AUTONOMOUS NATIVE HEALTH SERVICES, GOVERNMENT AND UNIVERSITY HOSPITALS.

A CASE STUDY OF AN EPIDEMIC OF INFANTILE CASTROENTERITIS IN NORTHWESTERN QUEBEC

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ABSTRACT

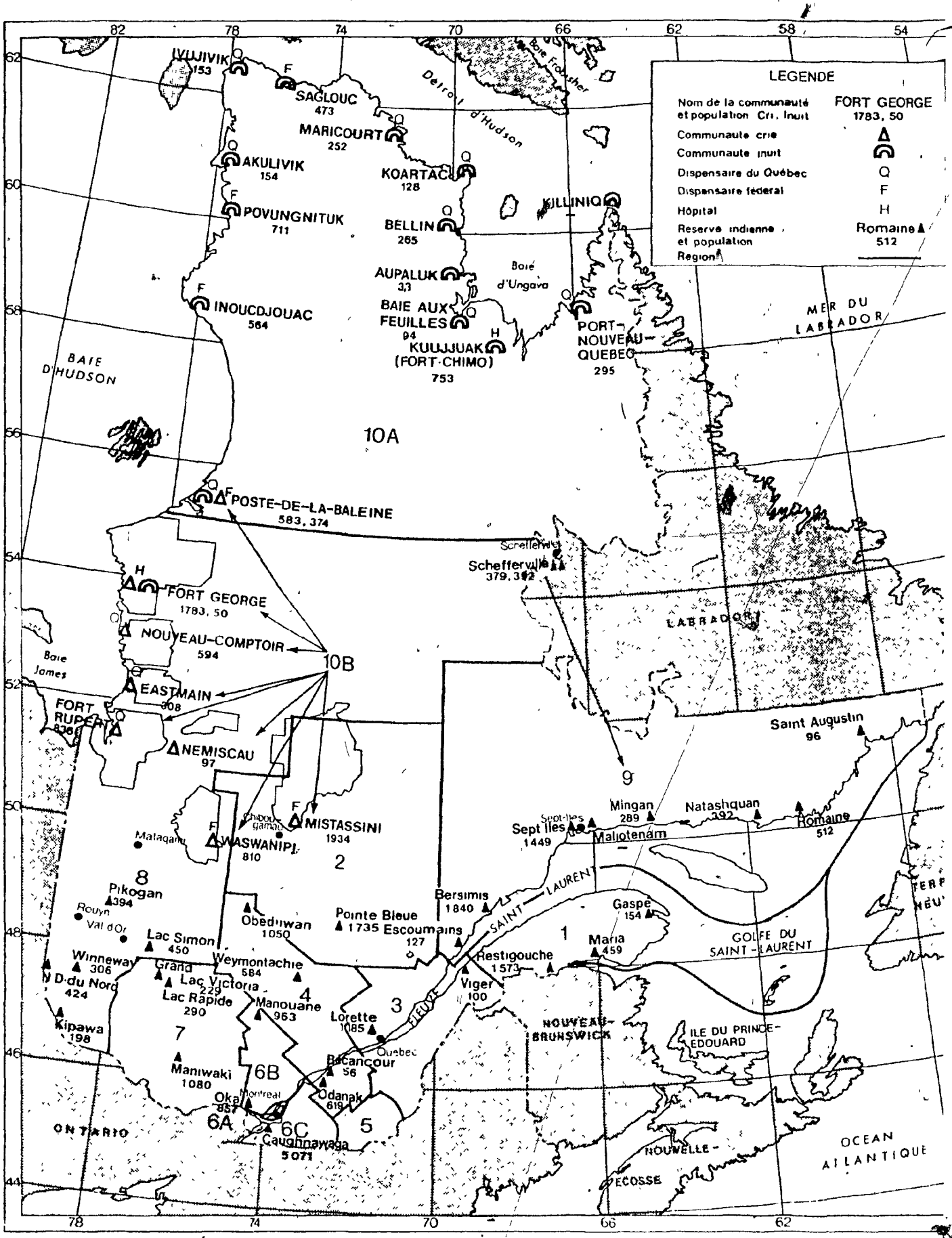
An epidemic of infantile gastroenteritis among native people in northwestern Québec highlighted problems in water distribution, waste disposal and personal hygiene in Cree and Inuit villages. The gastroenteritis, associated with Escherichia Coli 0111:K58, affected a majority of infants in some villages. At least eighty children were hospitalized, many for prolonged periods, with half requiring referral to pediatric centres. There were seven known deaths. Epidemiologic and clinical aspects of this epidemic are discussed.

The medical, administrative, and political responses to the epidemic among the Crée highlighted problems in the relationship of the Cree-run Regional Board of Health and Social Services with its university based consultants and with the federal and provincial governments. Similar problems can be expected where other autonomous native health services are established. They suggest the need for closer collaboration between such services and their consultants, particularly in the field of community health.

RÉSUMÉ

Une épidémie de gastro-entérite infantile survenue chez les autochtones du nord-ouest du Québec a mis en évidence des problèmes dans l'alimentation en eau potable, dans l'élimination des déchets et dans l'hygiène personnelles des villages cris et inuits. Dans certains villages, la majorité des enfants ont été atteints par cette épidémie de gastroentérite reliée au Escherichia Coli 0111:K58. Au moins quatre-vingts enfants ont été hospitalisés, plusieurs pour une période prolongée. La motié d'entre eux ont été référés dans des hôpitaux pédiatriques. Sept décès ont été enregistrés. Les aspects épidémiologiques et cliniques de cette épidémie sont discutés dans le présent exposé. La réaction des milieux médical, administratif et politique à cette épidemie a soulevé les problèmes qui existent dans les rapport entre le Conseil Régional de la Santé et des Services Sociaux dirigés par les cris, les consultant universitaires et les gouvernements fédéral et provincial. On peut s'attendre à faire face à des problèmes semblables là où d'autre services de santé autonomes seront établis chez les autochtones. Une collaboration plus étroite entre ces services et les consultants qui y sont rattachés est, donc, nécessaire et ce, plus particulièrement, dans le domaine de la santé communautaire.

LOCALISATION DES COMMUNAUTES AMERINDIENNES ET INUIT DU QUEBEC



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Dr. Marcel Parent (Département de Santé Communautaire, Montreal General Hospital) provided guidance through the maze of health services in northern Québec. Dr. Gerard Martineau (Infectious Disease Section, Ministère des Affaires Sociales) commissioned the epidemiologic report that is the core of this thesis. The environmental officers of Health and Welfare Canada, and Environnement Québec, taught me about the problems of rural sanitation.

Finally, I thank the members and advisors of the Cree Health Board and the Cree Regional Authority for their support. I was encouraged principally by their determination that this epidemic would be followed by improvements in the health of the Cree people of Québec.

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INTRODUCTION

The James Bay and Northern Québec Agreement[1] was signed in November 1975 by the Cree and Inuit of Québec and the governments of Québec and Canada. It was one of the first large scale native land claims settlements in North America and was stimulated by Québec's interest in the hydroelectric potential of its northern rivers. One of its most interesting aspects was the establishment of Cree and Inuit control of their own schools, health and social services, and other local services.

As excellent as this principle is, there have been many problems related to its implementation in, among others, the health sector. These include inadequate financial support, a shortage of local people with adequate training and experience in administration, and the inexperience of the Québec government in the problems of native Canadians. In carrying out its responsibility, the Cree Regional Health Board established an agreement with the Department of Community Health of the Montreal General Hospital (a McGill teaching hospital) to coordinate community health programs and to provide certain other medical services.

In the spring of 1980, infants in two Inuit villages on Hudson Bay suffered from a rather severe gastroenteritis that spread to other Inuit and Cree communities. The responses of the various agencies that have some responsibility in the Cree territory highlight many of the problems of health services for the Cree. I believe that these problems demonstrate the need for a different and more active involvement of the academic medical centre with the autonomous native health board.

My own involvement started from my work on the Inuit-Indian liaison committee of the Montreal Children's Hospital that received most of the severely affected infants. I was

a member of a team of physicians and environmental officers sent by the Québec Minister of Social Affairs to visit two Cree villages after public pressure from the Cree. After writing the medical report of that visit, I worked for the Cree Health Board as a consultant for their program of implementation of the recommended short-term measures. I was later asked by the Ministry of Social Affairs to prepare a full epidemiologic report (albeit retrospective) of this epidemic, a study of the type they had been urged to undertake many months earlier.

That report, including some "traditional" infectious disease epidemiology and specific policy recommendations, forms the core of this thesis. To it, I have appended four earlier reports that I had written - the first two for the medical-environmental visit and the second two directly for the Cree Health Board. These were all used in preparing the larger study.

To set this case in context, I first sketch a brief and general background of northern health services and the role of university medical centres (based mainly on secondary sources and only published accounts of university programs). I also give a more-detailed history of the Cree Health Board and its relationship with the Department of Community Health of the Montreal General Hospital.

The report itself is followed by a chronology of the medical, administrative and political responses to the epidemic. Finally I look at some of the broader issues to emerge from this experience that were not explored in the report itself.

HISTORICAL BACKGROUND

I. NATIVE HEALTH SERVICES IN NORTHERN CANADA

1) Health Problems

The particular health problems of native people in northern Canada have several sources.

a) Contact with white people from Europe and the south introduced communicable diseases (especially tuberculosis, measles, whooping cough, and gonorrhea) to which the population had not been previously exposed and was exceedingly susceptible.[2-4]

b) The establishment of outposts of southern culture and technology in the north have had a revolutionary effect on behaviour of northern people. In place of small bands of nomads following migratory herds, larger permanent settlements have been established. These have facilitated the spread of disease. They have undercut many of the traditional values of Indian and Inuit society that formed the basis of a very tenuous balance with a very harsh physical environment.[5-6] Widespread excessive alcohol consumption and an increase in violence are particularly dramatic.

c) The economic status of northern people has been very low. With traditional sources of livelihood less prevalent and the absence of indigenous modern enterprise, these communities are generally not economically self-sustaining. In addition, there has been a lag between the abandonment of traditional life patterns and the

provision of modern services. The permanent settlements typically have inadequate housing and poor sanitation.[2]

The effects of these problems are seen in various vital statistics. Although the infant mortality rate (death of infants under one year of age per 1000 live births) among registered Indians in Canada has decreased about threefold in the last twenty years, it remains about twice as high as the national rate (26.5 vs 13.5 in 1978).[7] With regard to native people in more remote regions, the rates are even higher (43.9 for Indians in the Northwest Territories (NWT), 37.5 for NWT Inuit in 1979).[8] Life expectancy tables for the various native groups and the territories are not constructed by Statistics Canada because of the small population.[9] Age adjusted mortality rates (death per 1000 population adjusted to a common age distribution for purposes of comparison) were not readily available for Indians and Inuit as ethnic groups. The rate for the NWT (population: 18% Indian, 34% Inuit, 48% other - white and Métis)[8] is similar to the national rate (5.9 vs 6.2 in 1978).[10,11] However deaths by accidents, injuries and violence comprised 32% of all deaths in the NWT versus 9.6% of all deaths in Canada. Within this group, suicides comprised 11.7% of all deaths in NWT versus 1.4% of all deaths in Canada.[10,11]

Although the greatest impact on these health problems will come from social change, the narrower issue of medical services poses its own

problems. Improvements in communication and transportation have helped to overcome some of the problems of geography. Nonetheless, small communities separated by large distances in a severe climate still challenge the organization of medical services.

2) History of Northern Medical Services

The earliest health services in the NWT and other remote northern regions (northern Québec, northern Ontario, etc) were provided by missionaries, generally Anglican or Roman Catholic bebinning in the last quarter of the nineteenth century.[12] (Moravian missionaries provided medical services to coastal Labrador until the Grenfell Association took over this role in 1900.[13]) Missionaries continued to provide the bulk of the services in the NWT until the mid-twentieth century.

The federal government first became involved by recruiting physicians to staff mission hospitals in the 1920's and 1930's. The thirties were marked by devastating epidemics in the north of tuberculosis, measles, whooping cough, and influenza. The government responded by beginning construction of its own network of nursing stations from the 1940's on. These services were administered by a branch of the Department of Mines and Resources from 1936 to 1945 when they were transferred to the newly organized Department of National Health and Welfare (NH&W). Both the Sioux Lookout Hospital[14] and Moose Factory Hospital[15] were built in 1950 to serve the native people of northern Ontario and Québec. The

military hospital in Churchill was adapted for similar use in Manitoba.[16] In the NWT, federal hospitals were built in Inuvik in 1961 and in Frobisher Bay in 1965.[12]

In most regions of the country, the federal government has continued to be directly and actively involved in native health services. Nevertheless, the Department of NH&W has maintained that it does not have a legal responsibility to do so. This policy was summarized in a statement in 1974, part of which states:

> . . . There are no Federal Statutes, including the Indian act, which establish the right of Indians to free health services or to be provided with health services directly by the Federal Government.
>
> The courts have also generally ruled that the Treaties between the Crown and Indians, including treaty number 6, which contains the "medicine chest" clause, do not confer on Indians the right to free medical care.
>
> It is therefore as a matter of policy rather than as a statutory or treaty obligation that the Federal Government has provided certain health services to Indians and has asked Parliament each year through appropriation acts for the authority and the resources to provide these services.
>
> The policy of the Federal Government has been and is that in accordance with its general responsibility in respect of Indians it should do what is necessary to ensure that Indians have access to adequate health services so they can achieve a standard of health comparable to that of other Canadians.

