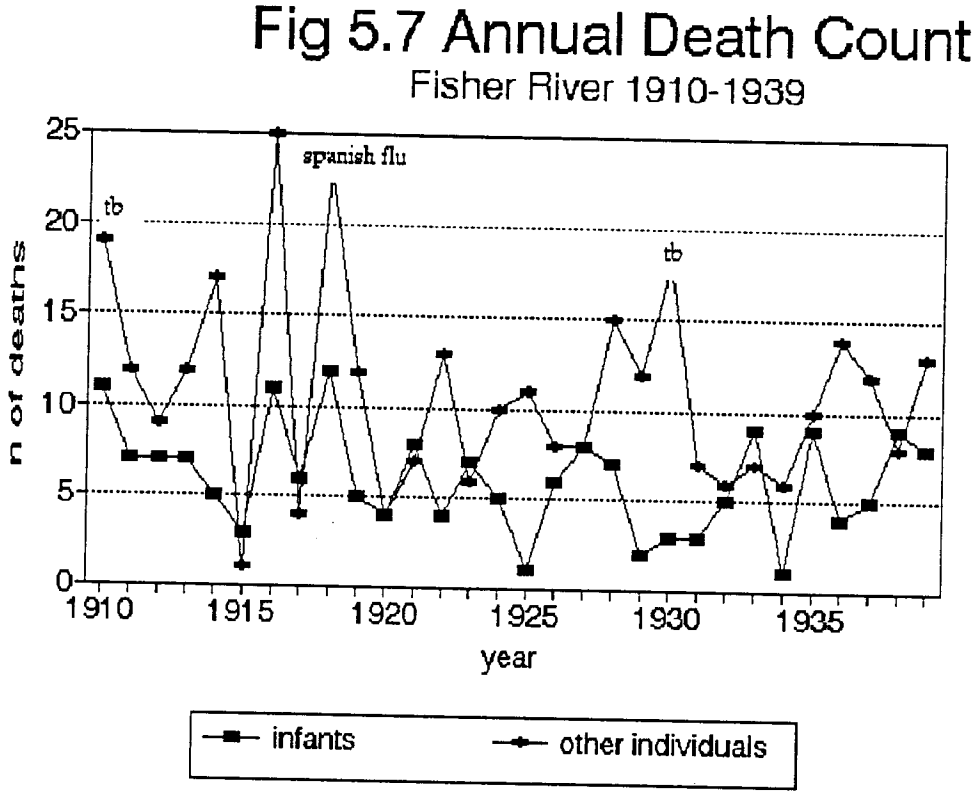
The seasons of highest infant mortality, winter and early spring, also correlated with periods of hunger and hardship for the Fisher River reserve. Sources of wage labour such as commercial fishing, farm labour and sawmill work were available during the warmer months of the year; very little trapping was done during the coldest months from Christmas until late March. (See Chapter 2, p.21). It is clear that respiratory infections, harsh climate and nutritional deficiencies, worked synergistically during this period of the annual round to amplify the risk of infant mortality.

Infant Mortality in the Wider Context of the Community

It is perhaps helpful at this point to examine infant mortality at Fisher River in the wider context of the community mortality profile. Appendix IV and Figure 5.7 display the annual death totals registered at the Fisher River Methodist Church from 1910 to 1939. The deaths are broken into infants and individuals one year of age and older in order to assess the

differences in mortality between the two groups.

Figure 5.7 features peaks and troughs which prevail during periods when epidemics from infectious diseases occurred. It is interesting to note that from 1910 to approximately 1920 the lines plotting infant and other individuals' deaths correspond quite closely. However, after 1920 there is much less correspondence between the lines; in fact, during the 1930s they seem to be quite independent of one another.



The amount of association between infant and other age groups' deaths was tested using Pearson's coefficient correlation (Sokal and Rohlf 1969: 264). For the years 1910-19,

r=0.824, signifying a strong positive association, where r=1 is complete correlation and r= -1 is perfect negative association (Sokal and Rohlf 1969: 264). Conversely, the years 1920-1939 show very little association with r=-0.124. This pattern is highlighted by the rankings of the years of maximum mortality for infants compared to all other deaths (Table 5.5). During 1910-19, the years of peak infant mortality are also those for all other deaths; however, during the subsequent two decades there is only one year, 1928, when infant and other deaths both rank among the top three mortality years.

Table 5.5 Rankings of Maximum Mortality for Infant and Other Deaths. Fisher River: 1910-1939

decade	rank	years of highest mortality for infants	years of highest mortality for other age groups
1910-1919	1	1918	1916
	2	1916	1918
	3	1910	1910
1920-1929	1	1921	1928
	2	1927	1922
	3	1923, 1928	1929
1930-1939	1	1933	1930
	2	1935	1939
	3	1938	1936

It is not surprising that the highest peaks in mortality for both infants and other individuals occur during epidemics of infectious disease. For example, during the Spanish influenza epidemic of 1918-19, 36 people perished. The mortality peak of 1916 is somewhat more complicated as a conglomeration of infectious respiratory diseases such as tuberculosis, measles, whooping cough and influenza account for the peak. Nevertheless, the infants' and other individuals' mortality profiles essentially reflect one another. By contrast, after 1920

not only is there a lack of concurrence between the epidemic peaks of infants and other individuals, but the cause of death profile is also different. In 1930, for instance, when 'other' mortality was very high and largely due to tuberculosis (11 out of 18 deaths or 61.1%), infant mortality was quite low at three deaths, two due to gastro-intestinal diseases and the third to a congenital defect.

It appears that the mortality profile for the community of Fisher River changed after 1920. The community was founded in 1876 by migrants from Norway House (Chapter 2, p.6), and it is possible that after approximately 30 years of settlement at Fisher River, those who had survived previous epidemics had acquired herd immunity to many of these infectious diseases. Tuberculosis, however, was still epidemic during the 1920s, 30s and 40s, and therefore became an common cause of death for many people, who no longer died from other forms of infectious disease. What is interesting, however, is that infants continued to die from airborne infections such as measles, whooping cough and influenza, and therefore the infant mortality profile after 1920 no longer reflected that of the rest of the community.

Conclusion

There were indications that the estimates of the IMRs derived from the aggregate records were reasonably accurate. For example, there was no bias in recording baptisms based on the sex of the infant. Also, there was no extreme underregistration of infant deaths during the neonatal period, judging by the moderate level of the endogenous IMR. Nevertheless, these results should be viewed with caution, in light of the probability of some underreporting of baptisms and infant deaths. Although precautions were taken to ensure that the infant deaths were linked to their respective baptismal records, there were inevitably some

infants whose births occurred prior to the initial year of the death cohort (1910) and some whose deaths occurred after the last year of the cohort (1939). It is impossible, moreover, to determine whether the infants were 'in observation' for the first full year of their lives, as one does with reconstituted family cohorts. For this reason, one cannot measure the error due to migration in and out of the community; and it was necessary to assume that the errors due to migration cancelled one another out.

The IMR at Fisher River for the study period 1910-1939 was extremely high at 249.3 per 1000 live births. Although the IMRs decreased slightly from 243.2 per 1000 to 227.6 per 1000 from the 1910-19 to 1930-39 death cohorts, this decline was not statistically significant. These findings are consistent with what is known of a variety of historical populations and is consistent with Latulippe-Sakamoto's national estimates for Canadian Indians from 1925 to 1940.

