

BAFFIN ZONE TELEMEDICINE STUDY

FINAL REPORT

DEPARTMENT OF COMMUNICATIONS

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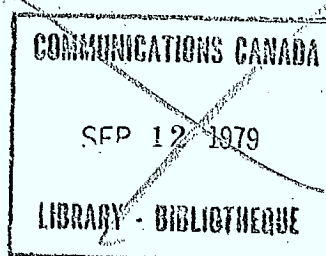
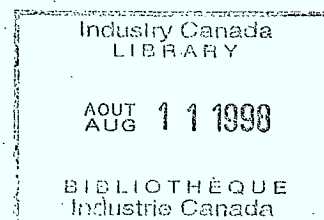
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While the project team gratefully acknowledges the valued assistance of these persons, the authors assume full responsibility for the content of this report.

The views, conclusions, proposals and recommendations put forth in this report are those of the authors, and do not necessarily represent policy positions of either the Department of Communications or Health and Welfare Canada.



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I - SUMMARY

A) EXECUTIVE SUMMARY

Reliable communications between the south of Canada and the northern regions, as well as transnorthern communications have long been unsatisfactory. It has been conclusively shown that HF radio is not the answer to these problems.

The development and deployment of satellite technology to northern areas has proved to be of tremendous benefit to residents and industry but has concurrently demonstrated that much has yet to be done, to achieve accessible and reliable communications of a standard now generally accepted in the south.

In particular, recent communications advances have been of immense assistance in the delivery of health care. It remains to identify the optimum balance of technology which may be needed for fulfillment of demonstrable needs in the health care services in the north.

To investigate the present status of the role of telecommunications in health care delivery in Baffin Island Zone, this study was initiated in May 1976. It has been designed to reveal what resources are presently available and how effectively they are being used, as well as to derive models for future systems in which telecommunications are an integral part of health care delivery rather than an accessory component.

Specially designed questionnaires and interviews were structured to collect data related to the operational medical, administrative and social uses of telecommunications in health care delivery in Baffin Island Zone.

The analysis of this data forms the major part of this report and generally substantiates many impressions which were formerly anecdotal or unconfirmed, and additionally produces new data which may be of use in planning future telemedical systems.

Finally, based on this analysis, four recommendations are offered.

These are:

1. That Telecommunications be fully integrated with the health care system as an instrument of health care delivery in Baffin Island Zone.
2. That a 24-hour, high quality communications system be made available in the Baffin Island Zone, specifically designed to meet the needs of the health care system.
3. That a pilot project be undertaken in the Baffin Island Zone utilizing present satellite facilities, to fully explore and directly assess the various potential characteristics of a system with a design such as proposed in Recommendation 2.
4. The auxiliary uses of telecommunications serving the total health field in the Baffin Island Zone (with potential application for other remote areas), be fully explored and assessed.

B) GOALS AND OBJECTIVES

The project's goals and objectives should be defined as short term and long term. The more immediate goals of the study are:

- to identify the usage and problems of the existing telecommunications systems (HF and Satellite) in the Baffin Zone.
- to make recommendations to improve the usage of the present systems, including administrative arrangements, routing of calls, etc.
- to recommend alternate telecommunications systems requirements, including the need for dedicated vs. common systems, for private vs. shared channels.

The broader and longer term objectives of the project are geared to provide information required for the planning of remote telecommunications systems as an integral component of the health care delivery system. These include:

1. the establishment of communications needs and priorities for a remote health care delivery system
2. an approximation of the volume of communications and the type of transmission generated between nursing stations and the Zone Hospital

3. the development of administrative procedures which will promote the effective use of remote telemedicine systems
4. the determination and assessment of some socio-psychological effects of reliable communications upon health care providers and clientele.

C) SUMMARY OF FINDINGS

The primary purpose of data collection in this research study was to provide basic information for the planning of an operational telehealth system, in the Baffin Zone but also readily applicable to other remote areas of Canada. The research study specifically set out to gather information pertaining to three fundamental parameters of the communications-health care interface:

- the volume and performance of communications traffic in the Baffin Zone;
- the purpose of calls and major utilization patterns;
- the communications needs of the health care delivery system as perceived by practitioners.

These three dimensions of the interface form the underpinnings of an operational telehealth system. It is thus in this context that the major research findings will be summarized.

(1) COMMUNICATIONS TRAFFIC

(a) Volume:

The total number of long distance calls as recorded during the data collection period (10 weeks) was 519. Of these, 77.6% were carried out on the Anik satellite system, 18% on HF radio and 4.4% on the Dew line. This can be translated into an average of 2 weekly calls per nursing station with HF, and 7 weekly calls per nursing station with Anik.

Aside from the inherent dichotomy of the two major telecommunications systems (HF and Anik), no major differentiating factors amongst the nursing stations seem apparent. Those stations with access to Anik used telecommunications much more extensively in their day to day tasks than did the HF radio locations. This included a higher frequency of administrative and medical routine calls, as well as a marked difference in the use of the system for social calls. Correspondingly, medical calls were more prevalent than administrative calls on HF radio. Additionally, the percentage of medical emergencies was higher on HF radio than on Anik. This substantiates the notion that HF radio is generally used solely for absolute necessities, due mainly to its poor reliability.

Outgoing calls were far more frequent than incoming calls throughout the entire Zone (at a ratio of approximately 3 to 1). This was true of all nursing stations, all communications systems, and any purpose of call. Thus, it is clear that the majority of communications traffic in the Zone emanates from the nursing stations. This is significant since it implies that there is a strong demand for communication with Frobisher Bay from the nursing stations.

Nurses and physicians were the most sought of all health care personnel. Calls to nurses comprised 30.8% of the total, while calls to physicians made up 29.1%, for a combined percentage of 59.9% of all calls. Both also had very high rates of accessibility at approximately 90% of the time.

(b) Performance:

The bulk of the performance data was tabulated according to the dichotomy of the two major telecommunications systems in the Zone.

In terms of quality and reliability, the results were not surprising: 92% of Anik calls were considered satisfactory, while only 60.2% of HF radio calls were seen as satisfactory. The Dew Line received a high rating of 90.5%. It is evident that the discrepancy in quality and reliability between Anik and HF radio forms the basis for most other differentiating factors.

The Anik system had 85.5% of calls completed easily, while HF radio and the Dew Line had 59.2% and 59.1% respectively. Furthermore, of those calls that were completed on HF radio, 40.8% of them were completed with difficulty. The vast superiority of the Anik system's reliability is clear.

78.9% of all Anik calls were completed on the first attempt. HF radio also had a fairly high rate of first attempt completions at 70%. However, this percentage on HF radio represents only 56 calls whereas the corresponding figure for the Anik system was 247.

When calls were completed, the person being sought was reached easily 83.3% of the time on HF radio and 93.5% on Anik. Aside from the 10% differential, these figures are more representative of the organizational methods used to locate the correct person and the high accessibility rate of medical personnel than the quality or reliability of the communications systems.

(c) Problems:

The various problematic factors that follow were extrapolated from the quantitative data as well as the subjective interviews with the nurses.

- (i) HF Radio: The single most prevalent reason for incomplete calls on HF was poor signals. 44.4% of incomplete calls were due to poor signals. An apparent contradiction exists between the two types of data on problems with HF radio. The quantitative data state that 70% of calls were completed on the first attempt. However, when nurses were asked to rank problems in order of seriousness, the outstanding problem was described to be the numerous attempts and considerable time consumption necessary to establish contact with HF radio. The explanation probably lies in the fact that the 70% figure only represents a small number of calls (56). Other problems on HF radio were poor reception, static, fading, etc. Delay in maintenance and repairs was also perceived as a significant problem. In sum, the major problems with HF radio concern its unreliability, poor quality, and often delayed accessibility.

- (ii) Anik: The most serious problem with the Anik system was congested circuits. This fact is apparent in the data and was echoed in the interviews. There have been calls where circuits have been congested for up to 7 hrs., requiring as many as 60 attempts to establish contact. Though such occurrences may be rare, they could have serious consequences. Another serious problem is the routing of calls through to the south or the "double-hop" phenomenon. It was found that connections were often lengthily delayed at the southern center. 18.9% of all incomplete calls on Anik were caused by this factor alone.

Other problematic elements of significance with the system were maintenance and repairs (often seen as the cause of congested circuits), noise and static, echo, fading, etc. The nurses generally felt that though there had been no marked incidences, these problems could substantially hamper the delivery of medical services. It should be noted that the problems outlined here are related to technical performance, and do not necessarily reflect difficulties with a system's applicability to health care services.

(2) PURPOSE OF CALLS

(a) Administrative and Medical:

Administrative and medical calls combined comprised over 80% of all calls. Administrative calls were the most frequent with a rate of 47%. The corresponding percentage for medical calls was 33.8%. The most frequent

second purpose of calls was the medical category. It seems surprising that medical calls should only prevail as a secondary subject. However, a far greater percentage of calls in the medical category were of an emergency nature than can be said of administrative calls. Only 9.4% of administrative calls were emergencies, whereas 35.8% of medical calls were emergencies. Although administrative calls may outnumber medical calls, in terms of importance of calls (demanding immediate access to telecommunications) the medical category carries more weight than the administrative category.

Though most calls were considered helpful in carrying out the work, neither category of calls were seen as significantly reducing the present workload. However, nurses did envisage that a substantial portion of their workload could be reduced by telecommunications should future systems provide the means.

(b) Major Utilization:

Within the administrative category the major use of telecommunications was for the transmission of medical data. Maintenance, transportation and supplies were other frequent topics. In the medical category, patient records and reinforcement of care management by a second medical opinion were the prevailing uses.

As a general observation, it is accurate to say that the two outstanding uses of present communications systems in the Zone are the transmission of medical data and reinforcement of care management.

(c) Social and Other Uses:

Social calls were remarkably infrequent throughout the entire Zone. There were only 98 calls recorded as social. Furthermore, 88.8% of these occurred on the Anik system. Only 8 social calls were made on HF radio throughout the entire Zone and for the total duration of data collection (10 weeks). These figures are in direct contrast to the feeling expressed by many of the nurses that social calls were desirable and vital in combatting professional and person isolation. It is clear that HF radio does not fulfill the perceived requirements for social uses of telecommunications.

Other uses are also very infrequent. These would consist of continuing education, information pertaining to personnel and other Zone policies, discussions of problematic cases with other nurses, warning of epidemics, etc. The total number of such calls was 9, only two of which were placed on HF radio.

(3) PERCEIVED IMPROVEMENTS

Possible improvements, as perceived by health practitioners, varied considerably. There was concensus, however, regarding the nature of desirable improvements.

(a) Reliability:

Underlying most suggestions for improvements in telecommunications serving health care delivery, is the provision of greater reliability of systems to allow easier access to the Frobisher Bay Hospital as well as to

other nursing stations within the Zone. Outside long distance calls (e.g., south or abroad) were also seen as very desirable.