> . . . In summary, Federal policy is therefore based on the principle of ensuring the availability of services by providing it directly where normal provincial services are not available and giving financial assistance to indigent Indians to pay for necessary services where this assistance is not otherwise provided. When Indians live in municipalities with normal medical services and welfare programs supported by the CAP agreements, the Federal Government believes they should benefit from these arrangements as would any other citizen.
>
> As provinces extend their health services into isolated areas where Medical Services Branch has so far been providing health care directly to the Indians, the question arises as to what changes should be made. The Federal Government is willing in these circumstances to withdraw its direct services and have the Province assume the responsibility, provided the Indians involved are agreeable and the cost-sharing for these services is handled under the existing Federal-Provincial Agreements without any special additional cost-sharing arrangements.[17]

In fact, in coastal Labrador, the role of the federal government, since Newfoundland's entry into Confederation (1949), has been limited to financial contributions to the Grenfell Association and the Newfoundland government.[13] In the case in question here, the James Bay Agreement (1975) formally transferred first line responsibility for health care of the Cree and the Inuit from the federal to Québec government.

3) The Role of Universities in Native Health Services

During the sixties, the first formal links were established between university medical centres and the medical services branch of the Department of NH&W. These were between McGill University and the Baffin Zone (eastern NWT) and Queen's University and the Moose Factory Zone (James Bay and the eastern coast of Hudson Bay).[18] In 1968, the Department sought to increase the number of such links. These currently include:

University of Alberta - Inuvik, MacKenzie
University of Manitoba - Northern Manitoba, Keewatin[16,19,20]
University of Toronto - Sioux Lookout[14,21]
Queen's University - Moose Factory[15]
McGill University - Baffin[22]

Other such ties that developed outside the aegis of NH&W were:

Memorial University - Labrador[12]
l'Université Laval - Ungava Bay
McGill University - Québec James Bay[22]

Each of these arrangements has developed along individual lines depending on local needs. Specific features in one or more of them have been:

a) subspecialist visits north

b) arrangements for patient referral south

c) recruitment and orientation of personnel for northern postings

d) training opportunities for medical students and residents

e) special laboratory services

II. THE CREE REGIONAL HEALTH BOARD AND THE DEPARTMENT OF COMMUNITY HEALTH/MONTREAL GENERAL HOSPITAL

The James Bay and Northern Québec Agreement (1975),[1] among many other points, transferred the responsibility for the health services of the Cree and the Inuit of Québec from Canada to Québec.

During the 1970's, the administration of medical services in Québec has become progressively decentralized. The province has been divided into 12 regions, each with a health and social services council representing the various medical and social service institutions of the region, for planning, coordinating and financing health and social services. According to the 1975 agreement, the Cree and Inuit were to establish similar regional health councils for their own people. In this way, they could acquire effective control over their own health services.

The salient points in the agreement on Cree Health Services are:

> 14.0.3 The said Cree Regional Board shall be responsible for the administration of appropriate health services and social services for all persons normally resident or temporarily present in the Region.
>
> 14.0.4 The said Cree Regional Board shall also take over and exercise the powers and functions of the existing establishment at Fort George, as well as other establishments hereafter created.
>
> 14.0.19 In implementing the Agreement and in dealing with the Cree Regional Board, Québec should recognize and allow to the maximum extent possible for the unique difficulties of operating facilities and services in the North:

> 14.0.20 Future health and social programs and services should be applied to the maximum extent possible through the Cree Regional Board.
>
> 14.0.27 Health centres, nursing stations and health stations at various locations, . . . belonging to the Department of National Health and Welfare . . . shall be turned over to . . . Québec. The time schedule for turning over the federal health facilities shall coincide with the assumption of full responsibility for administration of health services by Cree Regional Board . . .[23]

The Board membership consists of:

- one representative from each of the nine Cree communities
- one representative of the Cree Regional Authority
- three clinical staff representatives
- one non clinical staff representative
- the general manager of the regional hospital
- the director of the community health department responsible (by contract) for the region[24]

Like the Navajo National Health Foundation in Arizona,[25] this agreement foresaw the establishment of a large scale autonomous native health service. Many of the native land claims regotiations currently underway in Canada and the United States are focusing on issues of local autonomy. This case study highlights many aspects of the experience in the health field after this agreement.

In March 1977, the Cree Regional Board asked the Department of Community Health of the Montreal General Hospital (DSC/MGH) (a major teaching hospital of McGill University) to form an affiliation. Despite pressure from the government of Québec that they affiliate themselves with l'Université Laval, the Cree preferred the

English speaking institution. As a result, the Northern Québec Module (MNQ) of the DSC/MGH began operation in September 1978 with the following mandate:

a) arrangements for hospitalization in Montreal for specialized cases

b) organization of specialist visits north

c) recruiting and training of non-native personnel

d) training of native personnel

e) programming and evaluation in the field of community health

f) epidemiologic studies.

During the following 18 months, the MNQ was most successful in the first two areas. All the MNQ personnel were Montreal-based with communication mainly through the nursing coordinator for community health in the regional hospital in Fort George. As always, acute curative medicine took priority over programs in health promotion and long-term planning and training. These were hampered by administrative difficulties and frequent turnover of personnel in the Cree Health Board and its hospital in Fort George. The personal links between the hospital-based staff and outpost nurses with Montreal staff developed slowly. These links are important for the cooperation needed to define needs, develop programs and carry them out. The MNQ saw its own role as that of consultant - passively responding to needs addressed to it. Such an approach is antithetical to the philosophy of community health.

During this period (1977-79), many points of disagreement in interpretation of the James Bay Agreement arose between the Cree and the government of Québec. One of the sharpest was in the area of financial responsibility

for constructing various municipal services - sewage, water distribution, housing, roads - in the Cree communities.

The need for these services in the Cree (and Inuit) communities was reinforced by a report by the Director of Environmental Services of Québec to the Québec Government in January 1979 (The Jolicoeur Report).[26-27] No action was taken on this report other than a series of mutually recriminating letters and meetings characterized by charge and counter charge between the government negotiators and representatives of the Cree for more than one year. Virtually all relations between the Cree and Québec including the operation of the Cree Regional Health Board were affected by the increasingly bitter tone of this exchange.

In October 1979, the government of Québec commissioned an inquiry into the operation of the Fort George Hospital. The impetus for this inquiry was the obvious financial mismanagement by two of the administrators of the hospital (one white, one Cree). The report (Moisan Report)[28] did not restrict itself to financial matters but looked at all aspects of the operation of the hospital. It stopped just short of recommending that the institution be placed in trusteeship. It did make a very detailed list of recommendations and suggested that if they were not carried out within six months, trusteeship be considered. With regard to the affiliation with the DSC/MGH, it reiterated Québec's preference for Laval over McGill. It deplored the lack of any community health programs (although making no comparisons with Laval's own performance in Ungava Bay) and suggested that the MGH connection be reviewed.

It was in this context that the epidemic of infantile gastroenteritis occurred.

AN EPIDÈMIC OF INFANTILE GASTROENTERITIS

IN THE HUDSON BAY AND JAMES BAY REGIONS

A description with recommendations to
the Ministère des Affaires Sociales

I. INTRODUCTION

The purpose of this report is to describe an epidemic of infantile gastroenteritis among the native population of the Hudson Bay and James Bay regions of Québec that occurred in the spring and summer of 1980. This disease affected many children under two years in the villages in this region. In several villages a majority of such children became ill. At least eighty children were hospitalized because of it, many with long and complicated courses; almost half required transfer to children's hospitals in Montreal. At least seven* children died with gastroenteritis. This occurred in a region that certainly has less than 1,000 children under two years old.

In most of the cases where it was sought, a serotype of Escherichia coli was found that has been implicated as a pathogen causing gastroenteritis, especially in infants and especially in epidemic situations.[29-31] Some epidemiologic evidence, although not absolute, will be presented to implicate it as a pathogen in this situation. It did serve as a useful marker in this disease. The specific pathogenic organism is, in any case, of secondary importance. More important are other factors which must be considered in explaining such an epidemic:

a) environmental - accessibility of uncontaminated water for drinking
- disposal of human and other waste

b) behaviour - water storage
- food preparation
- infant feeding
- interpersonal contact within and between communities

*(four Cree, three Inuit). It is not known whether there were other related deaths that did not come to medical attention.

Several different administrative bodies have some effect on these factors
- local communities
- departments of community health
- regional health councils
- various provincial and (at the time) federal departments

While it is beyond the scope of this report to determine the specific areas of responsibility, it is clear that cooperation among people in these different bodies is essential. I have prepared this report with the hope that such cooperation will occur with a strong commitment to change conditions where needed, to lessen the likelihood of such outbreaks in the future.

II. SOURCES OF INFORMATION

The quality and quantity of information available to me varied from community to community. Several communities will be described in greater depth, knowing that many of the conclusions drawn from them are generalizable to others.

1) Environmental Reports

a) Report to SAGMAI ("The Jolicoeur Report")
"Services Municipaux en Territoire Inuit"
(October 1978)
Services Municipaux en Territoire Cri"
(January 1979)

b) Report by - Ministère de l'Environnement - region du Nouveau Québec
- Department of National Health and Welfare (NH&W) - Environmental Health Division

Visit to Povungnituk (May 1980)

c) Reports by - Ministère de l'Environnement & Ministère des Affaires Sociales - région du Nouveau Québec
Visit to Rupert House and Nemaska (August 1980)*

d) Report by - Department of NH&W - Environmental Health Division
Visit to Mistassini (September 1980)

e) Report by - Gary Pekeles to Cree Board of Health and Social Services
Visit to Eastmain and Paint Hills (September 1980)**

I have, in addition, made my own observations in the communities of Rupert House, Nemaska, Fort George and Mistassini.

2. Clinic Records

I have reviewed the numbers of clinic visits for gastroenteritis in the appropriate age categories in comparison to previous years in the following communities:

- Rupert House
- Fort George
- Mistassini
- Eastmain
- Paint Hills
- Povungnituk (from copies in the Fort George Hospital)

Discussions with the nurses in the Cree communities were very helpful.

Similar data from other Inuit communities were, unfortunately, not readily available. Community health services in these communities had been the

* Appendix I
**Appendix II

responsibility of NH&W and are now under the supervision of the Département de Santé Communautaire (DSC)/Centre Hospitalier de l'Université Laval (CHUL). The federal summaries for the period in question that were available were not broken into age categories and therefore are not helpful here. The Department of NH&W did provide a list of all apparent outbreaks of gastroenteritis in 1976-80 in native communities in the region.

3) Hospital Chart Review

Comparison of numbers of hospitalizations with previous years, exposure history (where applicable), and detailed information about the clinical course was sought for native children with gastroenteritis in the following institutions:

- l'Hôpital Chashasipich, Fort George (FGH)
- Moose Factory General Hospital (MFGH)
- l'Hôpital Chibougamau
- Montreal Children's Hospital (MCH)
- l'Hôpital Ste-Justine, Montreal (HSJ)

Summary information on cases seen at l'Hôpital St. Sauveur, Val d'Or was furnished by the DSC/ Rouyn-Noranda. Discussions with physicians in FGH, MFGH and MCH were very helpful.

4) Bacteriology Surveillance

Results of the cultures were obtained from the laboratories of the various hospitals and from the bacteriology laboratory of the Ministère des Affaires Sociales (MAS). During our visit to Rupert House and Nemaska, some surveillance cultures of sick and well children and family members were taken, and processed in the laboratories of either MCH or HSJ. Similar cultures from Mistassini were sent to the MAS laboratory.

III. PATTERNS OF HEALTH CARE IN JAMES BAY AND HUDSON BAY REGIONS

The period during which this epidemic occurred was one of change in the organization of health care services in the Hudson Bay and James Bay regions (see map). As part of the "James Bay and Northern Quebec Agreement" of 1975, the Cree Regional Board of Health and Social Services (Region 10B) and the Kativik Health and Social Service Council (Region 10A) were established as Regional Councils under Chapter 48 of Québec law. The Department of NH&W has been withdrawing from a direct role in provision of medical services over a period of five years.

The six Inuit communities of Hudson Bay (Table I) each had a nursing station (provincial or federal). A physician was based at Povungnituk during this period. Referrals for hospitalization were to Moose Factory and Fort George. Tertiary referrals in pediatrics went to the MCH. (Depending on the availability of flights, patients from Sugluk have been sent elsewhere - Frobisher Bay or Fort Chimo.) It appears that no DSC had clear responsibility for community health for those villages under provincial jurisdiction.

In the coastal Cree communities (Table I), nursing stations tied to the FGH existed in Great Whale, Fort George, Eastmain, Paint Hills, and Rupert House. No nursing station existed in Nemaska. Referrals for hospitalizations were to Fort George or Moose Factory with tertiary referral in pediatrics to MCH. The DSC of the Montreal General Hospital (MGH) had responsibility for community health. The nursing station in Mistassini was tied to the Chibougamau Hospital with referrals there,

and further pediatric referral to MCH. Referrals from the federal nursing station in Waswanipi were to Lebel and Amos. In addition, there are Cree living in the regions of Val d'Or and Matagami who are seen in hospitals there with referral by the usual routes of those institutions.