A biometric analysis of the age structure of infant mortality uncovers an excess of mortality after the fifth month of life. This probably reflects the vulnerable period after the age of six months for infants who are breastfed, when they are more apt to fall prey to food, water and airborne infections due either to the introduction of solid food or to the lack thereof. Based on the limited ethnographic evidence on infant feeding and the cause of death analysis which highlighted airborne infections as the major killers of infants during this period, I would assert that the excess mortality during late infancy arose from undernutrition. This is corroborated by the seasonal distribution of infant mortality, which shows higher infant mortality during the winter when resources and supplies were often scarce. It is clear that gastro-intestinal diseases, although an important cause of mortality during hot months were not a leading cause of death during infancy (Figure 5.4). As well, warmer seasonal

temperatures in the summer probably reduced crowding indoors and coincided with a more bountiful food supply, thereby concomitantly reducing the risk of infant death.

Despite the fact that infant mortality at Fisher River was intimately connected with the community's health in terms of resource availability, seasonal temperatures and living conditions, there are indications that from 1920 to 1939 the infant mortality profile disassociates from that of the rest of the community. This finding is important in light of the fact that the IMR is claimed to reflect the mortality rates of other age groups in the same community. This analysis, although only preliminary, warrants further investigation in this community and other historical populations.

The aggregate data yielded some important results concerning the dynamics between infant mortality and community health at Fisher River. However, there are other determinants of infant mortality related to the family unit that warrant investigation. For example, birth intervals, maternal age and sibship size are all questions pertinent to how and why high rates of infant mortality occurred at Fisher River. The analysis will now turn to reconstituted family methodology to begin to address these issues.

CHAPTER VI

Results: Reconstituted Family Analysis

This chapter presents the results of analysis on the reconstituted families from the marriage cohort formed between 1907 and 1930. The first section compares some of the descriptive parameters of infant mortality obtained using the aggregate and marriage cohort data in order to determine how well the marriage cohort represents the Fisher River community.

The remainder of the chapter is devoted to investigating some of the proximate determinants of infant mortality. Unfortunately, it is impossible to investigate family IMRs and characteristics of families with high IMRs, because of some of the limitations on the Fisher River data (Chapter 4, pp. 65-67) which preclude the collection of completely recorded family histories. Nevertheless, employment of a small number of complete families and partially recorded families permits analysis of "parental factors" (Figure 6.1, Chen 1983). They include sibship size, maternal age and intervals between births.

Parental factors affect infant mortality both biologically and sociologically; they influence nutrition of the fetus and infant, as well as the resources and care available to the infant in the family home (Chen 1983: 206). Although this chapter does not causatively link parental factors with high rates of infant mortality at Fisher River, it illuminates some of the reproductive characteristics of the families which may have affected infant mortality during the early twentieth century.

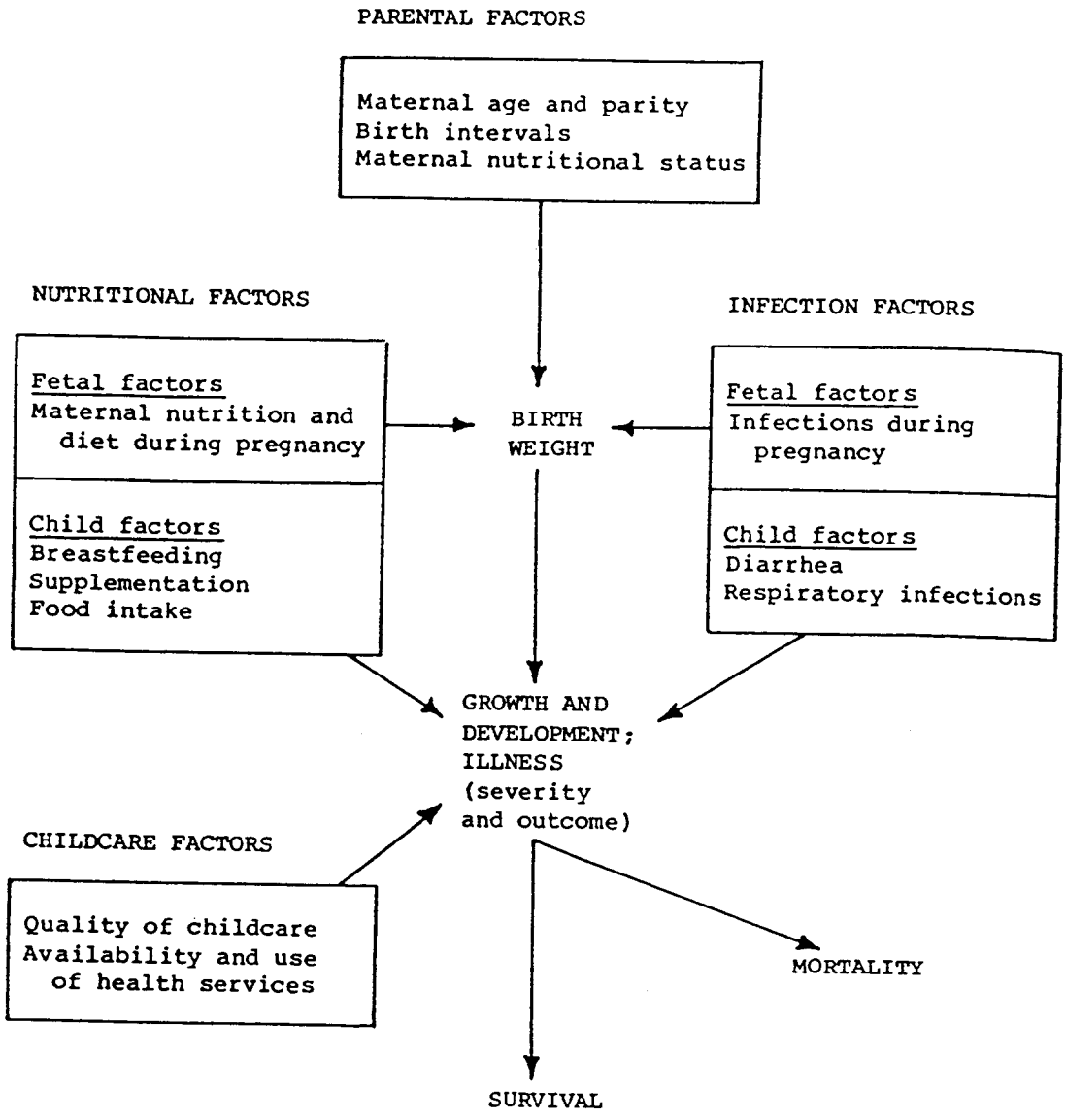


Fig. 6.1 The Proximate Determinants of Infant Mortality. From Chen (1983: 206).

Infant Mortality as Described by the Marriage Cohort versus the Aggregate Data

Before proceeding with some of the more involved analyses of infant mortality and the reconstituted family sample, it is important to determine whether the marriage cohort, in terms of infant mortality, is representative of the community as a whole. To do this, some results from the aggregate analysis will be compared to those from the reconstituted family analysis.

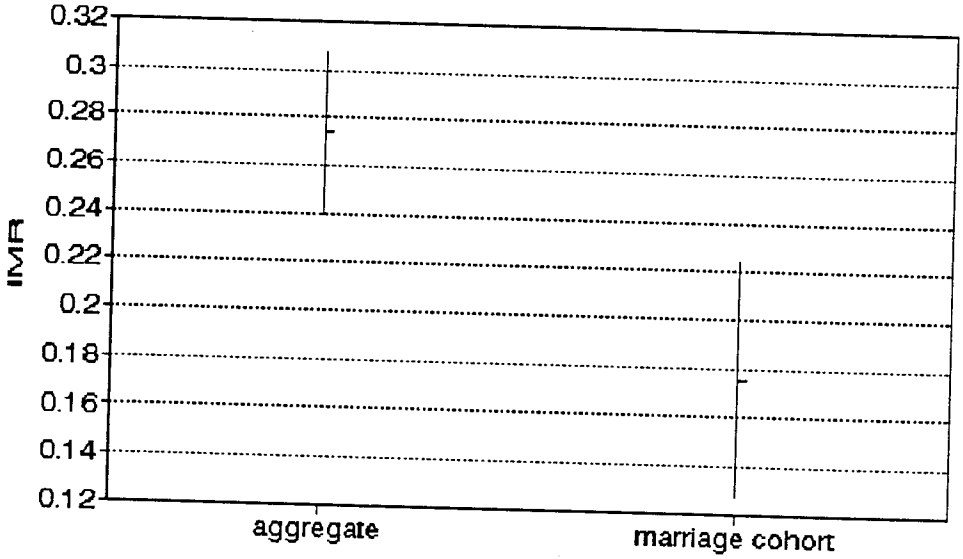
Table 6.1 presents the IMR for the marriage cohort. The IMR was calculated using the number of offspring born to the families in the cohort as the denominator and the number of infants in those families who died as the numerator.