The personnel from HF radio locations clearly indicated that the provision of satellite service would be a monumental improvement over existing conditions. The staff at Anik locations generally perceived their communications system as quite reliable, but clearly expressed the need for easier access to other nursing stations as well as more direct and immediate contact with Frobisher on a 24-hour basis. In order to achieve this, a direct private line (i.e., dedicated) for health services was seen as highly desirable.

In sum, almost all health practitioners expressed a strong need for a reliable, 24-hour, immediate service to Frobisher Bay at least, and the remainder of the Zone if possible. This need (and indeed demand) was much more acute for those with HF radio facilities.

(b) Additional Uses:

The above suggested improvements were considered to be the basic minimum standard for a telecommunications system to render beneficial results for health care delivery. However, a whole range of additional or auxiliary uses of telecommunications in health care was contemplated. These included continuing professional education, staff training, more elaborate medical data transmission (e.g., x-rays), processing of administrative paperwork, public health education, and so forth. One form of usage which was singled out was social calls. It was generally thought that social uses of communications were presently undermined and should assume a more important role.

The idea of a Zone conferencing capability received widespread support. Amongst the conferencing applications perceived were Zone staff meetings, inter-nursing station discussions on problem cases, sharing of information storage and retrieval was also believed to be an important consideration for future developments.

The above types of telecommunications applications were by and large perceived as being in the realm of long term planning, however. The priority for direct, highly reliable and immediate contact with the hospital at all times remains paramount.



A) THE NORTHERN HEALTH CARE ENVIRONMENT

The region of Canada above the 60th latitude is a vast wilderness remarkable for its severe climatic conditions and extended periods of darkness and daylight. In its one and a half million square miles of expanse live fewer than 60,000 residents and less than half of these are Inuit and Indians. About half the total population lives in a few urban areas while the rest live in about 100 small communities of 50-500 people. Travel between these remote communities is difficult and air services may be unreliable. Storms, rough airstrips and extreme cold make flying hazardous, and at times impossible.

In these circumstances, reliable communications are of paramount importance especially since high frequency radio transmission is often degraded or impossible due to sun spot activity or to the effects of ionospheric disturbances.

B) HEALTH CARE DELIVERY

Medical Services Branch is responsible inter alia for the provision of health care to residents of Northern Canada at a standard comparable with that offered to other Canadians. Health care in isolated areas of Canada will probably never achieve the same sophistication as in the south. Not only does isolation deter many health providers from undertaking northern service but it may also subsequently deprive them of the benefits of personal and professional contacts and communication with the mainstream of Canadian life.

The delivery of modern health care depends not only on the traditional one-to-one relationship between health providers and patients, but also

on the availability of, and interaction with, other health professionals. Thus telecommunications are a vital link in the provision of a chain of effective health care and nowhere is this more important than in the north.

The relatively recent introduction of radio-communications above the 60th parallel increased both the quality and range of health care delivery; while in the last few years one of the principal problems of radio transmission--lack of reliability--was removed by the introduction of communication satellites.

C) HISTORY OF NORTHERN HEALTH SERVICES

Before the mid-1700's, the north of Canada was largely unknown and unexplored and the only contact with the indigenous peoples was by traders and missionaries and in later years with clergy, commercial entrepreneurs and the RCMP. As contacts flourished, so did diseases.

Although rudimentary, and for the most part unorganized, medical care for the inhabitants of remote areas of Canada began about 100 years ago, and it was not until 1954 that a Northern Health Services Division was formed with the responsibility for the health care of northern residents. In the early '50s, Whitehorse General Hospital and the Mayo Hospital were built and in the early '60s, the Frobisher Bay and Inuvik General Hospitals were established.

In 1962, Medical Services Branch was formed by amalgamation of several other health services in NH&W but the bulk of its service consisted

of the provision of care to the native peoples. In fact Medical Services is the health department for the Territories, and has a role comparable with that exercised by provincial health departments. The Northern Regional Offices were opened in Edmonton in 1966. In recent years, the population and health care responsibilities of this region have steadily increased principally due to the resource development now being carried out.

Northern Region is divided into four Zones: Inuvik, MacKenzie, Keewatin and Baffin. The latter comprises a zone headquarters in Frobisher Bay and 11 related nursing stations. Seven of these are to be found on Baffin Island itself and the others on adjacent islands or the mainland.

D) HISTORY OF NORTHERN COMMUNICATIONS SERVICES

Prior to the Second World War the only commercial communications in Canada's North were provided by the Dominion Government telegraphs and by radio circuits mainly operated by the Royal Canadian Corps of Signals (RCCS). The only public communications were by radios operated by the RCMP, the Hudson's Bay Company, and amateur radio operators.

In 1942 the United States Air Force built a land-line along the Alaskan Highway. It was held by the RCAF and the Department of Transport (DOT) before being taken over by CNT in 1958. The Dew Line was built across the Canadian North by the U.S. Air Force in the mid-50's for the detection of nuclear missiles. It remains operational to this day.

The RCCS N.W.T. and Yukon Radio System was transferred from the Department of National Defence to DOT in 1957, only to be taken over by CNT in later years.

In 1966, a division of service responsibility was negotiated between CNT and Bell Canada. CNT was to provide public communications services in the Territories west of the 102° longitude, while Bell Canada would operate east of this longitude and serve the Districts of Keewatin and Franklin in the Eastern Arctic.

In 1969, Parliament enacted the Telesat Canada Act to establish a commercial body with a mandate to operate a domestic satellite communications system. The first Canadian domestic satellite, Anik I, was launched in November 1972 and became operational in early 1973. Two other domestic satellites, Anik II and III have since been launched.

All but a few communities in the North now receive satellite service, and virtually all communities will receive service within five years under the Northern Communications Assistance Program (NCAP). There are approximately 28 communities of over 50 people that are not yet served by satellite communications. Five of these are nursing station locations in the Baffin Zone.

E) HEALTH CARE DELIVERY TODAY IN BAFFIN ZONE

The organization of Baffin Zone is similar to that in other Medical Services zones in that a number of nursing stations report to Zone Headquarters which in turn reports to regional headquarters in Edmonton. In Baffin

Zone Headquarters in Frobisher Bay are found the Zone Medical Director, Zone Administrator and Zone Nursing Officer. From here supplies of drugs and equipment, Medical and Nursing advice are administered. Stores for the zone are kept in warehouses in Frobisher Bay and flown out as required. Secondary level medical care is provided in the 35-bed Frobisher Bay General Hospital.

Other than the Medical Zone Director, there are 4 physicians in Frobisher Bay but no others are in practice elsewhere in the zone. Doctors "circuit ride" (visit) the various settlements as regularly as possible, staying for a few days in each community. In addition, medical specialists from southern universities visit the Zone at intervals as the medical need arises e.g. psychiatrists, dentists, ophthalmologists, etc.

F) HEALTH CARE PROGRAMMES

Health care services are free to those who need them. Programmes include health education, public and environmental health, counselling and medical consultation, first aid for emergencies, and rehabilitation. Whenever necessary consultation with physicians in Frobisher Hospital may be requested and if warranted, the patient may be flown to the hospital for further diagnosis or treatment.

Ninety five percent of preventive and primary care is carried out by nurses in the remote communities and in some cases these nurses have received special upgrading of their skills and knowledge at courses held in southern universities. All medical care is given by federal medical personnel.

G) PROBLEMS

Canadian nurses, born and educated in the south are often faced with unique problems and frustrations when working in remote northern communities including: a) cultural and linguistic differences, b) isolation - personal, intellectual, professional and psychological, c) high turn-over rates of staff averaging 12-18 months, d) delays in mail and deliveries of supplies and e) inability to obtain consultation with physician because of poor telecommunications.

Since it is probable that nurses, rather than physicians, will continue to be the first point of contact between patients and the health care system in remote regions, it is self-evident that they must possess special attributes and moreover that the telecommunication link to physicians must be immediately available and reliable at all times.

H) PURPOSE OF RESEARCH STUDY

In the recent past, interest in telehealth care has grown considerably. On an increasing scale, demonstrations, experiments and studies are testing various aspects of the application of telecommunications to health care, as well as exploring the utility and suitability of different communications technologies for a variety of medical or educational tasks.

This research study is a joint venture between Health and Welfare Canada and the Department of Communications. It was undertaken to obtain a clear picture of the present communications situation in a representative

northern health care zone, and to identify future communications requirements or desired communications services as perceived by the health care providers.

The study also attempts to bridge the gap between experimental testing and operational requirements in the telemedicine field, and will provide information for telecommunications as well as health care planning, and was thus an interdisciplinary undertaking.

III - RESEARCH METHODS

A) BACKGROUND

There is a distinct need for the integration of reliable communications into the health care delivery system in Canada's remote areas, largely due to reasons of providing greater access to health and medical services. There is also an inherent need within the health care system itself, for matters of administration, management, medical consultation, continuing professional education, professional isolation, and so on.

This research is thus an attempt to identify, analyze, and document the problematic elements within the interface of communications and health care delivery to remote areas, and subsequently suggest ways and means by which to bring about required and desired improvements.

The study attempts to do this by firstly monitoring all long distance calls to and from the nursing stations in the Baffin Zone, and therefore estimating the volume of communications traffic within the medical service zone. Secondly, it attempts to identify the various purposes of calls (i.e.: medical, administrative, social) and the array of problems associated with the long distance calls.

B) THE RESEARCH DESIGN

The basic research design of this study assumes the form of an exploratory/descriptive study. Conventionally, a research design is either of an exploratory or descriptive nature; but in this case the research process encompasses characteristics of both types of research designs. On the one hand

it is an exploratory study since it fundamentally attempts to explore the possibilities of telecommunications as an instrument of health care delivery in remote areas of Canada, and more specifically in the Baffin Zone. On the other hand, it is a descriptive study because it records information pertaining to existing communications traffic, along with the incidence of medical, administrative, and social uses of the communications systems.

C) THE SAMPLE

The sample for this research study consists of 11 nursing stations in the Baffin Zone and the base hospital in Frobisher Bay. Since the entire region is included in the sample, no formal sampling techniques were necessary. However, there are several criteria that were important in determining the Baffin Zone as the target population for this study. They include:

- The Baffin Zone is representative of other medical zones of NH&W in terms of medical facilities, medical staff, population distribution, climate, environment, and communications facilities.
- The Baffin Zone is representative of the two most utilized communications systems throughout northern Canada: HF radio and satellite network telephone systems. The inherent dichotomy between the two systems, particularly in terms of quality, reliability, accessibility, cost, and so forth, allows for a very useful comparison of the systems and their applications to health care delivery.

- It is important that the sample include a base hospital as well as several nursing stations, since together they represent the basic unit of a remote health care system, and it is the purpose of the study to analyze the interaction between them.
- Although a less "scientific" criterion, the Zone personnel involved in the study were from the outset very interested and amenable to the project. This factor is a crucial determinant of the rate of response and therefore becomes indispensable for the successful completion of the study.

Because of the above, it is anticipated that the findings and results can be accurately projected to most remote areas of the country.