IV. EPIDEMIOLOGY

1) Povungnituk, Akulivik, Inoudjouac

The first referrals of infants with severe gastroenteritis were from Povungnituk and Akulivik to MFGH and FGH in April 1980. Table II summarizes the experience at the clinic in Povungnituk in 1979 and 1980. (Similar data were not readily available for Akulivik.) In addition to the increased number of cases seen in 1980, one notes an increased duration and severity of gastroenteritis from the number of return visits and hospitalizations. A total of eighteen children from these two communities were hospitalized with gastroenteritis including twelve referred on to MCH. The first cultures for E. coli 0111:K58 were from two children (one from Povungnituk, one from Akulivik) hospitalized at Fort George within a few days of their hospitalization. None of the first six hospitalized at MFGH had an enteropathogenic E. coli identified while there, but three of the five who were subsequently referred to MCH did have E. coli 0111:K58 (formerly 0111:B_4) grown from their stools while there. One will never be able to determine absolutely whether these represented later acquisition of this organism or inadequate culturing initially. The fact that infants hospitalized at different institutions had the organism at the same

time is highly suggestive that it was acquired in their common village of origin. All in all, twelve of the eighteen children hospitalized had 0111:K58 identified at some point in the course of their disease.

From April to June, seven children from Inoudjouac were hospitalized at Moose Factory, six of whom were referred to Montreal and one of whom died (again, no data are available on clinic visits). Four of the six had positive (E. coli 0111:K58) cultures.

2) Coastal Cree

From this initial focus among Hudson Bay Inuit, the disease spread in several directions that will be considered in turn. Six children from Akulivik and Povungnituk were hospitalized at FGH from March to June. In the month of April, seven Cree children (four from Fort George itself, three from Rupert House) were hospitalized at FGH with problems other than gastroenteritis who subsequently (during their initial hospitalization or soon after it) developed gastroenteritis, each having stools with positive cultures. The disease appears to have spread from this point source to various parts of the Cree community.

A total of fifteen children from Fort George were hospitalized and two referred on to Montreal. Nine of these had positive stool cultures at some point. The impression of the physicians there of a great increase in the number of cases seen in the outpatient department was not borne out by the data on visits for diarrhea/gastroenteritis from the medical records. The physicians felt that the records were inadequate.

The public health nurses in Fort George noted that many families with infants with gastroenteritis did not visit the hospital.

There were ten hospitalizations from Rupert House between April and July, all culture positive. Three were referred to Montreal and one died en route. Good record-keeping by the nurses allows a comparison with the previous year (Table III). With the same nurses stationed there in both years, the difference in hospitalizations for gastroenteritis is most impressive. Because no nurses were present in Nemaska, we have only the impression of the population that more than half the infants under two had diarrhea during the Spring of 1980. Two children were hospitalized in FGH in June and July, both culture positive (one referral to MCH). In addition, one child died in Matagami (June) and one in Val d'Or (August) with symptoms of gastroenteritis. A review of the clinic records from Eastmain and Paint Hills showed no increase in visits of infants with gastroenteritis. One child from Paint Hills with frequent visits to FGH for congenitally dislocated hips was hospitalized there with gastroenteritis and one infant was hospitalized in Moose Factory.

3) Mistassini Cree

In late August and September, there was a large increase in the number of infants seen in clinic with gastroenteritis (Table IV). Although the village typically has an increase in gastroenteritis in the summer (similar to other northern native communities), the severity was unusual in 1980(Note the large number of hospitalizations). A total of twenty children were hospitalized with eight referred to MCH and two to Chicoutimi. One child died in transit. Fourteen of the twenty had stool cultures positive for E. coli 0111:K58.

4) Sugluk Inuit

In August an increase in visits by infants with gastroenteritis to the Sugluk nursing station was noted (again, specific data not available). There were two known deaths within the community. Two children were hospitalized at MFGH, both with stools growing E. coli 0111:K58. Because of the lack of specific information given to me, I cannot say whether any children from Sugluk were hospitalized elsewhere.

5) Other Communities

The scope of this report is, strictly speaking, of gastroenteritis among Quebec Inuit and Cree. Infections are not limited by boundaries or tribal territory. To delineate the extent of this epidemic, I will briefly describe its spread elsewhere.

a) Belcher Islands

In June and July, four children from Belcher Islands, Northwest Territories (NWT), were hospitalized at MFGH, three culture positive, one referred to MCH and one to the Hospital for Sick Children, Toronto.

b) Ontario James Bay Cree

Moose Factory had a similar experience to Fort George. After the referral there of infants with gastroenteritis from the Hudson Bay area, many more infants from the community itself were seen in the outpatient department (fifty three in July-September 1980 vs thirteen in July-September 1979). At least four infants hospitalized at the time with other problems developed diarrhea

(three with cultures positive for E. coli 0111:K58). The infection spread up the Ontario coast as well. During the summer, nine Ontario Cree children were hospitalized with gastroenteritis with positive cultures (five from Moose Factory itself, four from other communities).

c) Abitibi Algonquin

Some cases were noted as well among Algonquin Indians in the region of Val d'Or with several hospitalizations. At least nine culture positive infants were hospitalized at l'Hôpital St. Sauveur in Val d'Or, one referred to MCH, and five to HSJ. Nursing stations in Lac Victoria and Lac Simon reported an increase in infants seen with gastroenteritis (no comparative data furnished).

d) Non-native Quebecois

Both pediatric centres in Montreal identified this organism in white children hospitalized there. A few of these could clearly be attributed to nosocomial spread, but others had no known contact. These probably represented the sporadically positive cultures whose pathogenic relevance in non-epidemic situations is unclear. Chibougamau Hospital had a similar experience, although contact there between Cree and whites outside the hospital may be more likely.

A summary of the experience in all these communities is found in Table V. To put these numbers into context, Table VI reviews the experience of infantile gastroenteritis in the three hospitals which have served as the first point of hospitalization for virtually all the Hudson Bay Inuit and James Bay and Mistassini Cree -

the MFGH, the Chashasipich Hospital in Fort George, and the Chibougamau Hospital.

V. SUMMARY OF ENVIRONMENTAL REPORTS

When the epidemic in Povungnituk became evident, a joint Health and Welfare - Canada and Environnement - Québec team prepared a report in May 1980. Its principal findings were:

a) The system of direct water intake from the river, manual chlorination and truck distribution appeared adequate. Water could still become contaminated when stored in domestic containers.

b) Disposal of waste water near the houses was a potential source of contamination.

c) Tearing and spilling of "honey bags" for human waste was a serious source of contamination.

Appropriate recommendations were made to the community.

Once the epidemic had spread into several coastal Cree communities, the MAS, at the request of the Cree, sent a joint environmental-medical team to Rupert House and Nemaska. The salient findings in each village were:

1) Rupert House

a) Although the drinking water was clean at its source, hand distribution and poor home storage led to almost universal contamination of water in individual homes. This was proven by coliform counts of samples from various houses.

b) Because of the poor drainage of the site, the system of ditches through the village served as a contaminated playground for children.

2) Nemaska

a) The actual source of water (in fact surface water) was contaminated.

b) Garbage was being dumped on the shore of the lake.

The medical report for the two villages noted the very low level of breast feeding at birth and virtual absence of breast feeding at six months. The water distribution problems and the practice of preparing formula for the day in the morning led to a high risk of contamination. With the lack of easily accessible water, personal hygiene was often poor.

Health and Welfare Canada prepared a similar report on Mistassini in September 1980. All but twenty houses were linked to a water and sewage system, but there had been a break in the system left unrepaired for several months. In addition, the individual kitchen taps were dirty and required "blazing" to get uncontaminated water. Personal hygiene was felt to be poor here as well, despite the presence of running water.

Dr. M. Moffatt (MCH), in a report following a pediatric visit to Mistassini (September 1980), urged, among other things, the promotion of breast feeding.

The link of the epidemic from the coastal communities to Mistassini is not as clear as it was along the coast where the two hospitals, in Fort George and Moose Factory, receiving ill children from the Hudson Bay region, became foci of infection for their respective communities.

There is almost no overlap in the patterns of medical care between the Mistassini and coastal Cree. Various Cree-wide organizations provide a point of contact. In

particular, a training session by the Cree School Board of teachers from various villages took place in Mistassini in early July. The NH&W team did not feel there was evidence that they were the vector of spread.

VI. BACTERIOLOGY SURVEILLANCE

With the initial outbreak in Povungnituk, no epidemiologic investigation was carried out by the MAS or Department of NH&W. Bacteriologic surveillance at the outset would have been invaluable in assessing the pathogenic significance of the organism E. coli 0111:K58 found in many of the cases. Culturing of family members and unaffected families (no one older than two had clinical evidence of disease) near the peak of the outbreak might have helped to delineate the mode of spread as well as the significance of the organism. Would it have been found in large numbers of the population at the time? Were other pathogenic organisms to be found early in the course of the disease, only to be suppressed by the time infants were hospitalized?

A belated attempt to gain some of this information was made during the mid-August visit to Rupert House and Nemaska, unfortunately, after the peak of the disease there. In Rupert House, cultures were obtained from six families with well, convalescing, or ill children (including family members, pets, water supply - total of thirty cultures). Only one, from a nine-month-old girl with diarrhea at the time (subsequently hospitalized), grew E. coli 0111:K58. All the rest, including two from children previously hospitalized with documented infection, were negative. Thirty similar cultures from Nemaska were all negative for enteropathogenic E. coli.

In September, similar surveillance cultures from several Mistassini families revealed no one carrying the same organism.

This information, collected as it was, late and in a relatively haphazard manner, can at best only support the pathogenicity of this organism. Studies in the bacteriology laboratories of both MAS and the MCH revealed no toxigenic mechanism of pathogenicity for this organism. This finding is consistent with past experience with it.[29,32] What was most characteristic of infants with positive culture was their striking clinical patterns. The disease was often very severe, very protracted, and with a remitting and relapsing course.

VII. CLINICAL FEATURES OF HOSPITALIZED CASES

The review of records from the various hospitals revealed eighty one culture positive cases of gastroenteritis requiring hospitalization as follows:

19 - Quebec Inuit
25 - Coastal Cree
14 - Mistassini Cree
11 - Quebec Algonquin

3 - Belcher Inuit (N.W.T.)
9 - Ontario Cree

Seven deaths of infants under one year with gastroenteritis occurred during this period (Table V). Only one of these had an adequate search for enteropathogenic E. coli prior to death and she had a positive culture. In addition to the eighty one, there were thirteen infants hospitalized with clinical features (age, time of onset, and course) very similar to the others:

3 - Povungnituk
2 - Inoudjouac
2 - Fort George
6 - Mistassini

The clinical summary will be based solely on the eighty one culture positive native children who survived their illness (sixty nine from Quebec, twelve from nearby Hudson Bay and James Bay areas). They represent the severe end of a spectrum of disease whose breadth has been outlined above. Among these is a subgroup of more severe cases that required referral to a pediatric centre (thirty one-MCH, seven-HSJ, six-Hospital for Sick Children, Toronto).

The mean age was 8 months (SD±4.8), (range 1-21m). Five were one month, nine were fourteen months or older, and all the others were in the two to thirteen month range. Unfortunately, feeding histories were not noted frequently enough to determine any effect of breast vs formula feeding. As mentioned above, we do know that at least among the Quebec Cree, the level of breast feeding beyond the first month or so is exceedingly low. In the twenty nine cases where a pre-morbid weight was available, an average weight loss of 12.6% (SD±6.9) was noted.

As noted above, there were several cases whose clinical course strongly supported a nosocomial acquisition of infection, and others where infection may have been acquired in hospital or foster home. These are summarized in Table VII. One must remember that because this study is restricted to native children, the several nosocomial infections of white children in both pediatric hospitals in Montreal are excluded.

The tendency to recur was most evident in the fifteen cases requiring re-hospitalization, but many others relapsed during their single hospitalization. The hospitalizations were long: mean 39.5 days(d) (SD±30.7), median 35.

Of the forty four referred to children's hospitals, thirty received parenteral nutrition for an average of 15d (SD±12.6). On average, it was started 16.1d after admission. Over one third of all cases where hospital feeding information is known (19/53) received inadequate calories (intravenous glucose solution with minimal oral feeding) for over one week. Duration of undernutrition prior to hospitalization is unknown. This at least acutely undernourished state undoubtedly compromised the recovery of these children. In twenty children who had serum albumin measured, seventeen were equal to or below 3.0g/100ml (well below the lower limit of normal in this age group), indicative of inadequate nutrition.

Other infections were the most common complications (Table VIII). Urinary tract infections are often difficult to document in infants with diarrhea because of urine contamination. The seizures, as well as the electrolyte imbalances, typically occurred near the onset of the disease or with a relapse. Acidosis with severe dehydration was often not documented. Both cases of hepatitis were in one month old infants.

The relation of the neutropenia to the disease itself or the treatment (possibly parenteral nutrition) is unclear. Although most of the cases occurred during or after parenteral nutrition (14/18), these cases were obviously the most severe and in four cases, no parenteral

nutrition had been given at the time of the neutropenia. The following table summarizes this issue.

		NEUTROPENIA	
		YES	NO
PARENTERAL NUTRITION	YES	14	15
	NO	4	48

Twenty five children received oral polymyxin in an attempt to suppress the E. coli organism and perhaps influence the course of disease. For the most part, the organism was sensitive in vitro to polymyxin. Unfortunately, the haphazard fashion in which this therapy was instituted, often not even doing follow-up cultures, much less conducting a randomized trial, allows absolutely no conclusions about the effect of this intervention. The same is true for the one child who received neomycin and three who received colistin.

VIII. OBSERVATIONS AND RECOMMENDATIONS

There are three levels of intervention against epidemics of this type:

a) Primary prevention - elimination of those conditions which allow the appearance and spread of the disease.

b) Secondary prevention - measures to minimize the spread of disease, once it has appeared, to individuals within the community and to other communities.

c) Treatment - medical intervention to change the course of disease in ill individuals.