Table 6.1 Estimated Infant Mortality Rates. Fisher River Marriage Cohort: 1907-1930

n of families	n of offspring	n of deaths	IMR/ 1000 live births
52	239	42	175.7

The IMR for the marriage cohort is 175.7 per 1000 live births. This rate is markedly lower than those calculated for the period IMRs (1910-1939) employing aggregate records (249.3 for the corrected data and 273.7 for the uncorrected data, Table 5.1, p.74). In fact, 95% confidence intervals calculated around the IMRs indicate that the two rates are significantly different from one another (Figure 6.2).

Fig 6.2 95% Confidence Intervals around Aggregate and Marriage Cohort IMRs



The IMR calculated from the marriage cohort may be a more careful and conservative estimate due to the prudent selection of the families, and hence this sample may be less prone to underregistration of births than the aggregate data. Alternatively, since precautions were taken to compensate for underreporting of baptisms in the calculation of the aggregate IMR (Chapter 4, p.61), the marriage cohort sample may be biased towards families that had lower levels of infant mortality. As discussed earlier (Chapter 4, p.68), it may be that families who were more sedentary and thus more established in the Fisher River community had economic benefits over the more transient families.

Despite the discrepant IMRs, the profiles of infant mortality for the aggregate data and the marriage cohort sample are quite similar. For example, the age structure of infant mortality for the marriage cohort sample derived by the biometric method (See Chapter 5, pp. 78-79) is similar in form to that of the aggregate data (See Figure 6.3 compared to Figure 5.3). Figures 5.3 and 6.3 both have lines with steeper slopes after the age of five months.

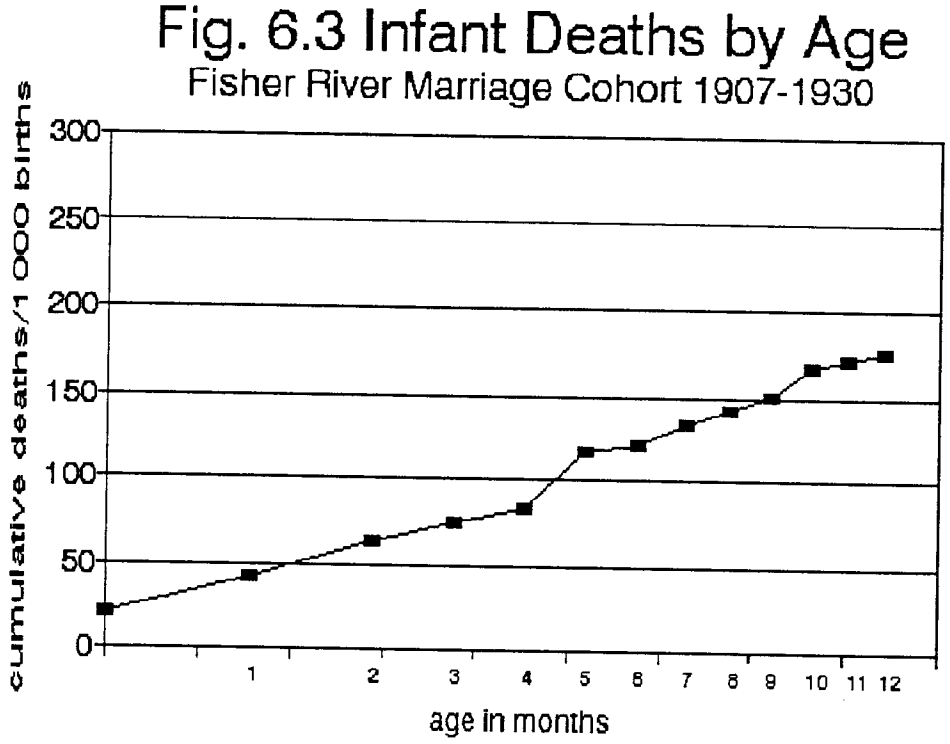


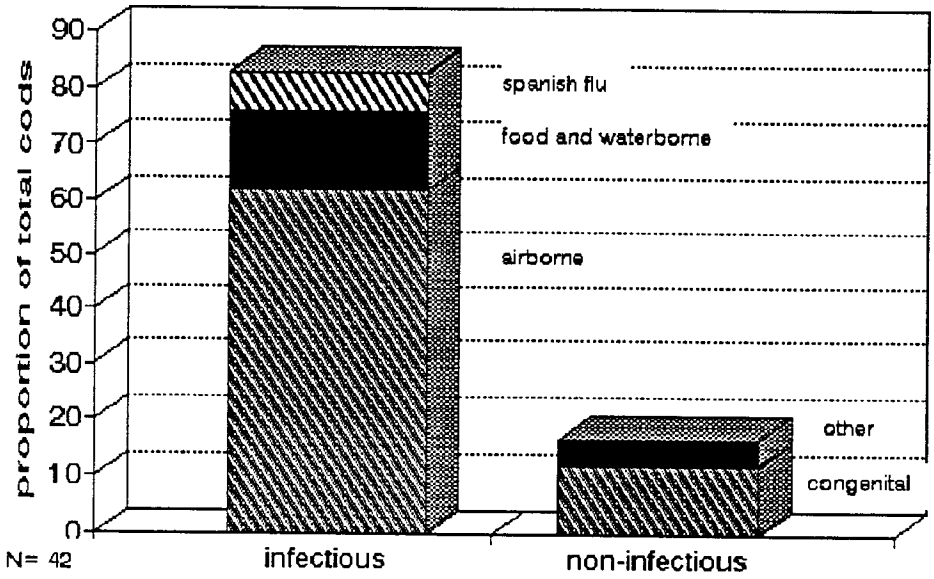
Table 6.2 Age-Specific Infant Deaths According to the Biometric Method[1]. Fisher River Marriage Cohort: 1907-1930

log (d + 1)[3]	n of deaths	cumulative IMR
0		20.6
313	10	41.8
576	5	62.8
757	3	75.3
908	2	83.7
1039	8	117.2
1154	1	121.3
1259	3	133.9
1355	2	142.3
1443	2	150.6
1528	4	167.4
1607	1	171.6
1685	1	175.7
total	42	

[1] Following Bourgeois-Pichat (1951).

Likewise, the proportionate infant mortality by cause of death for the marriage cohort mirrors that for the aggregate data. The rankings of proportional cause of death were identical; airborne infectious disease was the leading cause of mortality (Figures 6.4 and 5.5). Interestingly, unlike the aggregate data, all infant deaths from the marriage cohort had a cause of death listed. This may indicate that the infants and families in the marriage cohort were better known to Rev. Stevens and therefore more apt to have a cause of death noted in the burial register.

Fig 6.4 Causes of Infant Death
Fisher River Marriage Cohort 1907-1930



In summary, it appears that, in terms of the level of infant mortality, the marriage

cohort sample may not be representative of the larger Fisher River community. Nevertheless, the profile of infant mortality derived from the marriage cohort sample appears to reflect that of the larger community.