The sample does not include a primary care facility in Frobisher Bay. The reason is that the primary care situation in Frobisher Bay is atypical of the remainder of the zone, since care is provided by the Health Center which is well staffed and in proximity to the Frobisher Hospital. Second medical opinion, advice from senior nurses and health personnel can be obtained easily as these resources are available locally.

The total sample is as follows:

Location of N.S.	Pop*	Staff	Closest Hospital (air miles)	Communications System
Arctic Bay	311	2 nurses	757 - Frobisher	Anik
Broughton Island	390	2 nurses	254 - Frobisher	HF, and Dew Line
Cape Dorset	692	2 nurses	243 - Frobisher	Anik
Clyde River	357	1 nurse	461 - Frobisher	HF
Hall Beach	315	2 nurses	450 - Frobisher	HF, and Dew Line
Igloolik	611	2 nurses	535 - Frobisher	Anik
Grise Fjord	100	1 nurse	955 - Frobisher	HF
Pangnirtung	906	2 nurses	183 - Frobisher	Anik
Lake Harbour	260	1 nurse	255 - Frobisher	HF
Pond Inlet	550	2 nurses	662 - Frobisher	Anik
Resolute Bay	542	2 nurses	999 - Frobisher	Anik

* 1974 data

D) DATA COLLECTION

The data collection consisted of both qualitative and quantitative data. It was indispensable that both types be gathered, in order to gain a fuller and clearer picture of the prevailing situation concerning telecommunications and health care delivery. Notwithstanding the importance and necessity of hard quantitative data, there are numerous facts, problems, and intricacies that quantitative data simply cannot reflect.

In order to arrive at this mixture of data, three separate data collection instruments were designed. (see Appendix)

1) Communications Traffic Log

This is the major instrument of data collection in this study. The data from the log form the bulk of the quantitative assessment of the volume of communications traffic, the major associated purposes, advantages, problems, and so forth. The log is also the main source for evaluating the utilization of present systems. It was administered for two five-week periods during the study (summer and winter), in order to appropriately reflect seasonal changes which invariably affect settlement population and therefore the demand for medical services and the communications traffic. Prior to being administered in the Zone, the log was pre-tested for a one-week period in the Sioux Lookout Zone in Northwestern Ontario.

2) Interview Questionnaire

The interview questionnaire was designed to provide a qualitative information base that serves as a follow-up to the quantitative data derived from the log. In essence the interview questionnaire complements the log to the extent that it makes explicit the causes, problems, and results of the quantitative information. In addition, the interviews were extremely useful in gathering subjective information pertaining to the main concerns of the northern nurses on the local health care situation, as well as their priorities and preferences for possible improvements of communications systems.

Interviews were conducted at every nursing station throughout the Zone, during the fall season.

3) Operator Checklist

This is a short questionnaire specifically designed to identify the organizational arrangements concerning the routing of calls to and from the nursing stations and the Frobisher Bay Hospital, as well as the procedures involved to reach the desired person. This type of information is important for an analysis of administrative procedures, which are an integral part of utilizing telecommunications for medical purposes.

The checklist was administered to the Frobisher Bay Hospital operator for a period of four weeks.

IV - FINDINGS

The data presented in this section of the report are descriptive data. Although various correlations between variables are made, no statistical inferences or projections are carried out since the objective of the data collection was to describe present telecommunications usage and its accompanying factors.

A) SUMMARY DATA

The following data represent the preliminary analysis and compilation of the information gathered. The headings presented in the following tables represent the following:

<u>absolute frequency</u>	- total in numbers
<u>relative frequency</u>	- percentage of the total number of calls
<u>adjusted frequency</u>	- adjusted percentage taking into account the missing cases; that is, the total number of calls minus the missing cases.

It should be noted, also, that the number of "missing cases" or "no answer" is sometimes necessarily high. In Table 5, for example, the number of missing cases is necessarily high, since the majority of calls were completed and respondents were only to supply data contained in Table 5 if the call was not completed. The "missing cases", therefore, should not necessarily be interpreted as a negative value.

TABLE 1

TOTAL NUMBER OF LONG DISTANCE CALLS BY NURSING STATION
AND CHARACTERISTICS, BAFFIN ZONE

NURSING STATION	POPULATION*	COMMUNICATIONS SYSTEM	NUMBER OF CALLS	RELATIVE FREQUENCY (%)	NUMBER OF PATIENT VISITS	
					JULY-AUG	NOV-DEC
Resolute Bay	542	Anik	108	20.8	112	103
Cape Dorset	692	Anik	78	15.0	111	303
Pond Inlet	550	Anik	74	14.3	196	182
Pangnirtung	906	Anik	68	13.1	93	230
Igloolik	611	Anik	62	11.9	141	353
Arctic Bay	311	Anik	17	3.3	40	57
Clyde River	357	HF	33	6.4	397	239
Lake Harbour	260	HF	27	5.2	131	109
Broughton Is.	390	HF	23	4.4	178	264
Hall Beach	315	HF	19	3.7	107	187
Grise Fiord	102	HF	10	1.9	4	8
TOTAL	5,036		519	100%	1,520	2,035

* 1974 data

TABLE 2

TOTAL NUMBER OF INCOMING AND OUTGOING CALLS,
ENTIRE BAFFIN ZONE

TYPE OF CALL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
INCOMING CALL	128	26.6	27.2
OUTGOING CALL	370	71.3	72.8
MISSING CASES	11	2.1	
TOTAL	519	100%	100%

TABLE 3

TOTAL NUMBER OF CALLS BY SYSTEM USED,
ENTIRE BAFFIN ZONE

COMMUNICATIONS SYSTEM USED	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
HF RADIO	89	17.1	18.0
ANIK	384	74.0	77.6
DEW LINE	22	4.2	4.4
MISSING CASES	24	4.6	
TOTAL	519	100%	100%

TABLE 4

TOTAL NUMBER OF CALLS, COMPLETED
EASILY OR WITH DIFFICULTY, ENTIRE BAFFIN ZONE

HOW CALL WAS COMPLETED	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
EASILY	369	71.1	78.7
WITH DIFFICULTY	100	19.3	21.3
MISSING CASES	50	9.6	
TOTAL	519	100%	100%

TABLE 5

REASON FOR INCOMPLETE CALLS,
ENTIRE BAFFIN ZONE

REASON	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
Busy - Local	12	2.3	15.0
Busy - Ottawa	10	1.9	12.5
Busy - Frobisher	5	1.0	6.3
No Answer	9	1.7	11.2
Person Absent	10	1.9	12.5
Contact Not Possible	5	1.0	6.3
Poor Signals	13	2.5	16.2
Contact cut off	2	0.4	2.5
Other	14	2.7	17.5
Missing Cases	439	84.6	
TOTAL	519	100%	100%

TABLE 6

TOTAL NUMBER OF CALLS FOR WHICH CORRECT PERSON
WAS REACHED EASILY OR WITH DIFFICULTY, ENTIRE BAFFIN ZONE

HOW CORRECT PERSON WAS REACHED	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
EASILY	386	74.4	90.6
WITH DIFFICULTY	40	7.7	9.4
MISSING CASES	93	17.9	
TOTAL	519	100%	100%

TABLE 7

NUMBER OF ATTEMPTS MADE TO COMPLETE CALLS,
ENTIRE BAFFIN ZONE

NUMBER OF ATTEMPTS	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
1	319	61.5	75.1
2	35	6.7	8.2
3	34	6.6	8.0
4	20	3.9	4.7
5	4	0.8	0.9
6	4	0.8	0.9
7	1	0.2	0.2
8	2	0.4	0.5
11	2	0.4	0.5
14	2	0.4	0.5
27	1	0.2	0.2
60	1	0.2	0.2
No Answer	94	18.1	
TOTAL	519	100%	100%

TABLE 8

QUALITY AND RELIABILITY OF CALL,
TOTAL CALLS, ENTIRE BAFFIN ZONE

QUALITY & RELIABILITY OF CALL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
SATISFACTORY	362	69.7	85.4
UNSATISFACTORY	62	11.9	14.6
MISSING	95	18.3	
TOTAL	519	100%	100%

TABLE 9

FIRST PERSON TO BE REACHED, ALL CALLS,
ENTIRE BAFFIN ZONE

PERSON TO BE REACHED	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
PHYSICIAN	151	29.1	31.7
NURSE	160	30.8	33.5
ADMINISTRATOR	37	7.1	7.8
FRONT OFFICE	6	1.2	1.3
SOCIAL WORKER	3	0.6	0.6
OTHER	120	23.1	25.2
MISSING	42	8.1	
TOTAL	519	100%	100%

TABLE 10

ACTION TAKEN IF PERSON NOT REACHED,
ALL CALLS, ENTIRE BAFFIN ZONE

ACTION TAKEN	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
ALTERNATE PERSON	29	5.6	50.9
CALL RE-SCHEDULED	28	5.4	49.1
MISSING	462	89.0	
TOTAL	519	100%	100%

TABLE 11

FIRST PURPOSE OF CALL, ALL CALLS,
ENTIRE BAFFIN ZONE

PURPOSE OF CALL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
ADMINISTRATIVE	238	45.9	47.0
MEDICAL	171	32.9	33.8
SOCIAL	90	17.3	17.8
OTHER	7	1.3	1.4
NO ANSWER	13	2.5	
TOTAL	519	100%	100%

TABLE 12

SECOND PURPOSE OF CALL, ALL CALLS,
ENTIRE BAFFIN ZONE

SECOND PURPOSE OF CALL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
ADMINISTRATIVE	30	5.8	31.3
MEDICAL	62	11.9	64.6
SOCIAL	3	0.6	3.1
OTHER	1	0.2	1.0
NO ANSWER	423	81.3	
TOTAL	519	100%	100%

TABLE 13

ADMINISTRATIVE CLASS OF CALL, ALL ADMINISTRATIVE CALLS,
ENTIRE BAFFIN ZONE

TYPE OF ADMINISTRATIVE CALL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
ADMINISTRATIVE EMERGENCY	24	4.6	9.4
NON-EMERGENCY	231	44.5	90.6
NO ANSWER	264	50.9	
TOTAL	519	100%	100%

TABLE 14

MEDICAL CLASS OF CALL, ALL MEDICAL CALLS,
ENTIRE BAFFIN ZONE

CLASS OF MEDICAL CALL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
ROUTINE	140	27.0	64.2
EMERGENCY	78	15.0	35.8
NO. ANSWER	301	58.0	
TOTAL	519	100%	100%

Discussion:

There are certain trends that are apparent in the preliminary summary data presented above. As Table 1 demonstrates, the total number of calls is far greater from nursing stations with Anik service than from those with HF radio. This is undoubtedly due to the reliability factor and the notion that because of poor reliability HF radio is only used when it is absolutely necessary. Aside from the differing systems there is not much variation in the number of calls. It can also be said that the total number of calls for the total 10-week period is quite low (519). This yields an average of just over 2 calls per week per nursing station with HF radio, and almost 7 weekly calls per nursing station with Anik.