Health care delivery in northwestern Quebec involves many players. The description in III highlights the very complex pattern of responsibility and referral. The discussion of each of the three types of intervention will emphasize the importance of coordination of activity. A final section will treat the special role of the DSC's of CHUL and MGH in this region and the importance of coordination between them.

At least one area of overlapping and shared responsibility - that between the federal and provincial governments - is being simplified; direct responsibility for both health and environmental services becomes exclusively provincial in all these villages in a short time. Mutual understanding between the potential policy makers - the regional health councils - and the executors of that policy - the health care providers - has often been prevented by very different perspectives. Dealing with both these groups (in Region 10B), I have been impressed at how the resulting misunderstanding has often masked what are

genuinely shared interests and concerns. Difficulties in communication may exist among the various providers of medical services themselves. In Region 10B, links between physicians in the secondary hospitals and the nurses in the villages has been very good. Communication between them and the back-up resources in Montreal, the DSC and specialist consultants, has not been consistent (although it was improving during 1980). As a result, I feel that maximum benefit has not been derived from those available resources. The active involvement of the DSC/CHUL in the Hudson Bay region is recent and I have no first-hand information other than my discussions with the current director of the Projet Nord.

1) Primary Prevention

The case for improvements in water distribution and waste disposal in many Inuit and Cree villages has been made fully and well elsewhere. What is required is not another such report but the will to carry out those measures.

One cannot realistically expect changes in domestic hygiene habits without easily accessible clean water. Equally, the introduction of technical improvements will help little if not accompanied by public education to change those habits. Such programs must actively involve people in the villages in the planning and implementation. A joint effort of the regional office of the Ministère de l'Environnement and the local nurses (with the possible involvement of the DSC's) would probably be the most effective. Areas of emphasis are

- water storage (where applicable)
- food preparation (and separation from child care tasks)
- food storage
- garbage disposal

A pilot program of this type based on house visits by a public health nurse and community health worker has been ongoing for several months. The regional health councils and school boards should consider a joint training program for community health workers.

A second area of primary prevention is the promotion of breast feeding. We do not have data in this epidemic to evaluate the effect of feeding on the disease. Studies in similar populations have demonstrated a marked benefit of breast feeding over formula feeding in prevention of infantile gastroenteritis among other diseases.[33,34] Such a program requires action on several levels:

- education during prenatal visits
- policy during hospitalization for delivery
- support in the community - to create a climate of approval, and accommodation for mothers employed by band agencies.

The DSC's have been actively involved in this area in their own territory. They ought not to export their programs north, but place their expertise at the disposal of the people planning such programs locally.

2) Secondary Prevention

The first step in such prevention is recognition that a problem exists - not always an obvious matter. The local nurses as first line observers are the key, but recognition on a broader scale requires regional data collection. Cumulative records from the nursing stations designed to identify health problems by disease and age as well as measure productivity are essential. Assessment of the significance of such data would be the responsibility of the regional

nursing coordinator and physicians. Notification to the DSC and MAS may prompt further investigation from either of these when appropriate. Planning of intervention may require one or all of these depending on the scope and the nature of the problem.

During an outbreak of a water, food, or fecal - orally transmitted disease of last year's type, the education programs described in VIII-1 become particularly important. People in the village must be convinced of the link between their personal habits and spread of disease within the community. Sample culturing can serve as a method of reinforcement as well as surveillance. Such efforts may require the support of government departments, environment or social affairs.

In section VII the role of hospitals and foster homes as points of transmission of the disease between communities was noted. Again, in addition to those cases noted in Table VII, nosocomial spread occurred in the pediatric hospitals in the south as well, but to white children, outside the scope of this study. Recognition of infectious disease and implementation of appropriate infection control measures are the key to preventing nosocomial spread. Having said this, I recognize that this can be an exceedingly difficult problem, especially when hospitals are over-crowded as may happen during an epidemic.

Several children were infected in foster homes in Val d'Or and Montreal. Prevention of spread here is virtually impossible at the outset. Once a disease is recognized, alternate arrangements must be made, including, at times, hospitalization.

3) Treatment

Coordination of activity among local nurses, regional physicians and, if necessary, consultant specialists is crucial. A recurrent issue in such a tiered system of medical care is when to transfer - when patients need hospitalization and when they need the services of a specialized care centre. Open and easy communication and mutual respect among these providers is needed. One of the best ways of ensuring this is through regular visits of the specialists to the communities in the north, both nursing stations and the regional hospitals. In addition to the care for the patients seen, these visits provide an excellent opportunity for direct contact and discussion of appropriate approaches to different problems. The DSC's serve an important function in arranging these visits on a regular basis.

Looking back at the often protracted disease of this epidemic, some children would have benefited from earlier referral to a centre that could give them parenteral nutrition to increase their ability to fight the infection.

If a specific treatment is being considered, as polymyxin was here, coordination of its use is needed to evaluate its effectiveness.

4) The Role of the DSC's

Laval and McGill Universities have become centres with experience and expertise in medical problems of the north. For the first, the Projet Nord of the DSC/CHUL, in addition to itself providing community health service, is a point of access for the Inuit communities of Quebec to the medical resources of the University of

of Laval. Similarly, the Module du Nord of the DSC/MGH has provided community health services and coordinated the linking of the Cree communities to the medical resources of McGill. The latter, through its Baffin Project, has been involved as well in various aspects of medical care for the eastern Northwest Territories for over fifteen years. Both institutions benefit from sharing this experience and exchanging ideas.

The health needs of Hudson Bay and James Bay demand a more active role than is traditional from the two DSC's. Administrative support to regional health councils may be required at times. Facilitation of the use of public health and medical resources of their respective medical centres (including specialist visits) is important. To fill this role, the DSC's must have a good awareness of the needs of the local physicians and nurses, and the human resources available in their own institutions. A closer link to the medical side is needed than is usual in the public health sector. In fact, such cooperation may serve as a model for other health services.

Under the current arrangement, the Hudson Bay region is served in part by the two networks: supervision of nurses and community health from Fort Chimo and Quebec, and secondary and tertiary hospitalization often to Fort George and Montreal. Here, the need for cooperation between the two institutions becomes much more practical and immediate. I would urge the institution of regular meetings (perhaps semi-monthly) between physicians and other personnel affiliated with the two DSC's to discuss areas of common concern and exchange information.

TABLE I

POPULATIONS OF CREE AND HUDSON BAY INUIT COMMUNITIES OF QUEBEC

COMMUNITY	POPULATION 0-4 YEARS	TOTAL
COASTAL CREE		
FORT GEORGE	208	1917
PAINT HILLS	105	661
EASTMAIN	33	335
RUPERT HOUSE	80	880
NEMASKA	7	117
GREAT WHALE RIVER	27	392
INLAND CREE		
WASWANIPI	57	825
MISTASSINI	263	2113
HUDSON BAY INUIT		
GREAT WHALE RIVER	16	598
INOUDJOUAC	65	622
POVUNGNITUK	122	666
AKULIVIK	29	227
IVUJIVIK	34	153
SUGLUK	111	537

Note: These figures are from the beneficiary lists of the James Bay and Northern Quebec Agreement from October 1980 (Cree) and January 1981 (Inuit). Individuals from the various bands and municipalities may be living in other communities so these numbers are approximations of the numbers actually living in each of the communities.

TABLE II

CLINIC VISITS - GI SYMPTOMS - AND REFERRALS TO HOSPITAL

POVUNGNITUK

	UNDER 2 YEARS						2-16 YEARS	
	1979			1980			1979	1980
	NEW CASES	RETURN VISITS	HOSPITAL-IZATIONS+	NEW CASES	RETURN VISITS	HOSPITAL-IZATIONS+	NEW CASES	NEW CASES
JAN	-	-		-	-	1	-	2
FEB	-	-		2	-	-	-	3
MAR	-	-	-	11	17	3	2	-
APR	-	-	-	15	34	7	1	3
MAY	3	-	2	5	5	5	1	5
JUNE	4	-	-	2	5	1	6*	1
JULY	4	-	-	5	3	-	7*	3
AUG	6*	3	1	5	1	2	8*	-
SEPT	0	3	1			-	5	
OCT	2	-	-			-	3	
NOV	4	1	1			-	2	
DEC	-	-	-			-	2	

*predominantly culture proven shigella
+includes infants from Akulivik seen in Povungnituk before referral south

TABLE III

CLINIC VISITS - GI SYMPTOMS - AND REFERRALS TO HOSPITAL

RUPERT HOUSE

NEW CASES UNDER 16 YEARS

	1979		1980	
	VISITS	HOSPITALIZATION	VISITS	HOSPITALIZATION
JAN			6	-
FEB			4	-
MAR			1	1
APR	7	-	5	3
MAY	7	-	9	2 (+1 rehosp.)
JUNE	4	-	9	1 (+1 rehosp.)
JULY	3	-	15	2
AUG	3	-	15	1
SEPT	2	-		- (+1 rehosp.)
OCT	4	-		
NOV	6	-		
DEC	4	-		

TABLE IV

CLINIC VISITS - GI SYMPTOMS - AND REFERRALS TO HOSPITAL

MISTASSINI

NEW CASES

	1978	1979		1980	
	CLINIC VISITS (<16 YEARS)	CLINIC VISITS (<16 YEARS)	HOSPITAL-IZATIONS (<2 YEARS)	CLINIC VISITS (<16 YEARS)	HOSPITAL-IZATIONS (<2 YEARS)
JAN	6	2	3	2	1
FEB	11	8	4	8	2
MAR	4	2	1	4	1
APR	1	4	1	8	1
MAY	3	3	2	4	-
JUNE	8	10	1	5	1
JULY	10	22	6	5	6
AUG	8	12	6	14	14
SEPT	5	3	2	12	6
OCT	0	2	1		2
NOV	1	0	0		
DEC	3	0	1		

TABLE V

HOSPITALIZATIONS FOR INFANTILE GASTROENTERITIS

BY COMMUNITY - SPRING AND SUMMER 1980

COMMUNITY	HOSPITALIZATION IN GENERAL HOSPITAL	REFERRAL TO PEDIATRIC HOSPITAL	DEATHS
POVUNGNITUK - AKULIVIK	11 (6)* MFGH 6 (5) FGH	8 (6) MCH 3 (3) MCH 1 (1) MCH	
INOUDJOUAC	7 (4) MFGH	6 (4) MCH	1+(MOOSE FACTORY)
SUGLUK	2 (2) MFGH		2 (SUGLUK)
GREAT WHALE	3 (1) MFGH		
FORT GEORGE	15 (9) FGH	1 (1) MCH 1 (1) HSJ	
RUPERT HOUSE	10 (10) FGH 1 (1) VAL D'OR	2 (2) MCH 1 (1) MCH	1 (FORT GEORGE)
NEMASKA	2 (2) FGH	1 (1) MCH	1 (MATAGAMI) 1 (VAL D'OR)
PAINT HILLS	1 (1) FGH 1 (1) MFGH		
VAL D'OR CRÉE	1 (1) VAL D'OR 1 (1) VAL D'OR	1 (1) MCH 1 (1) HSJ	
MISTASSINI	20 (14) CHIBOUGAMAU (including 2 referred on to Chicoutimi)	9 (9) MCH	1 (CHIBOUGAMAU)
ALGONQUIN (LAC VICTORIA, LAC SIMON, VAL D'OR)	? (1) TEMISKAMING 16 (10) VAL D'OR	1 (1) MCH 5 (5) HSJ	

*Numbers in brackets are cases with stool cultures positive for E Coli 0111:K58

+If died in transit, point of departure is noted

TABLE VI

HOSPITALIZATIONS FOR INFANTILE GASTROENTERITIS

a. MOOSE FACTORY GENERAL HOSPITAL

$$\left(\frac{\leq 2Y - \text{GASTROENTERITIS ADMISSIONS}}{\leq 2Y - \text{ALL ADMISSIONS}}\right)$$

	1978			1979			1980		
	QUE* INUIT	QUE CREE	ONT CREE	QUE INUIT	QUE CREE	ONT CREE	QUE INUIT	QUE CREE	ONT CREE
JAN	$\frac{-}{1}$	-	$\frac{-}{9}$	$\frac{1}{6}$	$\frac{-}{1}$	$\frac{2}{13}$	$\frac{-}{1}$	-	$\frac{-}{5}$
FEB	$\frac{-}{6}$	-	$\frac{4}{23}$	$\frac{-}{2}$	$\frac{-}{1}$	$\frac{-}{14}$	$\frac{-}{1}$	-	$\frac{1}{4}$
MAR	$\frac{-}{4}$	$\frac{-}{1}$	$\frac{1}{10}$	$\frac{-}{5}$	$\frac{-}{2}$	$\frac{-}{13}$	-	-	$\frac{-}{12}$
APR	$\frac{1}{6}$	-	$\frac{2}{13}$	$\frac{-}{12}$	$\frac{-}{1}$	$\frac{-}{8}$	$\frac{6}{7}$	-	$\frac{1}{5}$
MAY	$\frac{-}{10}$	-	$\frac{-}{5}$	$\frac{-}{7}$	-	$\frac{-}{10}$	$\frac{6}{9}$	$\frac{-}{1}$	$\frac{-}{6}$
JUNE	$\frac{-}{4}$	$\frac{1}{4}$	$\frac{1}{9}$	$\frac{-}{6}$	-	$\frac{2}{7}$	$\frac{2}{10}$	-	$\frac{1}{7}$
JULY	$\frac{-}{5}$	$\frac{-}{2}$	$\frac{-}{6}$	$\frac{-}{3}$	-	$\frac{1}{11}$	$\frac{7}{10}$	$\frac{-}{1}$	$\frac{5}{13}$
AUG	-	$\frac{-}{2}$	$\frac{2}{6}$	$\frac{1}{4}$	-	$\frac{1}{8}$	$\frac{5}{5}$	-	$\frac{11}{15}$
SEPT	-	$\frac{-}{1}$	$\frac{2}{8}$	$\frac{-}{4}$	$\frac{-}{1}$	$\frac{1}{9}$	$\frac{4}{6}$	1	$\frac{15}{21}$
OCT	-	$\frac{-}{2}$	$\frac{1}{10}$	$\frac{-}{3}$	-	$\frac{1}{16}$	$\frac{-}{8}$	$\frac{1}{1}$	$\frac{5}{10}$
NOV	$\frac{-}{1}$	-	$\frac{2}{6}$	$\frac{-}{5}$	-	$\frac{-}{6}$	-	$\frac{-}{2}$	$\frac{4}{13}$
DEC	$\frac{-}{1}$	-	$\frac{-}{10}$	$\frac{-}{2}$		$\frac{-}{8}$	$\frac{-}{3}$	$\frac{-}{2}$	$\frac{3}{13}$
APR - SEPT	$\frac{1}{25}$	$\frac{1}{9}$	$\frac{7}{47}$	$\frac{1}{36}$	$\frac{-}{2}$	$\frac{5}{53}$	$\frac{30}{47}$	$\frac{-}{3}$	$\frac{33}{67}$