Sibship Size

The influence of the number of siblings in a family on infant death is a topic of investigation and in some cases families with higher sibship sizes are associated with a higher risk of infant mortality (Knodel 1985; Sorg and Craig 1983; Brennan 1983). The exact mechanisms underlying this association are at this point only conjectural. It may be that large sibship sizes are an indirect way of measuring high parity at a young maternal age, resulting in short birth intervals and reduced maternal health. Or, in a community where resources are at a premium, those allotted to infants may be reduced in large families.

Unfortunately, there are limitations on the Fisher River reconstituted family sample which preclude a thorough investigation of sibship size. Because of the lack of parental death dates for the marriage cohort families (Chapter 4, p.65), there is no way of confirming the complete number of offspring born to the couple. Nevertheless, an attempt at estimating the average sibship size can be made using families which are deemed to be complete by virtue of the mother attaining the age of 40 years[14]. Table 6.3 presents the number of families who are considered complete by the above mentioned criterion. In the case of four families there was no death record available for the mother; however, in all instances the woman was estimated

[14] Traditionally the age of 44 is used to mark the end of a woman's reproductive period. However, following Herring, Driben and Sawchuk (1983) age 40 was used instead. This allowed four more families to be included in the Fisher River subsample.

to have lived to at least the age of forty based on her date of birth and the date of birth of her last offspring.

Table 6.3 Degree of Completeness of Families in the Fisher River Marriage Cohort: 1907-1930

death record for mother	estimated or recorded death of mother	N of families
absent	not available	38
absent	> = 40 years of age	4
present	> = 40 years of age	5
present	< 40 years of age	5

According to the criterion stated above, a subsample of 9 of the 52 (17.3%) reconstituted families can be considered to have complete reproductive histories. One of these families has been removed because there was a five year hiatus between marriage and the birth of the first infant, indicating that the family may have been absent from Fisher River at this time. Hence, there are eight (15.4% of the sample) complete families.

Clearly, one must be cautious in interpreting results from such a small sample of families. There is also the possibility that the Fisher River subsample may be biased towards large families. The eight families were recorded completely by virtue of their continual presence in the community; hence these families may have been better able to afford (both in terms of resources and their immobility) to have many offspring.

It is in fact the case that the mean number of offspring born per family is high at 11.13 ($\pm$1.96). This is high but consistent with high fertility rates found for other twentieth

century aboriginal populations in Canada (cf. Herring, Driben and Sawchuk 1983; Roth 1981; Romaniuk and Piche 1972; Sawchuk 1972). Table 6.4 presents total fertility rates for historical and contemporary "natural fertility" populations[15]. Unfortunately, a total fertility rate could not be calculated for the Fisher River marriage cohort, as there were not enough complete families available. So the average sibship size of 11.13 is not directly comparable to the populations in Table 6.4. As a source of direct comparison, however, the average sibship size calculated from a marriage cohort of Madawaska French families from 1791-1838 was 11.34 (Sorg and Craig 1983).

Maternal Age

The age of the mother at the birth of her infant is considered to be a proximate determinant of infant mortality, especially in terms of perinatal mortality (birth to 7 days). In biological terms, childbearing at ages less than 17 and greater than 35 augments the risk of infant mortality (Boone 1989: 90; Chen 1983: 208).

In considering the influence of maternal age on infant mortality, it is best to employ the first three live births, because the use of higher order sibs introduce the confounding factor of sibship size. Young, high-parity mothers are more likely to have had infants die in their family, as infant deaths reduce birth intervals and allow a woman to conceive again more rapidly than if she were breastfeeding her previous infant (Knodel 1985: 91).

Unfortunately, the Fisher River marriage cohort does not have enough infant deaths in

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[15] Henry 1961 (cited in Howell 1979: 154) defines a "natural fertility" population as one in which there is no use of contraception; however, there may be behaviour such as prolonged lactation and post-partum sex taboos which depress fertility.

Table 6.4 Summary of Fertility of a Selected Sample of Populations[1]

Population	Date	Total Fertility Rate	Mean Age at First Birth (Years)	Mean Birth Interval (Months)	Source
!Kung	1963-73	4.7	21.4	50.6	Howell 1979
Hutterites		10.2	22.3	25.5	Eaton and Mayer 1953
Fort Hope Ojibwa	1938-44	7.5	21.5	27.4	Herring, Driben and Sawchuk 1983
Island Lake	1910-24	7.8	20.0	-	Sawchuk 1972
James Bay Cree	1968	7.2	21.9	32.5	Piche and Romaniuk 1972
Old Crow Kutchin	Post-1900	6.6	19.8	39.0	Roth 1981

[1] Adpated from Herring, Driben Sawchuk (1983: 160).

birth orders one through three to make the anlysis of IMRs and maternal age meaningful. However, maternal age can also affect infant mortality indirectly by influencing sibship size, which in turn affects infant mortality. The age of mothers at the birth of their first children indicates when women in a population begin to reproduce. The younger a woman begins to produce offspring, the more time she has during her fecund period to have children (Howell 1979: 164).

The beginning of reproduction in most cultures is usually denoted by marriage and depends on the culturally accepted norms for age at marriage. The beginning of reproduction for a woman at Fisher River usually coincided with marriage, although in five of the 52 cases, a child had been conceived before the couple was married in the Methodist Church. This is consistent with Dunning's (1959: 146) claim that Ojibwa men and women usually married when the woman was pregnant.[16]

In five other cases there was a lag between marriage and first conception of more than two years. This may have been due to the fact that the husband and wife were separated immediately after marriage or the wives were temporarily infertile. Alternatively, some of the first infants may have been baptized in a neighbouring community or may have died before baptism so that the 'first born' recorded at Fisher River in reality was the second or third born. Thus, in order not to bias the mean maternal age upwards, the five families whose first birth was recorded at Fisher River two years or more after marriage were

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[16]It must be borne in mind that this sample does not include illegitimate children, since it is based on the union of men and women whose marriage was sanctified in the Methodist Church. The registering of illegitimate children in the Church baptismal records was contingent on the Minister's record keeping. Between 1908 and 1940 no illegitimate children were recorded by F.G. Stevens. Prior to 1908, however, Steinhauer baptized 20 children whom he noted in the baptismal register as illegitimate.

removed from the sample. The mean maternal age at first live birth for the remaining families was calculated using either the birth date of the mother (or in many cases the birth year) and subtracting it from the birth date of her first live infant. In three cases there was no birth date or birth year recorded for the mother; as a proxy, the date and age at marriage for the mother was used.

The mean maternal age for the first born infant (N=47) is 20.55 years of age (± 2.05). This is very similar to those calculated for other historical aboriginal populations in Canada (Table 6.4). During the first decades of the twentieth century the Red Earth Cree women of northern Saskatchewan usually began to marry in their late teens (Meyer 1985: 108). For the Island Lake, Manitoba Cree-Ojibwa marriage cohort spanning the years from 1910 to 1924, Sawchuk (1972: 41) calculated a mean age of 19.99 years (± 3.63) for females at their first live birth.

Although the women in the Fisher River marriage cohort began reproduction at an early age relative to a modern industrialized nation, as seen in Table 6.4, the mean maternal age at first birth was quite similar to that of the very fertile Hutterites (Eaton and Mayer 1953) as well as the much less fertile !Kung (1979). Thus, although an early start to the reproductive period for women was one contributing factor to the high fertility for the Fisher River marriage cohort, it was not the determining factor.

Birth Intervals

Spacing of infants in a family, like maternal age, is an area of investigation important both to fertility and infant mortality (Chen 1983; Knodel 1985). The shorter the birth intervals, the higher a woman's attainable parity. Shorter birth intervals potentially impair the

mother's health, moreover, which in turn affects the health of her infants.