Table 2 clearly shows that the vast majority of long distance calls are initiated at the nursing stations. This means that the nurses seek

communication far more often than they are sought themselves. Table 3 again demonstrates the vast discrepancy between systems in the frequency of usage. It can be seen in Table 4 that the overwhelming majority of calls were completed easily, although no differentiation of systems is made at this time. Table 5 simply lists the reasons for incomplete calls, and as it is shown in the adjusted frequency column, the various reasons are fairly evenly distributed. Table 6 deals, in part, with administrative matters since it involves the person to be reached and not necessarily the quality or completion of calls. It is shown that throughout the Zone, problems in reaching the correct person are minimal. Tables 7 and 8 coincide with Table 4 by showing that the great majority of calls were completed on the first attempt, and the quality and reliability of calls were consistently seen as satisfactory. Table 9 shows that nurses and physicians are most often the first desired person to be reached, while the remaining categories are quite low. The relatively high "other" category, however, often refers to the pharmacist. Table 10 is consistent with Table 6 by demonstrating that for the majority of calls the correct person was reached. When the person was not reached, the "action taken" was evenly distributed, as the table demonstrates. Tables 11 & 12 represent the distribution of the first and second purpose of calls, respectively. Administrative matters comprised a large part of the first purpose, followed closely by medical matters. The number of social calls was relatively small. Medical calls comprised the largest percentage as a second purpose, which is somewhat surprising. The high "no answer" category in Table 12 demonstrates that multi-purpose calls were not frequent, again perhaps contrary to earlier expectations.

Tables 13 & 14 outline the distribution of emergency calls in both administrative and medical categories. It can be seen that medical emergencies are more prevalent than administrative emergencies, and that they comprise a fairly large portion of all medical calls (35.8%). The high values attributed to "no answer" reflect the fact that each table only represents calls of that category and when incorporated into the total number of calls, the no answer value is necessarily high. The truly representative figures in each table, therefore, is the adjusted frequency.

B) NURSING STATIONS:

Most of the data presented above refer to the entire Baffin Zone, as a single unit. Since the nursing station is the backbone of the northern health care system, it may be useful to identify variations amongst the eleven nursing stations surveyed. The following tables outline some of the key variables of the study in relation to the different nursing stations.

The presentation of most data in the remainder of this report will be as follows: each box signifying a cross-tabulation will contain four numbers:

- 1) absolute number - the number of occurrences; the count.
- 2) row % - the percentage of the horizontal total (from left to right).
- 3) column % - the percentage of the vertical total.
- 4) total % - the percentage of the total number.

In the following series of tables, for instance, the four numbers in each tabulation signify the following:

- absolute number: the number of calls (either incoming or outgoing) for the particular nursing station.
- row %: the percentage of total calls for that nursing station.
- column %: the percentage of all incoming or outgoing calls (depending which column is looked at) for entire zone.
- total %: the percentage of all calls for the entire zone.

Example: For example, Table 15 shows that Pangnirtung recorded 9 incoming calls. This comprised 13.6% of calls recorded for that nursing station; 6.5% of all incoming calls for the Zone; and 1.8% of all calls for the entire Zone.

TABLE 15

INCOMING OR OUTGOING CALL
BY NURSING STATION, BAFFIN ZONE

NURSING STATION	INCOMING CALL	OUTGOING CALL	ROW TOTAL AND % OF TOTAL NUMBER
PANGNIRTUNG (NUMBER)	9	57	66
(ROW %)	13.6	86.4	
(COLUMN %)	6.5	15.4	
(TOTAL %)	1.8	11.2	13.0
ARCTIC BAY	0	14	14
	0	100.0	
	0	3.8	
	0	2.8	2.8
CAPE DORSET	20	56	76
	26.3	73.7	
	14.5	15.1	
	3.9	11.1	15.0
RESOLUTE BAY	36	71	107
	33.6	66.4	
	26.1	19.2	
	7.1	14.0	21.1
POND INLET	30	44	74
	40.5	59.5	
	21.7	11.9	
	5.9	8.7	14.6
IGLOOLIK	17	42	59
	28.8	71.2	
	12.3	11.4	
	3.3	8.3	11.6
LAKE HARBOUR	3	24	27
	11.1	88.9	
	2.2	6.5	
	0.6	4.7	5.3

TABLE 15 (Cont'd)

NURSING STATION	INCOMING CALL	OUTGOING CALL	ROW TOTAL AND % OF TOTAL NUMBER
BROUGHTON ISLAND	7 30.4 5.1 1.4	16 69.6 4.3 3.1	23 4.5
HALL BEACH	8 42.1 5.8 1.6	11 57.9 3.0 2.1	19 3.7
GRISE FIORD	1 10.0 0.7 0.2	9 90.0 2.4 1.8	10 2.0
CLYDE RIVER	7 21.2 5.1 1.4	26 78.8 7.0 5.1	33 6.5
COLUMN TOTAL AND % OF TOTAL NUMBER	138 27.2	370 72.8	508 100.0

TABLE 16

FIRST PURPOSE OF CALL
BY NURSING STATION, BAFFIN ZONE

NURSING STATION	ADMINISTRATIVE CALL	MEDICAL CALL	SOCIAL CALL	OTHER	ROW TOTAL AND % OF TOTAL #
PANGNIRTUNG					
ABSOLUTE #	22	26	15	2	65
ROW %	33.8	40.0	23.1	3.1	
COLUMN %	9.2	15.2	16.7	28.6	
TOTAL %	4.3	5.1	3.0	0.4	12.8%
ARCTIC BAY	7	8	2	0	17
	41.2	47.1	11.8	0	
	2.9	4.7	2.2	0	
	1.4	1.6	0.4	0	3.4%
CAPE DORSET	31	24	20	0	75
	41.3	32.0	26.7	0	
	13.0	14.0	22.2	0	
	6.1	4.7	4.0	0	14.8%
RESOLUTE BAY	62	23	16	2	103
	60.2	22.3	15.5	1.9	
	26.1	13.5	17.8	28.6	
	12.3	4.5	3.2	0.4	20.4%
POND INLET	36	15	22	1	74
	48.6	20.3	29.7	1.4	
	15.1	8.8	24.4	14.3	
	7.1	3.0	4.3	0.2	14.6%
IGLOOLIK	31	25	5	1	62
	50.0	40.3	8.1	1.6	
	13.0	14.6	5.6	14.3	
	7.1	3.0	4.3	0.2	12.3%
LAKE HARBOUR	13	12	2	0	27
	48.1	44.4	7.4	0	
	5.5	7.0	2.2	0	
	2.6	2.4	0.4	0	5.3%

TABLE 16 (Cont'd)

NURSING STATION	ADMINISTRATIVE CALL	MEDICAL CALL	SOCIAL CALL	OTHER	ROW TOTAL AND % OF TOTAL #
BROUGHTON ISLAND	3 13.0 1.3 0.6	14 60.9 8.2 2.8	5 21.7 5.6 1.0	1 4.3 14.3 0.2	23 4.5%
HALL BEACH	12 66.7 5.0 2.4	6 33.3 3.5 1.2	0 0 0 0	0 0 0 0	18 3.6%
GRISE FIORD	9 90.0 3.8 1.8	1 10.0 0.6 0.2	0 0 0 0	0 0 0 0	10 2.0%
CLYDE RIVER	12 37.5 5.0 2.4	17 53.1 9.9 3.4	3 9.4 3.3 0.6	0 0 0 0	32 6.3%
COLUMN TOTAL & % OF TOTAL #	238 47.0%	171 33.8%	90 17.8%	7 1.4%	506 100%

TABLE 17

ADMINISTRATIVE CLASS OF CALL,
BY NURSING STATION, BAFFIN ZONE

NURSING STATION	ADMINISTRATIVE EMERGENCY	ADMINISTRATIVE NON-EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER
PANGNIRTUNG			
ABSOLUTE NUMBER	1	23	24
ROW %	4.2	95.8	
COLUMN %	4.2	10.0	
TOTAL %	0.4	9.0	9.4%
ARCTIC BAY			
	3	6	9
	33.3	66.7	
	12.5	2.6	
	1.2	2.4	9.4%
CAPE DORSET			
	1	36	37
	2.7	97.3	
	4.2	15.6	
	0.4	14.1	14.5%
RESOLUTE BAY			
	1	63	64
	1.6	98.4	
	4.2	27.3	
	0.4	24.7	25.1%
POND INLET			
	2	35	37
	5.4	94.6	
	8.3	15.2	
	0.8	13.7	14.5%
IGLOOLIK			
	4	25	29
	13.8	86.2	
	16.7	10.8	
	1.6	9.8	11.4%
LAKE HARBOUR			
	2	16	18
	11.1	88.9	
	8.3	6.9	
	0.8	6.3	7.1%

TABLE 17 (Cont'd)

NURSING STATION	ADMINISTRATIVE EMERGENCY	ADMINISTRATIVE NON-EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER
BROUGHTON ISLAND	2 66.7 8.3 0.8	1 33.3 0.4 0.4	3 1.2%
HALL BEACH	5 35.7 20.8 2.0	9 64.3 3.9 3.5	14 5.5%
GRISE FIORD	0 0 0 0	4 100.0 1.7 1.6	4 1.6%
CLYDE RIVER	3 18.8 12.5 1.2	13 81.3 5.6 5.1	16 6.3%
COLUMN TOTAL & % OF TOTAL NUMBER	24 9.4%	231 90.6%	255 100%

TABLE 18

MEDICAL CLASS OF CALL
BY NURSING STATION, BAFFIN ZONE

NURSING STATION	ROUTINE	EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER
PANGNIRTUNG			
ABSOLUTE NUMBER	20	14	34
ROW %	58.8	41.2	
COLUMN %	14.3	17.9	
TOTAL %	9.2	6.4	15.6%
ARCTIC BAY			
	5	5	10
	50.0	50.0	
	3.6	6.4	
	2.3	2.3	4.6%
CAPE DORSET			
	30	8	38
	78.9	21.1	
	21.4	10.3	
	13.8	3.7	17.4%
RESOLUTE BAY			
	20	7	27
	74.1	25.9	
	14.3	9.0	
	9.2	3.2	12.4%
POND INLET			
	6	4	10
	60.0	40.0	
	4.3	5.1	
	2.8	1.8	4.6%
IGLOOLIK			
	24	10	34
	70.6	29.4	
	17.1	12.8	
	11.0	4.6	15.6%
LAKE HARBOUR			
	12	3	15
	80.0	20.0	
	8.6	3.8	
	5.5	1.4	6.9%

TABLE 18 (Cont'd)

NURSING STATION	ROUTINE	EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER
BROUGHTON ISLAND	5 33.3 3.6 2.3	10 66.7 12.8 4.6	15 6.9%
HALL BEACH	7 77.8 5.0 3.2	2 22.2 2.6 0.9	9 4.1%
GRISE FIORD	0 0 0 0	1 100.0 1.3 0.5	1 0.5%
CLYDE RIVER	11 44.0 7.9 5.0	14 56.0 17.9 6.4	25 11.5%
COLUMN TOTAL AND % OF TOTAL NUMBER	140 64.2%	78 35.8%	218 100%

Discussion:

As was originally shown in Table 1, the major differences amongst nursing stations, in terms of communications traffic, rest mostly with the type of communications system being used. This trend holds true for any communications variable studied. In these tables, therefore, the focus was not on communications traffic per se, but rather on the type of calls and their purpose.