*Includes Inuit of Belcher Island

TABLE VI

b. FORT GEORGE HOSPITAL

$$\left(\frac{\leq 2Y - \text{GASTROENTERITIS ADMISSIONS}}{\leq 2Y - \text{ALL ADMISSIONS}}\right)$$

	1979		1980	
	INUIT	CREE	INUIT	CREE
JAN				
FEB				
MAR			$\frac{2}{2}$	$\frac{4}{16}$
APR	$\frac{-}{13}$	$\frac{-}{9}$	$\frac{2}{2}$	$\frac{9}{20}$
MAY	$\frac{2}{4}$	$\frac{1}{6}$	$\frac{1}{1}$	$\frac{6}{16}$
JUNE	$\frac{-}{2}$	$\frac{-}{14}$	$\frac{1}{2}$	$\frac{4}{15}$
JULY	$\frac{-}{2}$	$\frac{2}{9}$	-	$\frac{4}{14}$
AUG	$\frac{-}{4}$	$\frac{-}{7}$	$\frac{1}{2}$	$\frac{4}{16}$
SEPT	$\frac{1}{2}$	$\frac{-}{9}$	-	$\frac{1}{11}$
OCT	-	$\frac{-}{7}$		
NOV	$\frac{1}{2}$	$\frac{1}{7}$		
DEC				
APR - SEPT	$\frac{3}{27}$	$\frac{3}{54}$	$\frac{5}{7}$	$\frac{28}{92}$

TABLE VI

c. CHIBOUGAMAU HOSPITAL

$$\left(\frac{\leq 2Y - \text{GASTROENTERITIS ADMISSIONS}}{\leq 2Y - \text{ALL ADMISSIONS}}\right)$$

	1979		1980	
	CREE	WHITE	CREE	WHITE
JAN	$\frac{3}{12}$	2	$\frac{1}{8}$	-
FEB	$\frac{4}{18}$	1	$\frac{2}{7}$	2
MAR	$\frac{1}{8}$	1	$\frac{1}{10}$	-
APR	$\frac{1}{9}$	1	$\frac{1}{14}$	-
MAY	$\frac{2}{8}$	-	$\frac{-}{13}$	-
JUNE	$\frac{1}{7}$	-	$\frac{1}{24}$	-
JULY	$\frac{6}{17}$	-	$\frac{6}{10}$	1
AUG	$\frac{6}{15}$	-	$\frac{14}{18}$	-
SEPT	$\frac{2}{18}$	-	$\frac{6}{7}$	-
OCT	$\frac{1}{6}$	-	$\frac{2}{10}$	3
NOV	$\frac{0}{7}$	-		
DEC	$\frac{1}{6}$	-		
APR - SEPT	**$\frac{18}{74}$**		**$\frac{28}{86}$**	

TABLE VII

DEFINITE AND POSSIBLE ACQUISITION

OF GASTROENTERITIS IN HOSPITAL AND FOSTER HOME

GROUP	#	LOCATION	
QUEBEC INUIT	2	MFGH -	definite
	2	MFGH -	possible
	1	Foster Home, Montreal -	possible
QUEBEC CREE	7	FGH -	definite
	1	FGH -	possible
	1	Foster Home, Val d'Or -	possible
ALGONQUIN	1	Foster Home, Val d'Or -	definite
	1	Hospital Val d'Or -	definite
ONTARIO CREE	1	MFGH -	definite
	17		

TABLE VIII

COMPLICATIONS IN INFANTS HOSPITALIZED WITH GASTROENTERITIS AND E. COLI 0111:K58 CULTURES (n=81)

A.	OTHER INFECTIONS	
	1. Urinary tract infection	22
	2. Bacterial sepsis - definite	5
	- possible	3
	3. Pneumonia	4
	4. Cellulitis, ulcer	3
	5. Meningitis	1
	6. Varicella	3
	7. Measles	1
B.	SEIZURE	7
C.	NON-FATAL CARDIORESPIRATORY ARREST	2
	RESPIRATORY DEPRESSION	2
D.	PNEUMOTHORAX (with central line placement)	2
	SKULL FRACTURE	1
E.	NEUTROPENIA ± EOSINOPHILIA (< 1000 PNMs)	18
	CLOTTING PROBLEMS	2
F.	HEPATITIS	2
G.	ELECTROLYTE IMBALANCE	
	1. Hyponatremia ($Na^+ \leq 132$)	15
	2. Hypernatremia ($Na^+ \geq 150$)	4
	3. Hypokalemia ($K^+ \leq 3.2$)	7
	4. Hyperkalemia ($K^+ \geq 5.5$)	4
	5. Acidosis	?

RESPONSE TO THE EPIDEMIC IN THE CREE REGION

I. INTRODUCTION

A few facets of the response to the onset and spread of the epidemic are noted in the report. In this section, the response will be more fully explored.

Outbreaks of gastroenteritis are common in northern communities owing to the living conditions (see Appendix I and II). The unusual aspects of this epidemic were the severity and the long duration of the disease that facilitated its spread. These features were not, at first, apparent.

Another important factor reducing the initial response to the outbreak in the Hudson Bay area was the mixed and often confusing responsibility for community health in the region. Nineteen eighty was a year of transition of responsibility for health care services.

II. INITIAL OUTBREAK

As described in the report, the disease began in Povungnituk and Akulivik in late March. After the first referrals to the Montreal Children's Hospital and the identification of a potential pathogen, the Laboratory Centre for Disease Control (Health and Welfare, Canada) and the Infectious Disease Service (Social Affairs, Québec) were informed. No epidemiologic investigation was carried out. A joint federal/provincial environmental team visited Povungnituk and made several recommendations for short-term improvements to water distribution and waste disposal. As noted in Table II of the report, the incidence of the disease decreased in these two villages by May. No further action occurred there and there was no publicity about the epidemic.

III. SPREAD OF THE EPIDEMIC TO THE CREE REGION

Within a month, the epidemic spread to several Cree communities (Table III, VI b.). In early August, the Grand Council of the Crees held its annual meeting. The chairman of the Cree Regional Health Board raised the issue of inadequate financial support for health services by the Québec government. At the same meeting, the director of the Northern Module (of the Department of Community Health/Montreal General Hospital (DSC/MGH)) proposed to the health board chairman a more active role for the DSC, with most of the personnel in the north responsible for community health to become employees of the DSC. The DSC would thus progress from consultant to active player. In the political turmoil that followed (see below), the proposed contract to this effect was never drawn up (as of June 1981).

The following week, the Cree Health Board brought the epidemic to the attention of the Ministry of Social Affairs in a telegram. The ministry appointed a combined environmental/medical investigating team to visit two of the Cree villages (August 15-16, 1981). (The medical report is Appendix I.)

In their discussions with people in the two Cree communities, team members clearly supported the major objectives of the villages:

a) improvement in water distribution and waste disposal

b) establishment of a nursing station in Nemaska (a new village which had no medical service at the time)

c) a report to the people of Nemaska following a medical investigation of four recent unexplained deaths of infants from the community.

They emphasized to them, as well, the importance of changing personal hygiene habits and increasing breast feeding and suggested public education programs for these.

The visit had been made on very short notice with little preparation and involved only one area of the epidemic. Team members, recognizing these limitations, made inquiries about the possibility of a large scale epidemiologic investigation to determine the mode of spread of the disease within villages and between villages. Neither the Laboratory Centre for Disease Control (Health and Welfare, Canada) nor the Infectious Disease Service (Social Affairs, Québec) showed an interest in such an expanded inquiry.

IV. REACTIONS TO THE TEAM'S RECOMMENDATIONS

The ministry seemed, at first, to be delaying the release of the team's findings. The suspicion of a public relations exercise by the government was increased by the delay. The ministry, for its part, felt that the Cree had turned first to the press without going through the "normal channels". To add to this impression, the Cree, on August 22, called a press conference to bring further attention to the problem and accused the government of a "cover-up".

On August 27, the minister sent a list of proposals to the chairmen of the Cree Health Board:

a) He would ask the Corporation of Physicians to investigate the four deaths in Nemaska

b) The ministry would finance a temporary nursing station in Nemaska

c) He "appointed" two members of the original team to remain involved in implementation of its recommendations
   - Dr. G. Pekeles as medical consultant under the responsibility of the DSC/MGH
   - M. L. Guenette of the ministry to coordinate the overall effort

d) He urged the nurses in the region to increase their activity in community education

e) All recommendations regarding the environment were sent to the Ministry of the Environment who would contact the appropriate federal and Cree authorities.

The Ministry of Social Affairs called a meeting for September 2 of its own native health section, representatives of Health and Welfare Canada, the director of the Northern Module (DSC/MGH), and team members to discuss their findings. They did not invite any representatives of the Cree Health Board. At the insistence of team members, they extended such invitations, but did not change the date of the meeting to accommodate the schedule of the Cree representatives. Rather, meetings were held on consecutive days, the first without the Cree, the second without the director of the native health section. These separate parallel meetings epitomized the lack of real dialogue between the government and the Cree and increased the already large mutual suspicion.

Postures taken at these two meetings demonstrate the hostility. At the first, the director of the native health section said that the responsibility of the

Ministry of the Environment was to point out to the Cree their responsibilities so that they could seek funds from the federal government. With regard to the medical report, she stated that if proper measures were not taken in a short time, the Ministry of Social Affairs would have to "bypass existing structures" (i.e. impose a trusteeship). At the second meeting, the Cree prefaced their comments by noting the absence of any government representatives with financial authority, so that no specific responsibility for the tasks at hand could be assigned. They rejected the proposal that the ministry appoint people to supervise short-term measures. They wished the medical consultant to work for them and that a special committee of the Cree Health Board supervise the work.

V. LEGAL AND POLITICAL ACTIVITY

Preliminary discussions between the Cree and the Québec government revealed no willingness to pay for any of the sanitation work, claiming it was a federal responsibility. The Cree then sued the Québec government for sixty-four million dollars (September 12) for failure to live up to the health services provisions of the James Bay Agreement. They also began negotiating with the federal government for funding for the short-term measures.

One week later (September 20), the Ministry of Social Affairs imposed a trusteeship of 120 days on the Cree Health Board, citing mismanagement. The Cree prevented the trustees from entering Indian territory, the government cut off all funding for the running of the hospital and health board, and the Cree Regional Authority began financing the health services themselves to allow them to resist the trusteeship. These events coincided with

the moving of the hospital in Fort George as the entire village was being relocated. This general turmoil made planning for short-term improvements very difficult.

VI. "THE STANDING COMMITTEE" OF THE CREE HEALTH BOARD

An ad hoc committee of the Cree Health Board to oversee these short-term measures first met on September 15. No provincial officials were invited. Specific details and timetables for short-term improvements were made in the following areas:

a) water distribution

b) waste water disposal

c) garbage disposal

d) bath houses

e) nursing station for Nemaska

In addition, a plan for an education program tied to these was discussed. A community health worker was to be trained for each of the two villages to do house to house visits. Promotion of breast feeding was to start with a series of programs on the Cree network of the Canadian Broadcasting Corporation. The committee requested that the medical consultant visit the communities of Eastman and Paint Hills (not affected by this particular epidemic but with their own sanitation problems) to conduct similar investigations (see Appendix II).

The chairman of the committee was to supervise the overall project, consulting individual members as necessary. Negotiations with the (federal) Department of Indian Affairs for financial support, initially promising, were to continue. This project had the highest

priority for the Cree Regional Authority. It was prepared to advance money while awaiting a final answer from Indian Affairs and would pay itself if necessary for these improvements (as it subsequently paid for the general operations of the health board to resist the government trusteeship).

The committee faced several problems: the uncertain source of funding, the felt need to complete these measures before freeze-up, technical difficulties with many of the proposals that only gradually became obvious. Both provincial and federal environmental officers had reservations about various aspects of the plans. The influence of these officers was marginal for several reasons. The Cree were not dealing with provincial agencies because of the lawsuit and trusteeship. Both the federal and provincial departments agreed that the final transfer of responsibility (from Ottawa to Québec) for environmental affairs would occur in March, 1981; the Cree argued that this transfer was not automatic under the agreement. Long-term planning for coordination of health and environmental education was thus precluded.