The mean birth interval for the Fisher River sample was calculated by subtracting birth dates for the first to fourth offspring. Only the first three birth intervals were employed in the analysis in order to standardize the families in the marriage cohort.[17] The mean birth interval is 742.37 days or 24.4 months (N=99, ± 353.38 days or 11.61 months). Again, this is similar to other aboriginal populations (Table 6.4), although somewhat shorter in length, probably a result of the fact that only birth orders one through four were used to calculate the mean birth interval for the Fisher River marriage cohort. Birth intervals lengthen at older maternal ages and higher birth orders, probably because of lower fecundity at higher maternal ages (Romaniuk 1974: 347).

In a natural fertility, breast feeding population birth intervals will be influenced by the fate of the previous child. Although the exact mechanism is still debated, studies of birth intervals have shown that pregnancy is delayed during lactation (Knodel and Van de Walle 1968: 10; Howell 1979: 180). Consequently, if a child survives and is breast fed up to the age of at least six months, the birth of a subsequent child will be delayed. If, however, the child dies before the end of the lactation period, a woman is more likely to have a short birth interval (Knodel 1968; Knodel and Van de Walle 1967).

The Fisher River data concur with these findings. The average birth space between an infant who survived and the subsequent infant is 796.15 days or 26.2 months (N=79, ± 363.36 days or 11.9 months). On the other hand, the mean interval between an infant who

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[17] This is based on Romaniuk's (1974) technique for calculating birth intervals for his sample of fertility histories for the James Bay Indians. In order to facilitate comparability for different generations of female cohorts, Romaniuk used only the first two birth intervals in his analysis.

dies and the subsequent infant is 529.95 days or 17.4 months (N=20, ± 206.25 days or 6.78 months). These means are significantly different when tested with the student t-test (t=3.143, d.f.=97, p=0.002). These results confirm that Fisher River was a breast feeding community (Knodel 1968) and that the birth and death records for the infants are sufficiently accurate to manifest this pattern.

Birth intervals are also said to be inversely correlated with infant mortality; that is, the shorter the previous birth interval, the higher the risk of dying during infancy (Knodel 1985: 85). Table 6.5 compares the risk of dying during infancy (q_o) subsequent to three different birth interval categories using the Fisher River marriage cohort. Q_0 was calculated by dividing the n of infant deaths by N of total offspring.

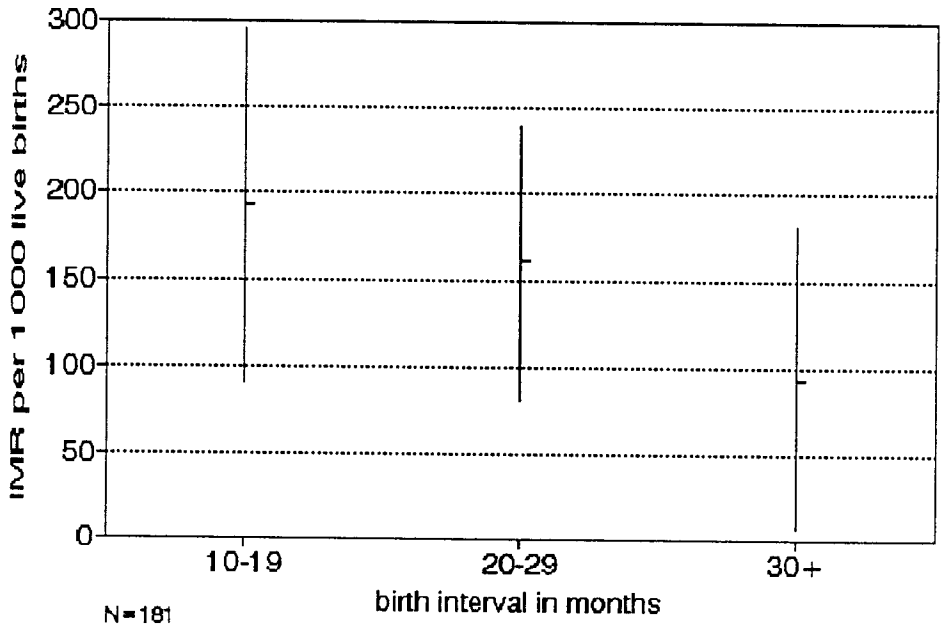
Table 6.5 Infant Mortality by Length of Interval to Current Birth and Fate of Previous Birth. Fisher River Marriage Cohort: 1907-1930

interval	fate of previous birth: survived		died		all fates	
in months	q_o	N	q_o	N	q_o	N
10-19	0.176	34	0.217	23	0.192	57
20-29	0.149	74	0.285	7	0.160	81
30+	0.095	42	0.000	1	0.093	43

Although it appears from q_o that the risk of dying decreases as the birth interval lengthens (at least for the 'survived' and the 'all fates' categories), this downward trend is not significant when confidence intervals are calculated for the rates (Figure 6.5). It is difficult at this juncture to know whether birth intervals do not significantly affect IMRs in this population or whether it is simply a matter of not having a large enough sample to detect a difference. This

is a question which must be further investigated in future studies of infant mortality in aboriginal populations.

Fig. 6.5 IMR According to Previous Birth Interval in Months



Conclusion

At this point, the issue of distribution of infant mortality among families in the Fisher River community is still somewhat opaque. Testing for clustering of infant mortality in certain families requires a large marriage cohort with fully recorded families. Because of limitations on the Fisher River data this analysis was attempted but was not feasible. Nevertheless, the significantly lower IMR derived from the marriage cohort sample compared

to that calculated from the aggregate data, points toward the possibility of some disparity in infant health among families at Fisher River. Well-recorded families selected for the marriage cohort, by virtue of their semi-permanence in the communtiy and commitment to the Methodist Church, may have had social and economic benefits over those families who were more transient or who were not well connected with the Church.

Fortunately, because the marriage cohort does appear to reflect the profile of infant mortality in terms of age structure and proportionate cause of death, we can assume that further analysis of sibship size, maternal age and birth intervals is valid. It is clear, however, that there are many questions left unanswered after the analysis of the reconstituted family sample, mostly because of the incomplete reproductive histories and the small number of families in the sample. Nevertheless, this analysis gives a better understanding of reproduction in the Fisher River community and its potential interactions with infant mortality.

Although an actual fertility rate cannot be calculated for the Fisher River reconstituted family sample, indirect computations based on a subset of completed families suggest that the women were very fertile. The high mean sibship size for the eight complete families, the young mean maternal age at first birth and the short average birth intervals were all within the range of other historical, North American aboriginal and non-aboriginal populations with high total fertility (Table 6.4). The short mean interbirth interval contrasts dramatically with that for the Dobe !Kung studied by Nancy Howell (1979) who are considered to have one of the lowest fertility rates of all human populations.

The influence of fertility on infant mortality is difficult to detect, although there are some indications that a large sibship size adversely affected infant survival. The association

between short birth intervals and the risk of death during infancy was inconclusive for the Fisher River sample, although there did seem to be a decreasing trend in the IMRs as the interbirth interval lengthened (Figure 6.6).

CHAPTER VII

Discussion and Conclusions

The aims of this thesis were twofold: 1) to describe infant mortality in an aboriginal community prior to the infusion of medical health services in Canadian aboriginal communities after W.W.II; and 2) to test the feasibility of using parish record data and family reconstitution method to study infant mortality in an early twentieth century reserve population. While the aims may seem straightforward, the results never are, and more questions are raised than answered. In the following chapter, however, I will attempt to synthesize some of the salient results of this study of infant mortality at Fisher River. Although the aims of the thesis are listed above in priority of importance, I will begin the chapter with a discussion of the methodology, followed by an interpretation and discussion of the results of the study.