Table 15 clearly shows that outgoing calls are much more frequent than incoming calls, for all nursing stations. Most of the nursing stations recorded over 65% of calls as outgoing. The only two with a more even distribution are Pond Inlet and Hall Beach. Arctic Bay and Grise Fiord are both notable for their very high percentage of outgoing calls: 100% and 90% respectively.

Concerning the purpose of call, Table 16 demonstrates a fairly even distribution between administrative and medical calls, although administrative calls are slightly more frequent. Resolute Bay, Pond Inlet, Hall Beach and Grise Fiord all reported comparatively high rates of administrative calls. On the other hand, Pangnirtung, Arctic Bay, Broughton Island, and Clyde River made more medical calls than administrative ones. Social calls were relatively few for all locations, with the possible exceptions of Pangnirtung, Cape Dorset, and Pond Inlet. Social calls are much fewer amongst locations with HF radio than those with Anik. This again demonstrates that HF radio is generally only used for absolute necessities.

Within the administrative category, the great majority of calls for all nursing stations were non-emergencies, as Table 17 reveals. The only exception was Broughton Island and this is probably coincidental since there were only 3 administrative calls recorded. No other flagrant differences amongst nursing stations seem to exist.

Table 18 shows that the medical and administrative categories were similar, in that most calls were routine as opposed to emergency for most

nursing stations. However, the rates of emergency calls were consistently higher in the medical category than in the administrative. Additionally, Broughton Island, Grise Fiord and Clyde River reported more medical emergency calls than medical routine calls. Once again, these are HF radio locations.

Generally speaking, the only real source of discrepancy, amongst the various nursing stations is the communications system being used. This factor seems to be at the root of all the differences, and no other real differentiating factors are apparent.

C) COMMUNICATIONS TRAFFIC:

(1) System Used:

TABLE 19

SYSTEM USED BY QUALITY AND RELIABILITY OF CALL,
ENTIRE BAFFIN ZONE

SYSTEM USED	SATISFACTORY	UNSATISFACTORY	ROW TOTAL AND % OF TOTAL NUMBER
HF RADIO (ABSOLUTE COUNT) (ROW %) (COLUMN %) (TOTAL %)	50 60.2 14.5 12.4	33 39.8 55.9 8.2	83 20.6%
ANIK	275 92.0 79.9 68.2	24 8.0 40.7 6.0	299 74.2%
DEW LINE	19 90.5 5.5 4.7	2 9.5 3.4 0.5	21 5.2%
COLUMN TOTAL AND % OF TOTAL NUMBER	344 85.4%	59 14.6%	403 100%

TABLE 20

SYSTEM USED BY HOW CALL WAS COMPLETED,
ENTIRE BAFFIN ZONE

SYSTEM USED	COMPLETED EASILY	COMPLETED WITH DIFFICULTY	ROW TOTAL AND % OF TOTAL NUMBER
HF RADIO (ABSOLUTE COUNT) (ROW %) (COLUMN %) (TOTAL %)	45 59.2 12.6 10.0	31 40.8 34.1 6.9	76 16.9%
ANIK	300 85.5 83.8 66.8	51 14.5 56.0 11.4	351 78.2%
DEW LINE	13 59.1 3.6 2.9	9 40.9 9.9 2.0	22 4.9%
COLUMN TOTAL AND % OF TOTAL NUMBER	358 79.7%	91 20.3%	449 100%

TABLE 21

SYSTEM USED BY WHY CALL WAS INCOMPLETE,
ENTIRE BAFFIN ZONE

SYSTEM USED	BUSY LOCAL	BUSY OTTAWA	BUSY FROBISHER	NO ANSWER	PERSON ABSENT	CONTACT NOT POSSIBLE	POOR SIGNALS	CONTACT CUT OFF	OTHER	ROW TOTAL AND TOTAL %
HF RADIO	1	0	1	0	3	3	8	0	2	18
(ROW %)	5.6	0	5.6	0	16.7	16.7	44.4	0	11.1	
(COLUMN %)	9.1	0	25.0	0	30.0	60.0	61.5	0	16.7	
(TOTAL %)	1.3	0	1.3	0	4.0	4.0	10.7	0	2.7	24.0%
ANIK	8	10	3	9	6	2	5	1	9	53
	15.1	18.9	5.7	17.0	11.3	3.8	9.4	1.9	17.0	
	72.7	100.0	75.0	100.0	60.0	40.0	38.5	100.0	75.0	
	10.7	13.3	4.0	12.0	8.0	2.7	6.7	1.3	12.0	70.7%
DEW LINE	2	0	0	0	1	0	0	0	1	4
	50.0	0	0	0	25.0	0	0	0	25.0	
	18.2	0	0	0	10.0	0	0	0	8.3	
	2.7	0	0	0	1.3	0	0	0	1.3	5.3%
COLUMN TOTAL AND % OF TOTAL NUMBER	11	10	4	9	10	5	13	1	12	75
	14.7%	13.3%	5.3%	12.0%	13.3%	6.7%	17.3%	1.3%	16.0%	100%

TABLE 22

SYSTEM USED BY HOW CORRECT PERSON WAS REACHED,
ENTIRE BAFFIN ZONE

SYSTEM USED	CORRECT PERSON REACHED EASILY	CORRECT PERSON REACHED WITH DIFFICULTY	ROW TOTAL AND % OF TOTAL NUMBER
HF RADIO (ABSOLUTE COUNT) (ROW %) (COLUMN %) (TOTAL %)	55 83.3 14.8 13.5	11 16.7 30.6 2.7	66 16.2%
ANIK	301 93.5 81.1 74.0	21 6.5 58.3 5.2	322 79.1%
DEW LINE	15 78.9 4.0 3.7	4 21.1 11.1 1.0	19 4.7%
COLUMN TOTAL AND % OF TOTAL NUMBER	371 91.2%	36 8.8%	407 100%

TABLE 23

SYSTEM USED BY ACTION TAKEN IF PERSON NOT REACHED,
ENTIRE BAFFIN ZONE

SYSTEM USED	ALTERNATE PERSON	CALL RE-SCHEDULED	ROW TOTAL AND % OF TOTAL NUMBER
HF RADIO (ABSOLUTE COUNT)	10	9	19
(ROW %)	52.6	47.4	
(COLUMN %)	34.5	33.3	
(% OF TOTAL)	17.9	16.1	34.0
ANIK	17	16	33
	51.5	48.5	
	58.6	59.3	
	30.4	28.6	59.0
DEW LINE	2	2	4
	50.0	50.0	
	6.9	7.4	
	3.5	3.5	7.0
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	29 51.8%	27 48.2%	56 100.0%

TABLE 24

INCOMING - OUTGOING CALL BY SYSTEM USED,
ENTIRE BAFFIN ZONE

TYPE OF CALL	HF RADIO	ANIK	DEW LINE	ROW TOTAL AND % OF TOTAL NUMBER
INCOMING	20	102	6	128
(ROW %)	15.6	79.7	4.7	
(COLUMN %)	22.5	27.0	27.3	
(% OF TOTAL)	4.1	20.9	1.2	26.2%
OUTGOING	69	276	16	361
	19.1	76.5	4.4	
	77.5	73.0	72.7	
	14.1	56.4	3.3	73.8%
COLUMN TOTAL	89	378	22	489
AND % OF TOTAL	18.2%	77.3%	4.5%	100%
NUMBER OF CALLS				

TABLE 25

SYSTEM USED BY PURPOSE OF CALL,
ENTIRE BAFFIN ZONE

SYSTEM USED	ADMINISTRATIVE CALL	MEDICAL CALL	SOCIAL CALL	OTHER	ROW TOTAL AND % OF TOTAL NUMBER
HF RADIO (ABSOLUTE COUNT)	38	42	7	1	88
(ROW %)	43.2	47.7	8.0	1.1	
(COLUMN %)	16.7	26.3	8.0	14.3	
(% OF TOTAL)	7.9	8.7	1.4	0.2	18.2%
ANIK	177	112	78	6	373
	47.5	30.0	20.9	1.6	
	77.6	70.0	88.6	85.7	
	36.6	23.2	16.1	1.2	77.2%
DEW LINE	13	6	3	0	22
	59.1	27.3	13.6	0	
	5.7	3.8	3.4	0	
	2.7	1.2	0.6	0	4.6%
COLUMN TOTAL AND % OF TOTAL	228	160	88	7	483
NUMBER OF CALLS	47.2%	33.2%	18.2%	1.4%	100%

TABLE 26

SYSTEM USED BY ADMINISTRATIVE CLASS OF CALL,
ENTIRE BAFFIN ZONE

SYSTEM USED	ADMINISTRATIVE EMERGENCY	ADMINISTRATIVE NON-EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER
HF RADIO (ABSOLUTE COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	7 16.7 30.4 2.9	35 83.3 15.8 14.3	42 17.2%
ANIK	11 5.9 47.8 4.5	177 94.1 79.7 72.2	188 76.7%
DEW LINE	5 33.3 21.7 2.0	10 66.7 4.5 4.1	15 6.1%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	23 9.4%	222 90.6%	245 100%

TABLE 27

SYSTEM USED BY MEDICAL CLASS OF CALL,
ENTIRE BAFFIN ZONE

SYSTEM USED	MEDICAL ROUTINE	MEDICAL EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
HF RADIO (ABSOLUTE COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	28 51.9 20.7 13.6	26 48.1 36.6 12.6	54 26.2%
ANIK	102 71.3 75.6 49.5	41 28.7 57.7 19.9	143 69.4%
DEW LINE	5 55.6 3.7 2.4	4 44.4 5.6 1.9	9 4.4%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	135 65.5%	71 34.5%	206 100%

TABLE 28

NUMBER OF ATTEMPTS MADE BY SYSTEM USED,
ENTIRE BAFFIN ZONE

NUMBER OF ATTEMPTS	HF RADIO	ANIK	DEW LINE	ROW TOTAL AND % OF TOTAL NUMBER
1 (COUNT)	56	247	6	309
(ROW %)	18.1	79.9	1.9	
(COLUMN %)	70.0	78.9	40.0	
(% OF TOTAL)	13.7	60.5	1.5	75.7
2	13	17	3	33
	39.4	51.5	9.1	
	16.3	5.4	20.0	
	3.2	4.2	0.7	8.1
3	9	20	2	31
	29.0	64.5	6.5	
	11.3	6.4	13.3	
	2.2	4.9	0.5	7.6
4	0	16	3	19
	0	84.2	15.8	
	0	5.1	20.0	
	0	3.9	0.7	4.6
5	0	4	0	4
	0	100.0	0	
	0	1.3	0	
	0	1.0	0	1.0
6	2	2	0	4
	50.0	50.0	0	
	2.5	0.6	0	
	0.5	0.5	0	1.0
7	0	0	1	1
	0	0	100.0	
	0	0	6.7	
	0	0	0.2	0.2