The federal environmental service did plan (without any consultation with the Cree) a one week visit to Rupert House for health education. The medical consultant to the committee visited Rupert House at the same time to observe progress on the short-term improvements and to start the training of the community health workers from the two villages (October 6-10).

No actual work had been started at that time. One of the members of the federal team made a specific list of objections to the working plans which he submitted to the Cree Regional Authority (notwithstanding the fact that his supervisor had been present as a member of the

committee at the initial planning session and had made little comment). Delays in furnishing the temporary nursing station in Nemaska persisted and the health worker for Nemaska refused, after the week of training, to begin her work until the nurses arrived.

At the same time, despite official Cree policy, a meeting was held between the newly appointed coordinator of community health for the Cree Health Board, two experienced outpost nurses, and the regional director of the Québec environment service to discuss coordination of education programs for the time of the transfer in March 1981.

VII. THE SHORT-TERM OUTCOME

In early November, the legal hearing in which the Cree challenged the trusteeship began (this ended when the 120 days elapsed and the trusteeship was not renewed). Near the onset of this hearing, the director of infectious diseases of the Ministry of Social Affairs asked Dr. Pekeles to conduct a broader scale epidemiologic review of the infantile gastroenteritis epidemic of the type that had first been suggested nine months earlier. It was not clear why this request was made at that particular time. The mandate given him was somewhat restricted in that he was dependent on secondary sources for information from outside the Cree region proper.

The report from the Corporation of Physicians on the four deaths in Nemaska was received by the ministry at the end of November. This report was never presented to any Cree authority or the village itself.

Despite the agreement in principle by Indian Affairs to pay for the short-term improvements, negotiations about the details dragged on. As of April 1981, the federal department had paid somewhat less than half of the approximately five hundred thousand dollar cost of the short-term measures.

By early 1981, door-to-door closed container water delivery was operating in Rupert House. New outhouses had been built and the ditches cleaned. A communal bath house was built. The timetable for the permanent system of water and sewage pipes for Rupert House was accelerated (through interim funding from the Cree Regional Authority) with work scheduled to begin with the spring thaw of 1981. House-to-house visits by the community health nurse (newly appointed) and the community health worker were continuing.

In Nemaska, a new well was in use, and the first group of houses, which were to be hooked up to the water system, were being completed. The opening of the nursing station was still delayed.

The DSC, together with the community health coordinator, had adopted a new form of record keeping for the nursing stations. No other programs were undertaken by the DSC in the face of the administrative void. Similarly, the trusteeship, inadequate financing and the resulting difficulties in opening the new hospital led to the resig- of all four physicians and many of the nurses in the James Bay region.

As part of the agreement at the end of the trusteeship, the MGH lent one of its administrators to the Cree Health Board to help it start functioning again. Some communication resumed at the level of day-to-day

operations between Social Affairs and the Cree despite the ongoing broader legal and political arguments.

On March 31, responsibility for environmental services and the last nursing stations under federal jurisdiction was transferred to Québec. Shortly before this, the Cree had begun an active political campaign in Ottawa to convince the federal government that, as several conditions of the James Bay Agreement had not been met, the federal government had a responsibility to remain actively involved.

VIII. THE FUTURE RELATIONSHIP

1. Cree - Québec Relations in Health Services

The events of the past year have demonstrated how the overall tone of relations between the Cree and the government of Québec sets the context for their activity in health services, often to the level of day-to-day operations. This effect was most dramatic in the actual closing of the regional hospital.

The government has frequently been insensitive to Cree concerns and perceptions. The lack of a cadre of civil servants with experience in native affairs is obvious. The Cree have often responded by not using what the government would call "normal channels" for communication but using the publicity of the press. The results of this tack were mixed in this case. Short-term improvements were made, but a bitter struggle ensued.

Although there has been some recovery from the nadir of the trusteeship with some ongoing contact, the general atmosphere of suspicion, hostility and

misunderstanding remains. The Ministry of Social Affairs and the Cree Health Board have not yet developed a stable working relationship. The government has been unable to offer the positive support that will foster the development of administrative self-sufficiency in the Cree Health Board. The health board has been unable to solicit specific support from the government, with the confidence that it will be able to retain autonomy. The financial disagreements colour most interactions. That the Cree feel the need to still involve the federal government suggests that these problems will continue.

2. Community Health and the Relationship of the Cree Health Board and the Department of Community Health/ Montreal General Hospital

This epidemic did lead to a heightened awareness of the importance of personal hygiene in the villages. Mechanisms to ensure ongoing community education are needed.

Reviewing the events of the past year, one is not impressed with the role of the DSC/MGH. The medical consultant to the health board committee was under the aegis of the DSC but this activity did not involve any of its permanent personnel. There were several reasons for the lack of an active role.

Firstly, both in its origin and its spread, this epidemic involved an area in several health jurisdictions. Coordination of investigation and planning would have been more appropriate at a broader scale but initiative was lacking at both the provincial and federal levels.

Secondly, the behaviour of the DSC has consistently been that of consultant, answering expressed needs rather than helping to define them. This posture is complicated by the lack of administrative depth within the health board itself.

The long term solution will be the training of more Cree in administration, and indeed, in medicine and nursing. Until that time, the board needs outside support. Some of this must come from the provincial government. Such cooperation will be difficult and the DSC may help to mediate the relations.

For the DSC to truly fulfill its mandate even as it currently exists, its role must transcend that of consultant in community health. It must be actively involved in the definition of needs, it must assist the planning of program administration as well as program content. Finally, it must serve as a "matchmaker", matching the needs it finds in the north and the resources at its disposal, either from the department itself or from the larger hospital or university framework.

To accomplish this task at least two major changes are required. At least one member of the Module du Nord must be based in the north, or at least spend as much time in the north as in Montreal. (None are now.) In addition, for the tasks of both helping to assess needs in the north and identifying available resources in the south, a medical background would be invaluable for the director (the incumbent has no medical background).

The changes in the relationship need to be discussed by the DSC and the Cree Health Board. An

initial working paper was presented to the health board last August and shelved. With the relative cooling of the political and legal problems, that initiative needs to be taken up again.

COLLABORATION BETWEEN AUTONOMOUS NATIVE HEALTH SERVICES AND OUTSIDE RESOURCES

Medical services are of secondary importance in improving the health status of native peoples on this continent. Economic improvement and social stability will have a greater effect. For the Cree of Québec, these were part of the promise of the James Bay Agreement. The money they received would seed the development of Cree enterprises and allow individuals to continue their traditional pursuits of hunting and trapping by guaranteeing them a minimum income.

Adequate sanitary facilities, water distribution and sewage disposal, are also prerequisites for community health. The most effective strategies for obtaining such facilities will vary according to the politics of local situations.

Although sanitation is not usually the direct responsibility of medical services, health care providers, both primary and consultant, can accelerate the building of adequate water and sewage systems. By pointing out the direct medical consequences of current conditions, they become advocates for change. In the case described here, neither the clinical personnel of the Cree hospital nor the department of community health working with them took on this role before or at the onset of the epidemic.

The difficulties in responding to this epidemic have some causes peculiar to the James Bay region of Québec. Others, though, can be generalized to autonomous native health services elsewhere, both now and in the future. Aspects of these were discussed in the report of the epidemic and the chronology of the response. Some of the broader issues will be reviewed here.

As negotiations about native land claims settlements continue in North America, the issue of greater local autonomy in various domains is consistently raised. The details of such arrangements in health services will differ from

jurisdiction to jurisdiction but certain features are likely to be common.

a) The availability of local people with backgrounds in administration and medicine will vary but in general will be less than the staffing requirements of those health services. This discrepancy will require the employment of outsiders at various levels of the service, at least at the outset.

b) Financial support will be a continuing area of discussion, even conflict, between the government and the local service.

c) As with any primary care health service, a network of back-up consultant specialists will be required.

d) Both cultural and physical distances may exist between the primary autonomous service and its consultants.

These problems are a challenge to any back-up resource, university or otherwise, to a native health service. There are two major goals which may at times be incompatible. The goal of meeting the current health needs is obvious and immediate. The longer term goal is to foster the development of native health services (among other services) that are autonomous in deed as well as in law. If any hope exists for the preservation of Indian and Eskimo culture, it lies in decreasing as much as possible the dependence of those cultures on white North America. (Even this strategy has its dangers; in learning the skills needed to increase their autonomy, native people may be accelerating their own assimilation.)

As noted in the historical background, Canadian universities have been involved in northern native health services for the last twenty years. They accepted contracts from

government agencies, usually the Department of National Health and Welfare, to provide consultant specialists among other services. These contracts were with government hospitals that themselves have had little or no input from the native communities they serve. This situation creates its own problems, but the dilemma described above has not existed in these university government relationships.

It does exist in the two cases of McGill University and the Québec Cree and l'Université Laval and the Québec Inuit. The primary focus of their contracts is for the provision of community health services. This focus, in itself, would demand a more active role than the cases where only consultant specialist services are provided. The inexperience of these two autonomous health services (compared to government administered services) requires more input from consultants as well. Against these two factors is the goal that the policy and administration of these health boards come from the people they serve.

The resolution of this dilemma will not come from arbitrarily defining a limit to the involvement of outside consultants. It is rather the quality of the involvement that will determine its long-term effect of either fostering or impeding the development of local expertise.

The role of the Québec government in regard to the Cree Health Board, for example, has clearly had the latter effect. Using the rhetoric of local autonomy, they let the Cree Health Board flounder by not financing it adequately and not assisting it administratively. (In addition, government health officials were completely incapable of bridging the cultural gap, and mutual hostility between Québec and the Cree grew.) When this policy led to the inevitable conclusion of serious problems within the Cree Health Board, the Québec government resorted to first threatening and then

imposing a trusteeship.

The DSC/MGH, for its part, chose to abide by a strict definition of consultant, that is responding to specific requests. This approach, as noted earlier, is antithetical to the philosophy of public health. Moreover, it was unrealistic for the DSC/MGH to expect such requests to be made appropriately, given the administrative and professional deficiencies within the Cree Health Board. The need was clearly for collaborative work rather than merely consultative.

Such a change in orientation could be made while continuing to respect the principle of local autonomy. The long-term goal would remain for the consultant community health service to work itself out of a job. Such a goal is not necessarily met by minimal involvement at the outset.

BIBLIOGRAPHY

1. The James Bay and Northern Québec Agreement, Editeur officiel du Québec, 1976

2. CANADA, Royal Commission on Health Services, Volume 1, Chapter 5; Volume 2, Chapter 9, Queen's Printer, Ottawa, 1965

3. Schaefer O, "Medical Observations and Problems in the Canadian Arctic" Can. Med. Assoc. J. 81 248-253; 386-393, 1959

4. Graham-Cumming G, "Northern Health Services" Can. Med. Assoc. J. 100 526-531, 1969

5. Seltzer A, "Acculturation and Mental Disorder in the Inuit" Can. J. Psychiatry 25 173-181, 1980

6. Winthrob RM, Diamen S, "The Impact of Culture Change on Mistassini Cree Youth" Can. Psychiatry Assoc. J. 19 331, 1974

7. Murdock A, "Mortality Rates in Indian and Inuit: Changes in Trends and Recent Experience" in Department of Indian Affairs and Northern Development, STATISTICS CANADA "Indian Demographic Workshop: Implications for Policy and Planning" Ottawa, 1980 p. 32-45

8. Department of National Health and Welfare "Report on Health Conditions in the Northwest Territories 1979", Ottawa, 1980

9. Personal communication, D. Nagnur, STATISTICS CANADA

10. Department of National Health and Welfare "Report on Health Conditions in the Northwest Territories 1978", Ottawa, 1979

11. STATISTICS CANADA, Causes of Death 1978, OTTAWA, 1980

12. Brett HB, "A Synopsis of Northern Medical History" Can. Med. Assoc. J. 100 521-525, 1969

13. Sarsfield P, "Report to the Naskapi Montagnais Innu Association and the Labrador Inuit Association Regarding the Health Care Delivery System in Northern Labrador", 1977

14. Goldthorpe G, "The Sioux Lookout Zone and the University of Toronto" U. Manitoba Med. J. 45 114-116, 1975

15. Bryans AM et al, "Northern Venture" Can. Med. Assoc. J. 94 791-794, 1966

16. Sutherland WA, "Medical Arrangements in the District of Keewatin, N.W.T." U. Manitoba Med. J. 45 121-123, 1975

17. Department of National Health and Welfare "Policy of the Federal Government Concerning Indian Health Services", Ottawa, November 1974

18. Bain HW, "Canada's Native Children" Can. Med. Assoc. J. 123 1237-1238, 1980

19. Hildes JA, "Health Care - Keewatin District" U. Manitoba Med. J. 46 100-105, 1976

20. Baskett TF, "A University Department's Involvement with Medical Care in the Canadian Worth" Can. Med. Assoc. J. 120 298-300, 1979

21. Bain HW, Goldthorpe G, "The University of Toronto 'Sioux Lookout Project' - a Model of Health Care Delivery" Can. Med. Assoc. J. 107 523-528, 1972

22. Coates A, "Annual Report 1978 - Inuit Indian Liaison Committee - Montreal Children's Hospital" (unpublished)

23. The James Bay and Northern Québec Agreement, pp. 252-257

24. Ibid., p. 253

25. Friedman E, "The Possible Dream: The Navajo Nation Health Foundation" Hospitals ___ 81-84, October, 1979

26. Jolicoeur G, "Services Municipaux en Territoire Inuit" SAGMAI, Québec, October 1978

27. Jolicoeur G, "Service Municipaux en Territoire Cri" SAGMAI, Québec, January 1979

28. Moisan R, "Report of Enquiry into the Administration and Operation of Chashasipich Hospital in Fort George" Québec, April 1980