Parish Record Demography and Reconstitution Methodology

If one wishes to investigate infant mortality prior to W.W.II for a specific reserve population, one is limited to certain data sources. The main sources are parish records and treaty annuity pay lists[18]. Although only parish records were used in this study, the complement of both treaty annuity pay lists and parish records would fill in the lacunae inherent in each data set alone. Herring, Driben and Sawchuk (1983) encourage the use of

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[18] Treaty Annuity Pay Lists are maintained by the federal government. They record the names of Band members and their children. Lists for years prior to 1900 are accessible to the public; however, after 1900 permission from the Band is necessary in order to view the documents.

multiple data sources; they question the accuracy of demographic studies of northern Algonkian populations based on one set of records.

Unfortunately, I was unable to gain access to the Fisher River treaty annuity pay lists; however, I attempted to enhance and check the quality of the records by employing parish records from the Peguis Anglican Church and oral interviews. In employing only the Fisher River parish records, moreover, I attempted to be as discerning as possible. In many ways the registers are very thorough. For example, birth date and cause of death data were noted in over 90% of the baptismal and burial records. These data were extremely valuable in an analysis of infant mortality.

The most serious drawback to the Fisher River parish records, especially with regard to family reconstitution methodology, is the lack of completely recorded family histories. This is a function of the high degree of family mobility at Fisher River during the early twentieth century. Despite the fact that the Cree-Ojibwa of northern Manitoba had been settled on reserves by the government during Treaty No. 5 negotiations and encouraged by missionaries to adopt an agricultural lifestyle, they were not stationary people. The spatial mobility of families was fostered in part by the tradition of post-marital movement, alternating between uxori- and patrilocality. Movement, however, was also encouraged by the early twentieth century northern aboriginal economy which necessitated travel to wage labour locations in the Lake Winnipeg region.

A study focusing on a single parish in a European or Euro-Canadian setting may be feasible because of the more sedentary nature of families in these populations. However, it is perhaps narrow to consider one reserve as the locus of study, when in fact several neighbouring reserves would better define 'the community'. Unfortunately, reconstituting

families for a group of parishes is a huge undertaking, and one would have to carefully consider the aims of the study before proceeding with the task. Here, I adapted the reconstitution methodology by employing partially reconstructed families in the analysis. This method was adequate for the analysis of infant mortality; however, as demonstrated in Chapter 6, it falls short for an investigation of fertility, where the complete reproductive histories of families are required.

The question of representativeness looms large for all studies employing family reconstitution methodology. In some ways the bias was minimized in this study, since there was no requirement that the family histories be complete and have lived their entire lives at Fisher River. Nevertheless, as evidenced by the lower IMR for the marriage cohort compared to the aggregate death cohort, it seems that the sample was biased towards families more or less established at Fisher River. It seems that it is impossible to avoid this bias, as selecting well recorded and established families in the marriage cohort sample is an implicit part of family reconstitution methodology. However, combining it with aggregate data analysis rendered the bias patent and balanced the view of infant mortality in the community. Aggregate data analysis also augmented the sample size for analyses such as seasonal patterning of infant mortality, where small numbers of infant deaths from the marriage cohort may not have evidenced a clear pattern.

Despite limitations in the data, the question remains: Was the family reconstitution method helpful in the study of infant mortality at Fisher River? Family reconstitution method enabled me to move the unit of analysis from the community to the family. Although the IMR is strongly influenced by the community environment, many of the more proximate determinants of infant mortality rest within the family setting. Ideally, in order to elucidate

the causes of infant mortality in a family one needs to know: the condition of the family dwelling; the quality of health of the other family members; the degree of access they have to resources and how resources are distributed within the family. Clearly, these data are difficult to discern from non-living populations, especially for a community where no family censuses were completed. However, by examining variables such as family size, birth intervals and maternal age, one is able to indirectly uncover a wider number of factors which contribute to infant mortality.

The Infant Mortality Rate and the Fisher River Community

In review, the IMR is considered to be a sensitive indicator of infant health and by extension community health. It can be concluded from this study that the IMR at Fisher River from 1910 to 1939 remained persistently high. According to the aggregate data estimates, it remained above 200 infant deaths per 1000 live births for each decade during the period. The marriage cohort (1907-30) yielded an IMR for the period of 175.2 infant deaths per 1000 live births. In other words, approximately 1 out of 5 of all children born at Fisher River during this period died before their first birthday. This is extremely high for modern developed nations and even modern developing countries. Such a high IMR indicates that morbidity was prevalent such that many infants succumbed to bouts of illness during infancy. Clearly, infants in the community were under extreme duress.

Some of the parameters of infant mortality and its underlying causes were examined in Chapter 5. According to all biological indicators, the women at Fisher River breast fed their infants. Breastfeeding affords infants a fair amount of protection, both immunologically and nutritionally. Even if a woman is malnourished, her breastmilk will be nutritionally adequate

for the infant (Gershwin, Beach and Hurley 1985). The rate of infant mortality at Fisher River rose after five months, indicating that either the infants were weaned at this point and were not adequately nourished with solid food, or that mothers continued to breast feed without proper nutritional supplementation. Breast milk alone is not nutritionally sufficient for an infant after six months of age (Chen 1983).

Infectious disease, specifically respiratory infections, worked synergistically with undernutrition. In an era without antibiotics or vaccination, the presence at Fisher River of diseases such as tuberculosis, pneumonia, bronchitis, measles and influenza was potentially lethal for infants and adults for that matter. This situation was further exacerbated by undernutrition, which left an infant's immune system weak and defenceless against infectious disease.

The interplay between respiratory infection and undernutrition manifested itself in the seasonal predominance of high IMRs in the community during the fall and winter and low rates during the summer. One factor which contributed to this pattern was the seasonal vacillation of respiratory infections; airborne infections waxed during the winter when people spent long periods of time indoors and when viruses and bacteria were easily propagated from human to human. On the reserve, people sheltered in log cabins during the cold winters; the cabins were purported by Indian Agents to be crowded and poorly ventilated (CSP, 1908, No.27, 273-274). Although this seasonal pattern of disease is common to a northern climate, it concurred with the community's seasonal period of dearth in the food supply during the winter months.

Family reconstitution analysis (Chapter 6) yielded some interesting results concerning parental factors and their effects on infant mortality at Fisher River. Demographic transition

theory usually treats infant mortality as the independent variable and fertility as the dependent variable. In other words, a decrease in infant mortality is seen as a motivator of fertility decline. However, the converse of this, that high fertility negatively influences infant mortality, is entertained by some researchers (Woods, Watterson and Woodward 1989). From the results of Chapter 6, it is clear that high fertility among mothers in the marriage cohort was associated with the high IMR. Although it is impossible to specify the underlying mechanisms, one can hypothesize that: 1) high parity and short birth intervals impaired the health of the mother and hence her infant (both pre- and post-natally); and 2) higher sibship sizes and shorter birth intervals depleted caregiving time and economic resources within a family, so that an infant's health potentially suffered.

This latter hypothesis, however, is somewhat tenuous as the baptismal records convey the number of offspring born to a couple, but do not reflect the actual household composition of the family. For example, adoption practices in aboriginal communities served as a practical means of distributing caregiving responsibilities more equitably (pers. comm., Wayne Warry 1992). The tradition of grandparents adopting their grandchildren at Fisher River is still common today (pers. comm., Theresa Mallette 1992). Hence, the hypothesis that sibship size affects a family's caregiving ability for infants could only be tested with knowledge of the domestic environment of individual families.

Beyond just the focus on infant health, infant mortality is deemed to be a sensitive indicator of overall community health (Young 1979: 175; Klein 1988: 1023). When studying populations from the past, the reliance on health indicators such as the IMR is necessary, as one cannot observe people's health firsthand. That does not, however, preclude questioning the indicator's validity.