TABLE 28 (Cont'd)

NUMBER OF ATTEMPTS	HF RADIO	ANIK	DEW LINE	ROW TOTAL AND % OF TOTAL NUMBER
8	0 0 0 0	1 100.0 0.3 0.2	0 0 0 0	1 0.2
11	0 0 0 0	2 100.0 0.6 0.5	0 0 0 0	2 0.5
14	0 0 0 0	2 100.0 0.6 0.5	0 0 0 0	2 0.5
27	0 0 0 0	1 100.0 0.3 0.2	0 0 0 0	1 0.2
60	0 0 0 0	1 100.0 0.3 0.2	0 0 0 0	1 0.2
COLUMN TOTAL AND % OF TOTAL NUMBER	80 19.6%	313 76.7%	15 3.7%	408 100%

Discussion:

One of the prime variables of this study is the communications system utilized during the transaction. As was noted earlier, the Anik system

is used much more extensively than the HF system, and this is largely attributable to Anik's superior quality and reliability. Table 19 demonstrates this by correlating the quality and reliability of the call with the system being used. As the row % shows, only 8% of Anik calls were seen as unsatisfactory as compared with 39.8% on HF radio. The Dew Line system also proved to be highly reliable, having 90.5% of calls satisfactory. When examining the totals we see that 14.6% of all calls were judged to be unsatisfactory; a rather low rate. Of that total percentage, well over half (8.2%) were calls made on HF radio. Table 20 also demonstrates the same feature in that 14.5% of Anik calls were completed with difficulty as opposed to 40.8% on HF radio. In sum, both tables show that the Anik system is more reliable, of better quality, and is easier to complete calls with than the HF radio system. These factors have generally been known for quite some time, but their importance lies in the implications for health care delivery. With the rates of unsatisfactory calls on HF radio, it is clear that the HF system is unsuitable for effective use in delivering health care.

Table 21 depicts the reasons why calls were incomplete. On the HF radio system, the most prevalent reason was poor signals, which again demonstrates the poor quality of the system. 44.4% of all incomplete calls on HF were due to poor signals. The other reasons are fairly evenly distributed and are not necessarily outstanding. On the Anik system, the most prevalent reason was the Ottawa operator being busy. Although the percentage is not extraordinarily high (18.9%), it does demonstrate that the "double hop" route on Anik calls constitutes the most frequent problem with that system. Another relatively high occurrence is the system being busy locally. This

echoes the common complaint that circuits are often overloaded and that in many cases more circuits are necessary for greater accessibility.

Concerning the difficulty involved in reaching the correct person, it is found that the Anik system is superior to HF radio. Table 22 shows that only 6.5% of Anik calls involved difficulty in reaching the correct person, while the corresponding figure for the HF system was 16.7%. This factor may point more to organizational matters in locating the correct person rather than system reliability, but it may also demonstrate the greater accessibility of the Anik system. In other words, it seems to be easier to reach the correct person on the Anik system. On the whole, however, persons are reached relatively easily, as each system shows a figure of close to 80% or above. When persons were not reached, the action taken was evenly distributed between re-scheduling the call and speaking to an alternate person, as Table 23 shows. It is perhaps surprising that roughly half of the incomplete calls on HF radio were re-scheduled if one considers previous data on the reliability of that system. Furthermore there was no significant difference between Anik and HF radio on this matter.

Concerning incoming and outgoing calls, the pattern does not change significantly by system used, as Table 24 demonstrates. Incoming calls (that is, calls coming in to the nursing stations) are much fewer than outgoing calls from the nursing stations. Incoming calls are slightly higher for Anik locations (27%) than for HF locations (22.5%). This may represent the fact that nursing stations serviced by Anik are more easily reached than those with HF radio. The percentage difference, however, is not large enough to

arrive at conclusive statements. This table does show that outgoing calls are prevalent which demonstrates the need for medical consultation, reinforcement and second opinion.

With regard to the purpose of call by system used, we see fewer medical than administrative calls on the Anik system while HF locations placed more medical than administrative calls. Although the percentage differences are not large, this once again demonstrates the superior reliability of the Anik system as shown in Table 25. Because the Anik system is more reliable more routine calls (largely administrative) are made. This factor is also represented in Table 26. It is shown that 16.9% of administrative calls placed on HF radio are emergencies; as opposed to 5.9% on Anik. Furthermore, despite the low total number of calls (42), HF calls nevertheless comprise 30.4% of all administrative emergency calls. The Dew Line follows the same basic pattern as the HF system, having 1/3 of all administrative calls classified as emergencies. A similar pattern exists amongst the medical calls placed, as presented in Table 27. The distribution of routine and emergency calls on HF radio is 51.9% and 48.1% respectively, while the corresponding distribution on Anik is 71.3% routine and 28.7% emergency. Thus, a much greater percentage of HF calls are emergencies than on Anik. In addition, HF calls comprise 36.6% of all medical emergency calls, despite the low total number of calls. On the Anik system 71.3% of medical calls were of a routine nature, which comprises 75.6% of all medical routine calls.

Table 28 reveals some interesting, though perhaps surprising figures. 78.9% of all Anik calls were completed on the first attempt, and 70% of all HF

radio calls were also completed on the first attempt. Considering the generally poor quality and reliability of the HF radio system, this 70% figure is a little bit out of the ordinary. Additionally, there were no extraordinarily high number of attempts on the HF system, as occurred on the Anik system. On Anik, for instance, one call required sixty attempts, another 27 attempts, and two each at eleven and fourteen attempts. The highest number of attempts to complete a call on HF radio was six. However, the volume of calls on HF was much smaller than on Anik which may explain the high success rate of HF radio calls in this table. The Dew Line is also shown as being fairly reliable in this table, having all but one call completed in four attempts or fewer.

(2) Incoming and Outgoing Calls:

TABLE 29

INCOMING - OUTGOING CALL BY QUALITY AND RELIABILITY OF CALL,
ENTIRE BAFFIN ZONE

TYPE OF CALL	SATISFACTORY	UNSATISFACTORY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
INCOMING (COUNT)	104	13	117
(ROW %)	88.9	11.1	
(COLUMN %)	29.1	21.7	
(% OF TOTAL)	24.9	3.1	28.1%
OUTGOING	253	47	300
	84.3	15.7	
	70.9	78.3	
	60.7	11.3	71.9%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	357 85.6%	60 14.4%	417 100%

TABLE 30

INCOMING - OUTGOING CALL BY PURPOSE OF CALL,
ENTIRE BAFFIN ZONE

TYPE OF CALL	ADMINISTRATIVE CALL	MEDICAL CALL	SOCIAL CALL	OTHER	ROW TOTAL AND % OF TOTAL NUMBER
INCOMING					
(COUNT)	66	42	21	2	131
(ROW %)	50.4	32.1	16.0	1.5	
(COLUMN %)	28.2	25.5	23.3	28.6	
(% OF TOTAL)	13.3	8.5	4.2	0.4	26.4%
OUTGOING					
	168	123	69	5	365
	46.0	33.7	18.9	1.4	
	71.8	74.5	76.7	71.4	
	33.9	24.8	13.9	1.0	73.6%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	234 47.2%	165 33.3%	90 18.1%	7 1.4%	496 100%

TABLE 31

INCOMING - OUTGOING CALL BY HOW CALL WAS COMPLETED,
BAFFIN ZONE

TYPE OF CALL	COMPLETED EASILY	COMPLETED WITH DIFFICULTY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
INCOMING			
(COUNT)	101	16	117
(ROW %)	86.3	13.7	
(COLUMN %)	27.9	16.3	
(% OF TOTAL)	22.0	3.5	25.5%
OUTGOING			
	261	82	343
	76.1	23.9	
	72.1	83.7	
	56.7	17.8	74.5%
COLUMN TOTAL AND % OF TOTAL NUMBER	362 78.7%	98 21.3%	460 100%

TABLE 32

INCOMING - OUTGOING CALL BY MEDICAL CLASS OF CALL,
BAFFIN ZONE

TYPE OF CALL	MEDICAL ROUTINE	MEDICAL EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
INCOMING (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	34 72.3 25.0 16.2	13 27.7 17.6 6.2	47 22.4%
OUTGOING	102 62.6 75.0 48.6	61 37.4 82.4 29.0	163 77.6%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	136 64.8%	74 35.2%	210 100%

Discussion:

As was shown in earlier tables, outgoing calls far outnumber incoming calls. When the quality and reliability variable is correlated with this, as in Table 29, incoming calls have a slightly higher rate of satisfactory quality and reliability. However, the difference in percentages (88.9% and 84.3%) is so slight that it is likely due to the higher number of outgoing calls. By and large, incoming and outgoing calls cannot be effectively differentiated according to quality and reliability, since 85.6% of all calls (whether incoming or outgoing) were judged to be satisfactory.

Table 30 demonstrates the prevalence of administrative calls, and also shows that administrative calls comprised a larger percentage of incoming than outgoing calls (50.4% incoming and 46% outgoing). Medical calls were slightly more numerous amongst outgoing calls, as were social calls.

Table 31 indicates that, proportionally, incoming calls were more often easily completed than outgoing calls. 86.3% of incoming calls were completed easily as opposed to 76.1% of outgoing calls. Correspondingly, the percentage of outgoing calls completed with difficulty is higher than for incoming calls.

When the medical class of call is correlated with the incoming-outgoing variable, we see that there is a greater percentage of medical emergencies amongst outgoing calls than amongst incoming calls. Table 32 records that 37.4% of outgoing medical calls were emergencies, whereas the corresponding figure in the incoming category is 27.7%. Since there are more emergencies within outgoing calls, the importance of the nurses being able to initiate a call is exemplified.