29. WHO Scientific Working Group, "E. Coli Diarrhea" Bulletin W.H.O. 58 23-36, 1980

30. Severs D et al, "Epidemic Gastroenteritis in Newfoundland During 1963 Associated with E. Coli 0111:B4" Can. Med. Assoc. J. 94 373-378, 1966

31. Gurwith M et al, "A Prospective Study of Enteropathogenic E. Coli in Endemic Diarrheal Disease" J. Inf. Dis. 137 292-297, 1978

32. Sack R, "E. Coli and Acute Diarrheal Disease" Ann. Int. Med. 94 129-130, 1981

33. Plank S and Milanesi M, "Infant Feeding and Infant Mortality in Rural Chile" Bulletin W.H.O. 48 203-210, 1973

34. Ellested-Sayed J et al, "Breast Feeding Protects Against Infection in Indian Infants" Can. Med. Assoc. J. 120 295-298, 1979

APPENDIX I

REPORTS TO THE MINISTÈRE DES AFFAIRES SOCIALES OF THE MEDICAL TEAM VISITS (AUGUST 16-17 1980) TO RUPERT HOUSE AND NEMASKA

RUPERT HOUSE

METHODOLOGIE

Nos informations ont été obtenues des sources suivantes:

- Discussions avec le chef de village, le comité de santé de Fort Rupert, et les infirmières du poste;
- Analyse avec les infirmières, des cas de gastro-entérite infantile survenus en 1979 et 1980;
- Visite du village et de plusieurs domiciles:
  - inspection de l'environnement physique, des installations destinées à l'entreposage de l'eau de boisson, investigations sur les méthodes de manipulation des aliments, les activités des enfants, l'hygiène personnelle, la présence d'animaux domestiques, etc . . . Lorsqu'indiqués, des informations d'ordre clinique ainsi que les antécédents d'alimentation de patients ou d'autres personnes ont été obtenus.
  - des prélèvements rectaux pour cultures ont été effectués chez les enfants antérieurement ou actuellement malades, de même que chez les animaux domestiques. De plus, des échantillons ont été obtenus à partir des contenants d'eau de boisson.

RESULTATS

1) Epidémiologie

On a noté une augmentation importante au printemps et à l'été 1980 de cas déclarés de diarrhée parmi les enfants de moins de deux ans (N = 53) en comparaison avec la même période de l'année 1979 (N = 24). De plus, le nombre de patients ayant dû être hospitalisés est passé de un (1) en 1979 à treize (13) à ce jour en 1980.

(Cette tendance semble être similaire à celle constatée dans plusieurs localités du nord-ouest du Québec cette année. Les premiers cas, et la plupart des patients avant du être hospitalisés à Montréal venaient du Grand Nord.)

2) Hygiène Domestique

Les informations recueillies révèlent que pas plus de 20% des nourrissons sont allaités et qu'à l'âge de 6 mois, pratiquement la totalité reçoivent du lait commercial. On s'approvisionne en eau à partir de robinets communaux, et cette eau est entreposée dans de grands contenants couverts à l'intérieur de la maison. L'eau est puisée à la louche, et le niveau est rétabli, ou le restant remplacé après une période de deux à sept jours. Les contenants sont rarement nettoyés. Plusieurs domiciles ont des réfrigérateurs. La préparation du lait des bébés est souvent faite le matin, à l'avance, à partir d'eau boullie et de lait concentré Carnation ou Similac. Nous observons des mouches, des miettes et des restants de nourriture non protégés dans plusieurs maisons. Les maisons sont bâties sur de la glaise, condition favorisant l'entrée d'eau dans les sous-sols; trois des sous-sols examinés étaient humides ou franchement mouillés. Devant la plupart des habitations, nous avons vu des caniveaux où de l'eau stagnait. Nous avons vu des enfants y jouer. Les lieux d'aisance sont bâtis près des maisons et il est vraisemblable de croire que les caniveaux et les sous-sols se partagent la nappe de liquides en provenant.

3) Microbiologie

Plusieurs des enfants hospitalisés à Montréal durant cette épidémie et venant des communautés cries et inuit, étaient porteurs de la bactérie Escherichia Coli 0111/K58 dans leurs selles. Cette bactérie est connue comme étant

potentiellement pathogène, et a été dans le passé associée à des éclosions de maladie diarrhéiques. Son isolation chez la plupart des enfants malades révèle une source commune de contamination dans ce groupe restreint. Cependant, pour établir une preuve solide que cette bactérie est la cause biologique directe de l'épidémie, il faudrait démontrer:

a) qu'elle est présente dans les selles des enfants au début de leur maladie;

b) qu'il n'y a pas d'autres organismes pathogènes chez ces enfants et

c) qu'elle soit absente ou tout au moins en nombre considérablement plus limité dans les selles des enfants sains.

A ce jour, aucune étude de laboratoire n'a démontré la pathogénicité de cet isolat.

Les cultures provenant des prélèvements rectaux effectués à Fort Rupert ont été apportées à Montréal et repiquées en dedans de 48 heures. Les spécimens provenaient de 23 personnes, dont trois enfants qui présentaient des symptômes. Trois bactéries potentiellement pathogènes ont été isolées: E. Coli 0111/K58 d'un diarrhéique de 18 mois, une salmonella du groupe B d'un enfant diarrhéique de 2½ ans, et une bactérie de l'espèce Aeromonas d'un enfant asymptômatique. Des échantillons non quantitatifs (par écouvillon) d'eau provenant des réserves domestiques de quatre maisons ont donné des cultures indifférenciables de cultures de selles, ce qui révèle une importante contamination. Les prélèvements rectaux provenant de deux chiens n'ont révélé aucun organisme pathogène. La recherche au microscope électronique n'ayant pu être faite, la présence d'un agent viral ne peut être éliminée.

a) Eau de boisson

Des réservoirs couverts munis de robinets devraient être installés dans toutes les maisons immédiatement, de façon à protéger adéquatement l'eau de boisson contre la contamination. Un camion-citerne améliorerait l'opération de distribution. Une désinfection périodique régulière des réservoirs devrait être faite.

b) Hygiène domestique

Un effort éducatif important devrait être entrepris afin de promouvoir le lavage des mains entre les soins donnés aux bébés et les autres tâches domestiques: préparation de la nourriture, activités et jeux à l'extérieur, etc.

2) Soins Médicaux

Trois niveaux de soins médicaux sont concernés:

a) primaire: l'infirmière locale;

b) secondaire: l'Hôpital Chisasibi et dans certains cas, l'Hôpital de Val-d'Or;

c) tertiaire: l'Hôpital de Montréal pour Enfants, et dans certains cas, l'Hôpital Ste-Justine

La communication et la coordination des soins entre Fort Rupert, Chisasibi et Montréal a été adéquate. Un contact plus étroit sera nécessaire si la situation présente persiste.

3) Traitement Aux Antibiotiques

Les résultats des analyses bactériologiques effectuées jusqu'à présent, et l'évaluation épidémiologique de la situation n'exigent pas, pour le moment, l'emploi d'antibiotique spécifique.

A long terme: Nous insistons fortement sur l'importance des aspects préventifs suivants:

1) Nous sommes en complet accord avec les recommandations que s'apprêtent à fournir les spécialistes de l'environnement qui ont fait partie de la mission. La disposition des eaux usées est inadéquate et le système d'adduction et de transport de l'eau est insuffisant. Cette situation doit être corrigée le plus tôt possible.

2) L'intensification des programmes actuels de santé publique par le comité de santé local et les infirmières, avec le support complet du CRSSS et du DSC de l'Hôpital Général de Montréal. L'accent devrait être placé sur deux points essentiels:

   a) Emphase sur l'hygiène personnelle et domestique. Cet effort d'information et d'éducation devra être fait concurremment avec l'amélioration des autres conditions de vie, s'il doit être efficace.

   b) Une campagne intensive en vue de promouvoir l'allaitement maternel. L'objectif visé devrait comprendre 100% des nourrissons jusqu'à l'âge de six mois. Après l'assainissement de l'environnement, cette mesure à notre avis est celle qui aura le plus d'effet sur la santé des enfants du village.

3) Ces programmes pourront nécessiter la présence d'une troisième infirmière à Fort Rupert, dont le mandat principal serait dirigé vers la santé communautaire.

4) La formation d'une personne du village au niveau post-secondaire dans le domaine de l'assainissement serait certainement un investissement utile à long terme, en

vue de la planification et du développement ultérieurs du village.

NEMASKA

METHODOLOGIE

Nos informations ont été obtenues des sources suivantes:

- discussions avec le chef de village, le président du Conseil Régional Cri, et le comité local de santé;
- visite du village, et des domiciles d'enfants sains et malades. Observation des conditions sanitaires. Prélèvements d'échantillons pour culture.

RESULTATS

1) Mortalité

Nous avons été informés du décès de quatre enfants de cette communauté (population totale - 150) survenus entre mai et août 1980. L'information obtenue sur chacun d'eux était insuffisante, et aucun jugement ne put être fait concernant la cause du décès dans ces circonstances. Il semble que des symptômes respiratoires et gastro-intestinaux avaient été présents chez ces quatre enfants.

Nom	Date de naissance	Date du décès	Lieu du décès
Ricky Marcel Blackned	80.06.03	80.06.28	Hôp. de Matagami
Andrew Roger Wapachee	77.08.07	80.05.14	Hôp. Ste-Justine
Tommy James Wapachee	80.05.12	80.08.11	Hôp. de Val d'Or
Jason Sam Tanouch	80.01.17	80.05.17	Lac Champion après avoir été vu à l'Hôp. de Matagami

2) Gastro-entérite

Selon le comité de santé, la plus grande partie des enfants de moins de deux ans ont souffert de diarrhée à un moment ou à l'autre durant les trois derniers mois.

Aucune information précise n'a été consignée au village sur cette situation.

3) Services de Santé

Le travail de construction de l'infirmerie n'est pas encore commencé. Aucune visite de médecin, d'infirmière ou de dentiste n'est faite de façon régulière.

Une éclosion de rougeole au printemps 1980 a nécessité la visite de personnel de l'hôpital Chisasibi en vue d'immuniser les enfants. Par ailleurs, à peu près aucun enfant du village n'a reçu les autres immunisations de base.*

Les évacuations pour raison médicale se font usuellement à l'hôpital de Matagami. Il semble que la communication entre l'hôpital et la communauté ait été très faible.

4) Hygiène Domestique

La population du village vit dans des tentes semi-permanentes, sans eau courante ni installations sanitaires individuelles. Il y a peu de protection contre les insectes. Les soins aux enfants (e.g. changement de couches) et la préparation de la nourriture ne peuvent être raisonnablement suivis d'un bon nettoyage des mains à cause du manque d'eau courante. La plupart des domiciles n'ayant pas de réfrigerateur, les mères préparent la formule de lait de leur bébé pour toute la journée, et doivent laisser celui-ci à la température ambiante, ce qui favorise la croissance microbienne. Les infections cutanées sont endémique chez les enfants. L'allaitement maternel est le fait d'une minorité de mères.

En résumé, la plupart des conditions favorisant la diarrhée endémique ou épidémique sont présentes dans ce village.

*Une analyse du dossier de Andrew Roger Wopachee, faite à l'Hôpital Ste-Justine après décès, a démontré que celui-ci était dû à des complications de rougeole.

5) Bactériologie

Quatorze prélèvements rectaux ont été effectués dans cinq familles, dont quatre d'enfants souffrant de diarrhée. Aucun de ces échantillons, analysé à l'Hôpital Ste-Justine, n'a permis l'isolation d'une bactérie entéropathogène. Notamment, Escherichia Coli 0111/K58 n'a pas été mis en évidence. Les selles de quatre enfants malades ont été examinées au microscope électronique, mais aucune particule virale n'y a été trouvée. La quantité de matériel fécal prélevée sur l'écouvillon était minime: un échantillon plus abondant aurait rendu cet examen spécial plus utile.

Il faut noter que le seul échantillon provenant d'un contenant à eau de boisson, et prélevé en y plongeant un écouvillon, s'est rélévé porteur de multiples bactéries intestinales, ce qui indique une importante contamination fécale. La famille avait souffert de diarrhée en juin, et les deux plus jeunes enfants avaient au moment de la visite recommencé une autre diarrhée.

CONCLUSIONS

Il est évident que quatre décès d'enfants dans un village dont le nombre de naissances est du même ordre de grandeur constitue un taux de mortalité infantile absolument inacceptable.

Le peu d'informations recueillies ne nous permet pas de déclarer avec certitude s'il y a eu ou non une épidemie de diarrhée à Némiscau en 1980. Il semble cependant que la diarrhée y soit endémique. Presque tous les enfants et la plupart des adultes ont souffert ou souffrent actuellement de diarrhée. Au point de vue médicale, les habitants de ce village peuvent être considérés comme une population fortement à risques devant la possibilité d'éclosions épidémiques

d'infections gastro-intestinales, cutanées et respiratoires, et il reste beaucoup à faire pour améliorer leur situation.

RECOMMANDATIONS

1) A cause de la grande anxiété de la population à la suite de ces quatre décès, et de l'insuffisance des informations que nous avons pu recueillir, nous recommandons que le Conseil Régional Cri donne le mandat à un médecin de l'Hôpital Chisasibi d'analyser les circonstances ayant entouré le décès de ces quatre enfants, au moyen d'entrevues et de revue des dossiers se trouvant aux hôpitaux de Matagami, Val d'Or et Ste-Justine. Le M.A.S. devrait offrir le support nécessaire à cette étude. Un rapport devrait être adressé au comité de santé de Némiscau. Il n'y a aucune raison de croire, à l'heure actuelle, que ces décès sont reliés à l'infection gastro-intestinale qui sévit actuellement de Ivujivik à Fort Rupert.