The IMR is thought to be closely related to other age-specific mortality rates; however, Murray (1988) contends that this must be empirically tested. Although not a specific goal of this thesis, analysis of the aggregate mortality profile of the Fisher River data for 'other age groups' revealed some divergence from the infant mortality profile (Chapter 5, pp.90-93). From 1910 to 1920 the years of epidemic disease equally affected infants and other age groups; however, during the years 1920 to 1939, for which there was a high toll of infant mortality, there was little correspondence in the mortality patterns of infants and other age groups. In fact, the high peaks and troughs representing yearly counts of deaths subsided for other age groups after 1920, whereas they persisted for infants. Thus, after 1920 there may have been some change in the mortality profile of other age groups which was not signalled by the IMR. This, of course, is not conclusive evidence that the IMR is unrepresentative of community health, but the question does merit further research using historical populations.

The IMR is also claimed to be a sensitive indicator of community health because infant mortality is more sensitive than other mortality rates to changes in the socioeconomic environment and healthcare intervention (Murray 1988). However, criticism has been inveighed against this assumption because within any community there is inequitable distribution of resources which vitiates discussion of a homogeneous state of health (Nichter and Kendall 1991: 197). This was, in fact, probably the case at Fisher River, as manifested by the significantly lower IMR for the sample of reconstituted families compared to the aggregate rate. It is not difficult to imagine a scenario where Rev. Stevens, as gatekeeper for resources such as medicine, wage labour, clothing and food from his farm, provided benefits for families that were closely associated with the Methodist Church.

The comparison of the age structure of infant mortality and the cause of death profile for the marriage cohort and aggregate data (Chapter 6, pp.99-103) demonstrated that despite the discrepancy in the IMRs, the pattern of infant mortality in the marriage cohort reflected that of the aggregate data. Thus, it is still feasible to discuss what I will label in a catchall phrase, the 'reserve environment'. As discussed in Chapter 2, during the early twentieth century families at Fisher River had to work extremely hard at wage labour, trapping and hunting in order to survive. Fur and fish yields and their respective markets fluctuated yearly and seasonally between 1910 and 1939 and although there were some government food rations given to people on the reserve, undernutrition was rife. Fisher River was in constant contact with other communities on Lake Winnipeg and with the introduction of the Hudson's Bay Railway new immigrants settled in close proximity to the reserve. Thus, there was no lack of human contact for disease transmission. Large families lived in small dwellings and respiratory infections, especially tuberculosis, were endemic at Fisher River. Finally, the community had little control over its resources; this had powerful repercussions on the quality of life for the people and was exhibited in their poor health status.

Infant Mortality in the Early Twentieth Century Aboriginal Context

In considering the IMR as an indicator of aboriginal health, it is informative to contemplate the opinions regarding aboriginal infant mortality held by government bureaucrats during the early twentieth century. As Armstrong (1990) argues, the IMR was an early twentieth century analytical invention by the medical health establishment. The IMR has subsequently been used by nations of the world to rank the quality of state healthcare and social programs. The IMR, moreover, has been used as a tool for those with a hidden

political agenda. For example, British medical doctors employed the high IMR in England during the 19th century to justify their censure of women working outside of the home (Dyhouse 1978).

Health inspectors working for the Department of Indian Affairs regarded tuberculosis and infant mortality as "conditions peculiar to the Indians which are responsible for the excessive death rate" (CSP 1908, No.27, xxiii). The causes of high aboriginal IMRs alternated between the mother as the incompetent caregiver and environmental problems of reserve life. One health inspector surmised:

> Probably much of this infantile mortality may be traced to premature marriage, which result in weakly offspring, and to ignorance of inexperienced mothers as to what constitutes suitable nourishment for their children, and as to their care when sick (CSP 1911, No.27, xxii).

The IMR was viewed as an indicator of Indian progress from heathen primitivism to the 'civilized' state; thus the 'cure' for the high IMR was sought in the promotion of Western hygiene and healthcare.

> Baby clinics are held wherever possible, and on some reserves, in addition to monthly clinics, baby shows are being established with a view to stimulating the interest of Indian parents in proper methods of caring for their children. Indian women and girls are encouraged by the nurses and field matrons to cultivate gardens, and they are instructed in methods of canning fruit and vegetables for the winter months. By such simple instruction in the art of living, coupled with the care given by the Indian agents and medical attendants, the health of the Indian people must be improved (Ann. Dept. Rep. 1925-26, vol.II, 11).

The missing perspective on this issue is how the community itself experienced infant death, what it meant in terms of aboriginal culture and to the families involved. Every culture values its children; aboriginal cultures today look towards their children in terms of cultural survival (Warry 1989: 211). However, different cultures define when childhood

begins and ends. Dunning (1959: 98) noted that in the early years of the twentieth century the Northern Ojibwa of Pekangekum did not name their infants until they had a naming ceremony, which occurred between the age of a few months and one year. Thus, one might speculate that 'personhood' arrived later for an infant in that culture. The Methodist Church deemed that personhood began with the Christening ceremony, which occurred ideally as soon after birth as possible. However, as evidenced by the Fisher River baptismal records, infants were baptized on average several months after birth (Table 4.1, p.59). It is possible that this custom reflected aboriginal values about the beginning of personhood. One could speculate, moreover, that the high risk of death during infancy supported the tendency to delay the initiation of personhood.

Unfortunately, there is little ethnohistoric information that gives insight into how a family reacted to an infant death. However, one poignant passage from Rev. Stevens' autobiography sheds some light on what a parent experienced, and suggests that the Cree-Ojibwa perspective, although not uncaring, was resigned or accepting of infant death. Rev. Stevens employed a Fisher River guide named Peter to accompany him on a tour of neighbouring communities. When Peter left with Stevens, his ten month old infant daughter, who according to Stevens had been sickly since birth, was on the verge of dying. During their trip Rev. Stevens had word sent from his wife that Peter's daughter had died. Stevens recounted: "I took him to one side and broke the news to him. He said, 'It is no news to me. I knew it that Saturday night at Little Grand Rapids.' That was when she died" (p.52).

Infant Mortality: Past and Present

This study of infant mortality at Fisher River, Manitoba obviously cannot be

generalized to all aboriginal communities during the early twentieth century. Undoubtedly, some reserves had lower rates of infant mortality during this period, and there were probably others that endured even higher rates. Studies of infant mortality such as this one in other historical aboriginal communities would be a valuable source of comparison. One could then ask what social and environmental conditions precipitated a high IMR in one community in contrast to a lower IMR in another community.

What remains now is to compare the results of this study to what is known about infant mortality in Canadian aboriginal populations today. Unfortunately, this is somewhat difficult as recent studies concerned with aboriginal infant mortality employ national or provincial aggregate data. Moreover, the political and economic context has radically changed in the approximately sixty years between aboriginal communities in the early twentieth century and those today. After W.W.II there were major infrastructural changes on Canadian reserves, including the establishment of the welfare state and the rapid infusion of medical health care (Young 1988). Thus, it is perhaps impossible to compare data from one reserve in northern Manitoba prior to W.W.II to present day aboriginal peoples all over Canada.

On the other hand, there are some commonalities in the results which merit attention. Firstly, infant mortality among aboriginal peoples in Canada today is still much higher than the national average (Muir 1988; Pekeles 1988). In absolute terms the aboriginal IMR has declined in the past sixty years, but relative to the IMR for other people in Canada, the gap remains. Secondly, studies of morbidity among infants in northern reserves reveal that upper respiratory infections are still a persistent cause of health problems (Evers and Rand 1982). Although health care reduces deaths from these causes, the health of infants is still impaired

by these diseases.

Clearly, there are some factors that were operating within the reserve environment during the early twentieth century which continue to operate today. It would be fruitless for me to speculate on these factors, as I have not found any community-based studies of infant mortality in the modern reserve context which are comparable to the results of this study. However, based on the findings of this study, I can suggest some areas of research which I recommend pursuing.