(3) Reaching the Correct Person:

TABLE 33

FIRST PERSON TO BE REACHED BY HOW CORRECT PERSON WAS REACHED,
ENTIRE BAFFIN ZONE

PERSON TO BE REACHED	REACHED EASILY	REACHED WITH DIFFICULTY	ROW TOTAL AND % OF TOTAL NUMBER
PHYSICIAN (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	113 88.3 30.4 27.6	15 11.7 39.5 3.7	128 31.3%
NURSE	129 90.2 34.7 31.5	14 9.8 36.8 3.4	143 34.9%
ADMINISTRATOR	30 88.2 8.1 7.3	4 11.8 10.5 1.0	34 8.3%
FRONT OFFICE	5 83.3 1.3 1.2	1 16.7 2.6 0.2	6 1.4%
SOCIAL WORKER	2 100.0 0.5 0.5	0 0 0 0	2 0.5%
OTHER	93 95.9 25.0 22.7	4 4.1 10.5 1.0	97 23.7%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	372 90.7%	38 9.3%	410 100%

TABLE 34

HOW CORRECT PERSON WAS REACHED BY TIME CALL PLACED,
ABSOLUTE NUMBERS ONLY, ENTIRE BAFFIN ZONE

HOW PERSON WAS REACHED	1:00-9:00	9:00-12:00	12:00-17:00	17:00-24:00	ROW TOTALS
EASILY	14	118	131	43	306
WITH DIFFICULTY	3	12	17	5	37
COLUMN TOTALS	17	130	148	48	343

TABLE 35

ACTION TAKEN IF PERSON TO BE REACHED WAS NOT AVAILABLE,
BAFFIN ZONE

ACTION TAKEN	PHYSICIAN	NURSE	ADMINISTRATOR	SOCIAL WORKER	OTHER	ROW TOTAL & % OF TOTAL
ALTERNATE PERSON (COUNT)	17	4	1	1	5	28
(ROW %)	60.7	14.3	3.6	3.6	17.9	
(COLUMN %)	60.7	33.3	33.3	100.0	62.5	
(% OF TOTAL)	32.7	7.7	1.9	1.9	9.6	53.8%
RE-SCHEDULE	11	8	2	0	3	24
	45.8	33.3	8.3	0	12.5	
	39.3	66.7	66.7	0	37.5	
	21.2	15.4	3.8	0	5.8	46.2%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	28	12	3	1	8	52
	53.8%	23.1%	5.8%	1.9%	15.4%	100%

TABLE 36

ACTION TAKEN IF PERSON NOT REACHED BY PURPOSE OF CALL,
ENTIRE BAFFIN ZONE

ACTION TAKEN	ADMINISTRATIVE CALL	MEDICAL CALL	SOCIAL CALL	OTHER	ROW TOTAL AND % OF TOTAL NUMBER
<u>ALTERNATE PERSON</u>					
(COUNT)	12	12	4	0	28
(ROW %)	42.9	42.9	14.3	0	
(COLUMN %)	48.0	54.5	57.1	0	
(% OF TOTAL)	21.8	21.8	7.3	0	50.9%
<u>RE-SCHEDULE</u>					
	13	10	3	1	27
	48.1	37.0	11.1	3.7	
	52.0	45.5	42.9	100.0	
	23.6	18.2	5.5	1.8	49.1%
<u>COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS</u>					
	25	22	7	1	55
	45.5%	40.0%	12.7%	1.8%	100%

Discussion:

The above set of tables (33-36) deals with the availability or accessibility of the various health care personnel using a communications system. It has already been shown that the Anik system is regarded as superior to HF radio or the Dew Line in reaching the correct person. Now we are looking at the differences within the various staff themselves.

Table 33 firstly shows that nurses are the most frequently sought of all personnel, followed closely by physicians. 34.9% of calls were directed

at nurses, while 31.3% were seeking a physician. The "other" category is also quite high (23.7%) and consists mostly of the pharmacist and dentist.

All personnel had an exceptionally high rate of accessibility via the communications system. Nurses were reached easily at a rate of 90.2%; physicians at a rate of 88.3%; administrator - 88.2%, and so forth. The category labelled social worker had an accessibility rate of 100%, but only two calls were involved. By and large, the accessibility rate was excellent for all personnel since the total rate was 90.7%.

Table 34 examines differences that may exist in reaching the correct person easily in terms of the time at which the call was placed. Again, the great majority of calls show that correct persons were reached easily even during the irregular hours. The normal working hours, however, (9:00 - 17:00) were both most popular and most successful in terms of reaching the correct person easily.

Of those calls in which the person to be reached was not available (total of 52), the split between rescheduling the call and opting for an alternate person was fairly even (46.2% and 53.8% respectively). However, Table 35 demonstrates that there are substantial differences amongst the various personnel as to the action taken if the person was not reached. When physicians were unavailable, 60.7% of calls were directed to an alternate person while only 39.3% were re-scheduled. By contrast, when nurses were unavailable, only 33.3% of calls went to an alternate person and 66.7% were re-scheduled. The figures were identical for the administrator - (33.3% and 66.7%).

When this variable is coupled with the purpose of call, we see that there is no major discrepancy amongst the purposes as to the action taken if a person was unavailable. As Table 36 conveys, 48% of calls in the administrative category were directed at an alternate person and 52% were re-scheduled. In the medical category, 54.5% chose an alternate person, and 45.5% of calls were re-scheduled. The slight difference here is explained by the fact that medical emergencies often cannot be made to wait until the call is re-scheduled, but communication must be initiated immediately. In the social call category 42.9% of calls were re-scheduled when the desired person was unavailable while 57.1% were transferred to an alternate person.

D) PURPOSE OF CALLS:

Communications Traffic and Purpose of Calls are the two major dimensions of this study. The data presented in the following pages will not only outline the various purposes of calls, but also incorporate numerous variables into the analysis.

As was seen in Tables 11 to 14, administrative calls are slightly more prevalent than medical calls, but medical calls have a higher emergency rate. Social calls were relatively low on all counts. It was also shown in Table 25 that when the variable "system used" enters the analysis, a larger proportion of HF radio calls are medical rather than administrative, while the reverse is true of Anik calls.

The various categories of calls will now be examined in more depth.

(1) Administrative:

TABLE 37.

ADMINISTRATIVE CLASS OF CALL BY HOW CALL WAS COMPLETED,
BAFFIN ZONE

ADMINISTRATIVE CLASS OF CALL	COMPLETED EASILY	COMPLETED WITH DIFFICULTY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
ADMIN. EMERGENCY (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	13 56.5 6.7 5.5	10 43.5 23.3 4.2	23 9.7%
NON-EMERGENCY	182 84.7 93.3 76.5	33 15.3 76.7 13.9	215 90.3%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	195 81.9%	43 18.1%	238 100.0%

TABLE 38

ADMINISTRATIVE CLASS OF CALL BY WHY CALL WAS INCOMPLETE
BAFFIN ZONE

ADMIN. TYPE OF CALL	BUSY- LOCAL	BUSY- OTTAWA	BUSY- FROBISHER	NO ANSWER	PERSON ABSENT	CONTACT NOT POSSIBLE	POOR SIGNALS	CONTACT CUT OFF	OTHER	ROW TOTAL AND % OF TOTAL
<u>EMERGENCY</u>										
(COUNT)	3	0	0	0	1	0	1	1	2	8
(ROW %)	37.5	0	0	0	12.5	0	12.5	12.5	25.0	
(COLUMN %)	50.0	0	0	0	16.7	0	14.3	100.0	33.3	
(% OF TOTAL)	8.6	0	0	0	2.9	0	2.9	2.9	5.7	22.9%
 NON- EMERGENCY	 3 11.1 50.0 8.6	 3 11.1 100.0 8.6	 2 7.4 100.0 5.7	 2 7.4 100.0 5.7	 5 18.5 83.3 14.3	 2 77.4 100.0 5.7	 6 22.2 85.7 17.1	 0 0 0 0	 4 14.8 66.7 11.4	 27 77.1%
COLUMN TOTAL AND % OF TOTAL NUMBER	6 17.1%	3 8.6%	2 5.7%	2 5.7%	6 17.1%	2 5.7%	7 20.0%	1 2.9%	6 17.1%	35 100%

TABLE 39

ADMINISTRATIVE CLASS OF CALL BY CALL HELPING TO ORGANIZE
PATIENT TRAVEL, ENTIRE BAFFIN ZONE

ADMIN. CLASS OF CALL	HELPED	DID NOT HELP	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
EMERGENCY			
(COUNT)	7	12	19
(ROW %)	36.8	63.2	
(COLUMN %)	15.9	8.2	
(% OF TOTAL)	3.7	6.3	9.9%
NON-EMERGENCY			
	37	135	172
	21.5	78.5	
	84.1	91.8	
	19.4	70.7	90.1%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	44	147	191
	23.0%	77.0%	100%

TABLE 40

ADMINISTRATIVE CLASS OF CALL BY CALL HELPING TO ORGANIZE
PHYSICIAN TRAVEL, BAFFIN ZONE

ADMINISTRATIVE CLASS OF CALL	HELPED	DID NOT HELP	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
EMERGENCY			
(COUNT)	2	14	16
(ROW %)	12.5	87.5	
(COLUMN %)	7.1	9.8	
(% OF TOTAL)	1.2	8.2	9.4%
NON-EMERGENCY			
	26	129	155
	16.8	83.2	
	92.9	90.2	
	15.2	75.4	90.6%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	28	143	171
	16.4%	83.6%	100%

TABLE 41

SYSTEM USED BY CALL HELPING TO ORGANIZE
PATIENT TRAVEL, BAFFIN ZONE

SYSTEM USED	HELPED	DID NOT HELP	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
HF RADIO (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	13 40.6 25.5 6.6	19 59.4 13.1 9.7	32 16.3%
ANIK	36 23.5 70.6 18.4	117 76.5 80.7 59.7	153 78.1%
DEW LINE	2 18.2 3.9 1.0	9 81.8 6.2 4.6	11 5.6%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	51 26.0%	145 74.0%	196 100.0%

TABLE 42

SYSTEM USED BY CALL HELPING TO ORGANIZE
PHYSICIAN TRAVEL, BAFFIN ZONE

SYSTEM USED	HELPED	DID NOT HELP	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
HF RADIO (COUNT)	3	22	25
(ROW %)	12.0	88.0	
(COLUMN %)	12.5	15.2	
(% OF TOTAL)	1.8	13.0	14.8%
ANIK	18	113	131
	13.7	86.3	
	75.0	77.9	
	10.7	66.9	77.5%
DEW LINE	3	10	13
	23.1	76.9	
	12.5	6.9	
	1.8	5.9	7.7%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	24	145	169
	14.2%	85.8%	100.0%

TABLE 43

ADMINISTRATIVE CLASS OF CALL BY FIRST SUBJECT OF CALL,
BAFFIN ZONE

ADMIN. CLASS OF CALL	MAINTENANCE	TRANSPORTATION	SUPPLIES	FUNDS	MEDICAL DATA	MANPOWER	OTHER	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
<u>EMERGENCY</u>								
(COUNT)	6	5	1	3	8	0	0	23
(ROW %)	26.1	21.7	4.3	13.0	34.8	0	0	
(COLUMN %)	25.0	10.0	2.7	30.0	13.3	0	0	
(% OF TOTAL)	2.7	2.2	0.4	1.3	3.5	0	0	10.2%
<u>NON-EMERGENCY</u>								
	18	45	36	7	52	16	29	203
	8.9	22.2	17.7	3.4	25.6	7.9	14.3	
	75.0	90.0	97.3	70.0	86.7	100.0	100.0	
	8.0	19.9	15.9	3.1	23.0	7.1	12.8	89.8%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	24 10.6%	50 22.1%	37 16.4%	10 4.4%	60 26.5%	16 7.1%	29 12.8%	226 100.0%