2) Une infirmerie permanente et une infirmière à plein temps sont indispensables dans les plus brefs délais. Ceci permettra d'offrir:

   - des soins médicaux de première ligne et une accessibilité plus rapide aux services de deuzième ligne;
   - un programme d'immunisations aux nourrissons et enfants;
   - des programmes d'éducation et d'information sanitaire, notamment,
     . hygiène personnelle
     . promotion de l'allaitement au sein.

3) Nous supportons sans restriction les recommandations que s'apprêtent à fournir les responsables de l'Environnement sur l'état de l'environnement, en ce

qui a trait à l'approvisionnement en eau potable et à la disposition des eaux usées.

- Une source d'approvisionnement en eau saine constitue un besoin urgent. Ont pourrait creuser un puits profond, ou installer une petite usine de pompage avec chlorinateur. En attendant que ces travaux soient réalisés, et nous espérons que ce sera avant la période du gel, les familles devraient faire bouillir l'eau de boisson et de lavage. Les barils et seaux à eau devraient être remplacés immédiatement par des contenants à couvercle munis de robinets. Ces contenants devraient être nettoyés fréquemment et gardés remplis d'eau bouillie.
- Les lieux d'aisance actuels devraient être stérilisés et remblayés aussitôt que possible. Des toilettes chimiques ou un autre type d'installations bien construites devraient être installées immédiatement.

4) Nous désirons rassurer le Conseil Scolaire Cri en ce qui trait aux enfants de Némiscau. Il n'y a actuellement aucune raison d'empêcher les enfants de fréquenter les écoles d'autres villages aussitôt que celles-ci ouvriront leurs portes.

APPENDIX II

REPORTS TO THE CREE HEALTH BOARD OF VISITS (SEPTEMBER 22-24 1980) TO EASTMAIN AND PAINT HILLS

EASTMAIN

INTRODUCTION

A visit was made to Eastmain September 22-23, 1980 to investigate the health conditions of the community. A report on municipal services, including sanitation and water distribution of Eastmain and other Cree communities was made in January 1979 by the "directeur des services de protection de l'environnement" to SAGMAI "the Jolicoeur Report". In the main, the conditions described therein and the priorities for the future are the same today. As I do not claim expertise in these areas, I have repeated the salient features described by Jolicoeur and pointed out where the situation has since changed.

METHODS

Information was derived from the following sources:

- discussions with the nurse
- examination of the nursing station records for:
  - clinic visits for infantile gastroenteritis 1979-80
  - number and location of births 1977-80
  - infant feeding histories for infants born 1978-80
  - hospitalization of children 1979-80
- discussions with the chief of the village and the water pump maintenance man
- tour of the village with visits to several houses, water taps, dump and school
- interviews with villagers about water collection and storage, garbage storage and disposal, outhouses, food storage, and personal hygiene

RESULTS

1) Community Facilities

A) Water supply

As noted in the Jolicoeur report, a well and pump station exist with filtration, reduction of iron content, and chlorination with pre and post treatment reservoirs. I was informed that repeated reports from the Ministère de l'Environnement have not shown bacterial contamination of this water at source. Pipes run this water to the school, teachers' houses and nursing station. Since 1978, two more public taps have been added to the single one previously on this line. One man is responsible for maintenance of the pump house.

The river is no longer used as a source of water because of the increased salinity following changes in its rate of flow (apparently due to the building of dams for hydroelectric power).

Everyone questioned in the community said that the taps were unacceptable to them as sources of drinking water because of the taste and colour of the water.

B) Solid garbage disposal

The pump is about two kilometers from the village, apparently recently relocated. Currently, there is no public garbage pickup. People either take their garbage to the dump by barrow or truck, or what appears to be more common, throw it near the house or burn it nearby.

2) Houses and Domestic Hygiene

Most of the houses were built about seven to eight years ago. Heating is generally by wood stove. Drainage is not a problem except with excessive spring rain and thaw.

All houses have one or more 45 gallon drums outside to collect rainwater for all uses including drinking. These are often kept covered, occasionally with cloths over them to serve as crude filters, are rarely cleaned. Water for drinking is kept indoors, either in plastic garbage-can type containers or, in many houses in covered plastic or metal containers with taps. Javel is never used to clean these.

Garbage bags are generally kept outside the houses. Flies were noted in many houses and considerable variation is the cleanliness of the houses was found. As the village freezers have not worked for several years, most houses have freezers to store game. Fewer houses have refrigerators. My impression was that the water is frequently boiled for infant feeding, but rarely for drinking by others.

Most houses have outhouses. Building and replacing of these is purely at personal discretion. Use of chamber pots is particularly common during the winter. Slop water is generally tossed out the front door.

3) Health and Nursing Services

The community is usually served by two nurses and a nurse's aide, although there have been many periods when the second nursing position was unfilled. Unlike many communities, Eastmain has benefitted from having continuity of nursing care over several years. Health education is exclusively on an individual basis for hygiene and nutrition.

A "weight-watchers" programme exists. There appear to be no school health programmes. There is no local health committee. A random review of charts suggested that immunization rates are high from infancy through the pre-school period.

4) Births and Feeding Patterns

Year	Births	# With Known Feeding History	Comment
1977	10 (5 - Fort-George) (3 - Moose Factory) (2 - Val d'Or)	7 - 4 breast fed 3 formula	- mean duration 3m. - 2 with maternal post-partum complications
1978	5 (5 - Fort-George) (2 - Moose Factory) (1 - Val d'Or)	4 - 2 B.F. 2 formula	duration ??
1979	6 (5 - Fort-George) (1 - Moose Factory)	4 - 3 B.F. 2 formula	mean duration 8m.
1980 (8m)	4 (2 - Fort-George) (1 - Val d'Or) (1 - Granby)	4 - 2 B.F. 2 formula	mean duration 3½m.

Generally, children continue to drink from bottles until three to four years old.

5) Children's Illnesses

The nurses cite otitis, skin infections, dental caries as the most common health problems. Apparently, there has not been an outbreak of gastroenteritis this year in Eastmain as there has been in other communities.

Clinic Visits for Symptoms of Gastroenteritis
Under 3 Years Old

	1979	1980
January	0	0
February	4	0
March	0	1
April	0	0
May	0	0
June	0	N.A.
July	N.A.	N.A.
August	0	N.A.
September	1	0
October	0	
November	N.A.	
December	0	

There has been only one hospitalization for gastroenteritis. There have been children with diarrhea who have not been seen at the nursing station. The nurses feel that this pattern is the result of their education programme last year on management of gastroenteritis.

Hospitalization of Children
(excluding dental visits)

	1979	1980
	13	11
Respiratory inf.	3	2
Trauma	2	1
Other orthopedic	2	4
Tonsillectomy	2	1
Other surgery	0	1
Other	4	2
Fort-George	9	8
Val d'Or	2	2
Montreal	1	
Québec	1	
Moose Factory		1

RECOMMENDATIONS

1) Water Supply

The position of the Jolicoeur report can only be re-emphasized; a water pipe distribution system must be built with the shortest possible delay. Several other considerations are germane.

In addition to the relative inaccessibility of the well-water, its taste and colour have encouraged the use of an unacceptable source of drinking water - rainwater collected in large, open, inadequately cleaned drums. Bacterial contamination of this water has been documented repeatedly.

Consultation with regard to the mineral content, turbidity, etc of the treated water and means of improving its quality is required. Such consultation could be sought from the Ministère de l'Environnement.

The use of closed containers for drinking water as in some households should be urged on the others. The feasibility of daily distribution of water by tank truck should be studied. Both of these are offered as interim measures only.

2) Sewage

Treatment of used water is nonexistent at the moment. Consultation is required as to the relative merit for this community of multiple septic tanks vs a drainage pipe system. Possible interim improvements include better outhouses, chemical toilets, or honey buckets. Again, appropriate consultation is required.

3) Education Programme

Improvement in the esthetic quality and distribution

of water will need to be coupled with an education programme discouraging drinking drum-stored water and use of clean covered containers. The importance of hand washing between various domestic activities needs to be emphasized. Breast feeding appears generally well established in the community but further encouragement, and discouraging prolonged use of bottles is needed.

The close ties of the nursing staff to the community should facilitate such an education programme. The resources of the school should be enlisted as well. Establishment of a local health committee should be considered.

PAINT HILLS

INTRODUCTION

A visit was made to Paint Hills September 23-24, 1980 to investigate the health conditions of the community. A report on municipal service, including sanitation and water distribution of Paint Hills and other Cree communities was made in January 1979 by the "directeur des services des protection de l'environnement", to SAGMAI, the "Jolicoeur Report". In the main, the conditions described therein and the priorities for the future are the same today. As I do not claim expertise in these areas, I have repeated the salient features described by Jolicoeur, and pointed out where the situation has since changed.

METHODS

Information was derived from the following sources:

- discussion with the nurses
- examination of the nursing station records for:
  - clinic visits for infantile gastroenteritis 1979-1980
  - number (1977-1980) and location (1980) of births
  - hospitalization of children 1979-1980
- discussion with chief Walter Hughboy and public health officer, Willie Matches
- tour of the village with visits to several houses, water sources, dump and school
- interview with villagers about water collection and storage, garbage storage and disposal, outhouse, food storage, and personal hygiene

RESULTS

1) Community Facilities

A) Water supply

Other than the new site of Nemaska, Paint Hills has the poorest water supply system. River water from the level of the village (although above the major sewer sources) is pumped into a pipe system that reaches the Hudson's Bay Co. complex, the school and teacher's residence. The nursing station is served by an independent pump. Water from both is considered contaminated and not used for drinking. Water for drinking is delivered to the school and nursing station, other individuals are responsible for obtaining their own water. Sources of water, currently, are several:

a) spring and reservoir without any treatment and completely open above the village. The reservoir has just received its annual cleaning, but coliform counts just prior to this showed marked bacterial contamination.

b) rapids on the river above the village - frequently contaminated as well.

c) a small lake above the village which has been contaminated on 1 of 2 tests.

d) rainwater from an island in the bay - usually free of contamination, but requires canoeing out with receptacles to collect the water.

e) rainwater collected in buckets about the houses. Thus, there is no consistently clean, generally accessible source of water. The problem is worse in the winter.

B) Solid garbage disposal

There is biweekly collection of garbage for the dump located far enough from the village (about 2km). Much garbage though appears to be thrown elsewhere.

2) Houses and Domestic Hygiene

With few exceptions, the houses have been built in the last decade. In addition, there is active housing construction proceeding currently. Drainage does not appear to be a problem, except for springtime. In addition, some of the area zoned for future houses is quite marshy and presumably would require land fill.

In some houses, drinking water kept in covered containers, in others in open bins. None seemed to receive adequate cleaning (i.e. regularly with javel).

Garbage bags are generally kept outside. Most houses are clean and relatively well maintained. Most houses have refrigerators. Although all people questioned acknowledged the importance of boiling water for drinking, most admitted that this was done sporadically. Slop water is generally tossed out the front door.Outhouses are as found in the other coastal communities.

3) Health and Nursing Services

The community is served by two nurses. The usual problems of rapid turnover exist although the current personnel assisted by the translator/aide appear to have a good rapport with the community. There are no formal health education programmes in operation currently. A local health committee has just been established. Immunization rates are high from infancy through the preschool period.

4) Births

1977 - 20
1978 - 23
1979 - 23
1980 - 15 (Moose Factory 11, Fort George 3, Paint Hills 1.) Information on infant feeding is not readily available in the charts, but the impression of the nurses is that "most" infants are breast fed at least initially. Duration is equally unknown.

5) Children's Illnesses

As in Eastmain, ear, skin and tooth problems are the most common. Paint Hills was equally spared the gastroenteritis outbreak found in several other Cree communities.

Clinic Visits for Symptoms of Gastroenteritis
Under 3 Years Old

	1979	1980
January	1	0
February	1	1
March	2	1
April	1	0
May	0	N.A.
June	0	0
July	2	2
August	1	3
September	7	1
October	2	
November	0	
December		

Members of the community do recall a large outbreak of gastroenteritis four to five years ago, but none since.

There have been no hospitalizations for gastroenteritis in the last two years.

Hospitalization of Children
(excluding dental visits)

	1979	1980
	30	34
Resp. infec:	3	4
Orthopedics	9	19
Tonsillectomy	2	0
Circumcision	2	3
Other surgery	4	2
Other	10	6
Fort-George	18	27
Val d'Or	7	4
Moose Factory	1	1
Montreal	4	2

Note: Most of the orthopedic visits are the follow-up of congenitally dislocated hips and represent several visits by each of a group of patients with this problem.

RECOMMENDATIONS

1) Water Supply

A proposal made several years ago for a water system using water from the Makatua needs to be reevaluated. More work will be required in Paint Hills than any other community for the provision of an adequate water distriution system. The current situation doesn't even have the basis for an interim solution and consultation is required. If a consistently clean source of water is identified, a tank truck and closed container system as suggested elsewhere may be used as a temporary measure.

2) Sewage

Again, consultation is required to determine what is the most appropriate system for sewage treatment in this community. Meanwhile, better outhouses, chemical toilets or honey buckets should be considered.

3) Education Program

All the interim measures suggested will require the active participation of the community. Education about water storage, disposal of waste material and personal hygiene is required. The prolonged use of bottle feeding must be discouraged. The involvement of the newly established local health committee together with the nurses will be helpful.