There are ample reports of IMRs aggregated at the provincial or national level. What is needed now is analysis done at the level of the reserve community. The analysis would employ ethnographic and demographic/household data. An excellent example of this type of work is Margaret S. Boone's (1989) study of infant mortality among Black inner city communities in Chicago.

Some of the parameters and proximate determinants of infant mortality, besides use of the healthcare system, should be examined. This study revealed a seasonal pattern of infant mortality related to disease and undernutrition. It would be interesting to compare these results to the seasonal pattern, if any, of infant mortality in aboriginal reserve communities today. One might speculate that respiratory and gastro-intestinal diseases would fluctuate with seasonal temperatures; however, the presence of a market economy and social security today would possibly eliminate the seasonal pattern of mortality.

Another area of investigation is fertility and its impact on infant mortality. The relationship between fertility and child mortality is pursued in developing countries (Chojnacka and Adegbola 1990); however, there is no such research to my knowledge concerning aboriginal peoples. This would seem appropriate considering that aboriginal

people in Canada have had a high fertility rate since the turn of the century; although it has decreased somewhat since the 1960s (Romaniuk and Piche 1972), the birth rate among registered Indians is still almost twice as high as the national rate (Pekeles 1988: 1568).

As well, there is a need for research that investigates other indicators of infant health in aboriginal populations such as infant birth weight. Birthweight data should be compared to IMRs and morbidity data and analysed in tandem with data on maternal health, prenatal care and nutrition.

In summary, this study of infant mortality at Fisher River was meant to serve as a window on aboriginal health conditions in the early twentieth century, a snapshot of one community. It is intended to demonstrate what is possible to learn from the past and what research needs to be done in the future.

APPENDIX I

Annual Number of Events at Methodist Church of Fisher River, Manitoba (1907-1939).

Year of Event	Baptisms	Marriages	Burials	Total
1907	34	7	14	55
1908	25	4	24	53
1909	37	6	16	59
1910	36	1	32	69
1911	29	6	20	55
1912	22	5	19	46
1913	30	3	20	53
1914	25	1	24	50
1915	23	5	4	32
1916	16	3	40	59
1917	19	3	6	28
1918	19	6	44	69
1919	25	11	17	53
1920	19	8	12	39
1921	17	6	18	41
1922	26	2	17	45
1923	20	2	15	37
1924	24	12	15	51
1925	22	4	13	39
1926	20	3	15	38
1927	24	6	16	46
1928	21	6	25	52
1929	28	6	14	48
1930	23	6	21	50
1931	27	6	13	46
1932	23	10	12	45
1933	24	1	16	41
1934	30	8	7	45
1935	23	1	22	46
1936	27	4	19	50
1937	16	6	15	37
1938	22	7	18	47
1939	25	3	21	49
Totals	767	161	590	1573

APPENDIX II

Causes of Death for Fisher River Infants: 1910-1939

Cause of Death	n of infant deaths
INFECTIOUS	
airborne	
bronchial pneumonia	1
bronchitis	3
broncho-pneumonia	1
flu	11
influenza	4
measles	3
pneumonia	40
pneumonia and spinal meningitis	1
stomach flu	3
tubercular trouble	1
tuberculosis	5
whooping cough	8
congestion of lungs	2
cough	3
inflammation of lungs	1
lung trouble	1
total	88
spanish influenza	11
food and waterborne	
bowel complaint	7
bowel trouble	6
chronic constipation	1
cholera infection	1
constipation	3
diaharrea	2
gastric trouble	2
indigestion	2
inflammation of bowels	1
summer complaint	4
teething[1]	1
tubercular bowels	2
total	32
other	
otitis media	1
stomatitis	1
total	2

APPENDIX II continued

Causes of Death for Fisher River Infants: 1910-1939

Cause of Death	n of infant deaths
NON-INFECTIOUS:	
other	
jaundice	1
lack of nourishment	1
malnutrition	1
total	3
congenital	
birth injury	3
constitutional weakness	4
deformed	1
immature birth	1
imperfect birth	2
infantile deformity	1
infantile diaharrea	1
infantile weakness	10
pre-natal defect	2
premature birth	5
total	30
non-specific	
convulsions	2
hemmhorage	1
infant	3
neglect	3
perished while travelling	1
total	10
no cause of death listed	6
TOTAL	182

[1] "Teething" was included in the gastro-intestinal category following Sawchuk, Herring and Waks (1985) who contend that "teething" represents the disease complex of weanling diarrhea.

APPENDIX III

Matrix for calculating the risk of infant deaths relative to infant births (Knodel 1988)

n of birth by mo.	n of deaths per month											
N= 664												
J 59	J 1	F 2	M 2	A 1	M 0	J 0	J 2	A 0	S 1	O 1	N 0	D 0
F 67	F 8	M 4	A 2	M 1	J 0	J 0	A 1	S 2	O 0	N 0	D 0	J 0
M 61	M 9	A 3	M 1	J 1	J 0	A 1	S 1	O 1	N 1	D 0	J 0	F 1
A 67	A 11	M 0	J 0	J 1	A 2	S 0	O 2	N 1	D 0	J 2	F 0	M 2
M 64	M 3	J 0	J 0	A 2	S 0	O 1	N 2	D 1	J 0	F 1	M 0	A 0
J 48	J 3	J 0	A 1	S 1	O 3	N 1	D 0	J 1	F 0	M 0	A 0	M 3
J 61	J 1	A 0	S 1	O 1	N 2	D 1	J 2	F 0	M 3	A 2	M 0	J 0
A 49	A 2	S 3	O 0	N 1	D 0	J 2	F 0	M 0	A 1	M 0	J 0	J 1
S 44	S 3	O 0	N 1	D 0	J 2	F 1	M 2	A 1	M 0	J 0	J 0	A 1
O 40	O 8	N 1	D 0	J 4	F 1	M 1	A 1	M 0	J 0	J 1	A 1	S 0
N 46	N 6	D 0	J 0	F 1	M 2	A 0	M 0	J 0	J 0	A 0	S 0	O 0
D 58	D 4	J 3	F 2	M 1	A 2	M 0	J 3	J 1	A 1	S 0	O 0	N 1

APPENDIX IV

Annual Count of Deaths. Fisher River: 1910-1939

Year	n of deaths < 1 year old	n of deaths > 1 year of old	total deaths	per cent of total deaths < 1 year old
1910	19	11	30	36.7
1911	12	7	19	36.8
1912	9	7	16	43.8
1913	12	7	19	36.8
1914	17	5	22	22.7
1915	1	3	4	75.0
1916	25	11	36	30.6
1917	4	6	10	60.0
1918	23	12	35	34.3
1919	12	5	17	29.4
1920	4	4	8	50.0
1921	7	8	15	53.3
1922	13	4	17	23.5
1923	6	7	13	53.9
1924	10	5	15	33.3
1925	11	1	12	8.3
1926	8	6	14	42.9
1927	8	8	16	50.0
1928	15	7	22	31.8
1929	12	2	14	14.3
1930	18	3	21	14.3
1931	7	3	10	30.0
1932	6	5	11	45.5
1933	7	9	16	56.3
1934	6	1	7	14.3
1935	10	9	19	47.4
1936	14	4	18	22.2
1937	12	5	17	29.4
1938	8	9	17	52.9
1939	13	8	21	38.1

Per Cent of Total Deaths < 1 Year Old:
1910-1919 $\bar{x}$=40.6, ± 14.8, range = 22.7 to 75.0
1920-1929 $\bar{x}$=36.1, ± 15.7, range = 8.3 to 53.9
1930-1939 $\bar{x}$=35.0, ± 14.6, range = 14.3 to 56.3

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