TABLE 44

ADMINISTRATIVE CLASS OF CALL BY SECOND SUBJECT OF CALL,
BAFFIN ZONE

ADMIN. CLASS OF CALL	TRANSPORTATION	SUPPLIES	FUNDS	MEDICAL DATA	MANPOWER	OTHER	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
<u>EMERGENCY</u>							
(COUNT)	0	0	0	0	0	2	5
(ROW %)	0	0	0	60.0	0	40.0	
(COLUMN %)	0	0	0	15.8	0	22.2	
(% OF TOTAL)	0	0	0	7.9	0	5.3	13.2%
<u>NON-EMERGENCY</u>							
	1	4	1	16	4	7	333
	3.0	12.1	3.0	48.5	12.1	21.2	
	100.0	100.0	100.0	84.2	100.0	77.8	
	2.6	10.5	2.6	42.1	10.5	18.4	86.8%
<u>COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS</u>	1	4	1	19	4	9	38
	2.6%	10.5%	2.6%	50.0%	10.5%	23.7%	100%

TABLE 45

SYSTEM USED BY FIRST SUBJECT OF ADMINISTRATIVE CALLS,
BAFFIN ZONE

SYSTEM USED	MAINTENANCE	TRANSPORTATION	SUPPLIES	FUNDS	MEDICAL DATA	MANPOWER	OTHER	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
HF								
(COUNT)	10	6	8	0	18	4	5	51
(ROW %)	19.6	11.8	15.7	0	35.3	7.8	9.8	
(COLUMN %)	41.7	12.5	20.0	0	27.3	23.5	14.3	
(% OF TOTAL)	4.2	2.5	3.3	0	7.5	1.7	2.1	21.3%
ANIK								
	10	40	32	9	42	13	28	174
	5.7	23.0	18.4	5.2	24.1	7.5	16.1	
	41.7	83.3	80.0	90.0	63.6	76.5	80.0	
	4.2	16.7	13.3	3.7	17.5	5.4	11.7	72.5%
DEW LINE								
	4	2	0	1	6	0	2	15
	26.7	13.3	0	6.7	40.0	0	13.3	
	16.7	4.2	0	10.0	9.1	0	5.7	
	1.7	0.8	0	0.4	2.5	0	0.8	6.2%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	24	48	40	10	66	17	35	240
	10%	20%	16.7%	4.2%	27.5%	7.1%	14.6%	100%

TABLE 46

SYSTEM USED BY EASE OF ADMINISTRATIVE WORKLOAD,
BAFFIN ZONE

SYSTEM USED	YES	PERHAPS	NO	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
HF RADIO				
(COUNT)	11	5	19	35
(ROW %)	31.4	14.3	54.3	
(COLUMN %)	21.6	10.9	16.0	
(% OF TOTAL)	5.1	2.3	8.8	16.2%
ANIK				
	40	35	91	166
	24.1	21.1	54.8	
	78.4	76.1	76.5	
	18.5	16.2	42.1	76.9%
DEW LINE				
	0	6	9	15
	0	40.0	60.0	
	0	13.0	7.6	
	0	2.8	4.2	6.9%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	51 23.6%	46 21.3%	119 55.1%	216 100%

(2) Medical

It was observed earlier (Table 14) that within the category of medical calls, approximately 35% of calls were seen as emergencies. When the variable "importance of call" is weighed, the importance of telecommunications in medical care is well demonstrated. 78.5% of calls were viewed as very or quite important.

TABLE 47

IMPORTANCE OF CALL, ALL MEDICAL CALLS,
BAFFIN ZONE

IMPORTANCE OF CALL	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
VERY IMPORTANT	77	14.8	33.2
QUITE IMPORTANT	105	20.2	45.3
PRECAUTIONARY	50	9.6	21.5
MISSING	287	55.3	
TOTAL	519	100.0	100.0

TABLE 48

SYSTEM USED BY IMPORTANCE OF MEDICAL CALL,
BAFFIN ZONE

SYSTEM USED	VERY IMPORTANT	QUITE IMPORTANT	PRECAUTIONARY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
HF RADIO				
(COUNT)	18	26	16	60
(ROW %)	30.0	43.3	26.7	
(COLUMN %)	25.0	25.0	34.8	
(% OF TOTAL)	8.1	11.7	7.2	27.0%
ANIK				
	50	75	27	152
	32.9	49.3	17.8	
	69.4	72.1	58.7	
	22.5	33.8	12.2	68.5%
DEW LINE				
	4	3	3	10
	40.0	30.0	30.0	
	5.6	2.9	6.5	
	1.8	1.4	1.4	4.5%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	72 32.4%	104 46.9%	46 20.7%	222 100%

TABLE 49

HOW CALL AFFECTED CARE MANAGEMENT, ALL MEDICAL CALLS,
BAFFIN ZONE

HOW CALL AFFECTED CARE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (%)	ADJUSTED FREQUENCY (%)
REINFORCED	51	9.8	29.5
REASSESSED	41	7.9	23.7
CHANGED	19	3.7	11.0
PATIENT EVACUATED	62	11.9	35.8
MISSING	346	66.7	
TOTAL	519	100.0	100.0

TABLE 50

HOW CALL AFFECTED CARE MANAGEMENT BY SYSTEM USED,
BAFFIN ZONE

HOW CALL AFFECTED CARE MANAGEMENT	HF RADIO	ANIK	DEW LINE	ROW TOTAL AND % OF TOTAL NUMBER
REINFORCED (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	11 22.4 27.5 6.8	35 71.4 31.3 21.7	3 6.1 33.3 1.9	49 30.4%
REASSESSED	7 20.0 17.5 4.3	24 68.6 21.4 14.9	4 11.4 44.4 2.5	35 21.7%
CHANGED	7 41.2 17.5 4.3	10 58.8 8.9 6.2	0 0 0 0	17 10.6%
PATIENT EVACUATED	15 25.0 37.5 9.3	43 71.7 38.4 26.7	2 3.3 22.2 1.2	60 37.3%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	40 24.8%	112 69.6%	9 5.6%	161 100%

TABLE 51

MEDICAL CLASS OF CALL BY HOW CALL AFFECTED CARE MANAGEMENT
ENTIRE BAFFIN ZONE

MEDICAL CLASS OF CALL	REINFORCED	REASSESSED	CHANGED	PATIENT EVACUATED	ROW TOTAL AND % OF TOTAL NUMBER
ROUTINE (COUNT)	26	25	6	22	79
(ROW %)	32.9	31.6	7.6	27.8	
(COLUMN %)	65.0	69.4	42.9	39.3	
(% OF TOTAL)	17.8	17.1	4.1	15.1	54.1%
EMERGENCY	14	11	8	34	67
	20.9	16.4	11.9	50.7	
	35.0	30.6	57.1	60.7	
	9.6	7.5	5.5	23.3	45.9%
COLUMN TOTAL AND % OF TOTAL NUMBER	40	36	14	56	146
	27.4%	24.7%	9.6%	38.4%	100%

TABLE 52

MEDICAL CLASS OF CALL BY QUALITY AND RELIABILITY OF CALL
ENTIRE BAFFIN ZONE

MEDICAL CLASS OF CALL	SATISFACTORY	UNSATISFACTORY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
ROUTINE (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	101 85.6 62.3 53.7	17 14.4 65.4 9.0	118 62.8%
EMERGENCY	61 87.1 37.7 32.4	9 12.9 34.6 4.8	70 37.2%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	162 86.2%	26 13.8%	188 100%

TABLE 53

WAS PATIENT INFORMATION TRANSFERRED THROUGH LINK,
BY MEDICAL CLASS OF CALL, ENTIRE BAFFIN ZONE

TRANSFER OF PATIENT INFORMATION	ROUTINE	EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
YES			
(COUNT)	91	65	156
(ROW %)	58.3	41.7	
(COLUMN %)	91.9	95.6	
(% OF TOTAL)	54.5	38.9	93.4%
WAS ALREADY AVAILABLE	8	3	11
	72.7	27.3	
	8.1	4.4	
	4.8	1.8	6.6%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	99	68	167
	59.3%	40.7%	100%

TABLE 54

HELPLEFULNESS OF CALL BY MEDICAL CLASS OF CALL
ENTIRE BAFFIN ZONE

HELPLEFULNESS OF CALL	ROUTINE	EMERGENCY	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
VERY HELPLEFUL (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	62 49.6 57.4 34.4	63 50.4 87.5 35.0	125 69.4%
SOMEWHAT HELPLEFUL	35 87.5 32.4 19.4	5 12.5 6.9 2.8	40 22.2%
NO EFFECT	11 73.3 10.2 6.2	4 26.7 5.6 2.2	15 8.4%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	108 60%	72 40%	180 100%

TABLE 55

SYSTEM USED BY HELPFULNESS OF CALL,
ENTIRE BAFFIN ZONE

SYSTEM USED	VERY HELPFUL	SOMEWHAT HELPFUL	NO EFFECT	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
HF RADIO (COUNT) (ROW %) (COLUMN %) (% OF TOTAL)	29 63.0 20.3 13.9	15 32.6 30.6 7.2	2 4.3 12.5 1.0	46 22.1%
ANIK	109 71.2 76.2 52.4	30 19.6 61.2 14.4	14 9.2 87.5 6.7	153 73.6%
DEW LINE	5 55.6 3.5 2.4	4 44.4 8.2 1.9	0 0 0 0	9 4.3%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	143 68.8%	49 23.6%	16 7.7%	208 100%

Discussion:

Tables 37 to 46 present data concerning only administrative calls. Although Table 37 shows that administrative non-emergency calls far outnumber administrative emergencies, there is a substantial difference between the two when the variable "how call was completed" is considered. Though there were only 23 calls considered administrative emergencies, a fairly high rate (43.5%) of these were completed with difficulty. The corresponding figure in the non-emergency category is only 15.3%, and that is from a much larger total sum. Thus it seems that emergency calls were particularly struck with bad luck since 10 of 23 calls were completed with difficulty, while only 33 of 182 calls were completed with difficulty in the non-emergency category.

When examining the reason why a particular call was incomplete, as Table 38 does, it is seen that no single reason predominates. When looking at the column totals (representing the sum of each reason), the distribution is fairly even although some are higher than others. Amongst the more frequent reasons for non-completion are: busy-local (17.1%); person absent (17.1%); and poor signals (20.0%). The latter is mainly attributable to HF radio as noted earlier. Further, there are no major differentiating factors between emergency and non-emergency calls on this count, aside from the fact that non-emergencies account for 77.1% of incomplete calls as opposed to 22.9% for emergencies. This is more than likely due to the much larger volume of non-emergencies.

Tables 39 and 40 look at whether or not calls were instrumental in organizing patient and physician travel, for both emergency and non-emergency

administrative calls. Both tables demonstrate quite convincingly that calls generally did not help to organize patient or physician travel. Table 39 reveals that 77% of calls did not help to organize patient travel, while Table 40 shows that 83.6% of calls did not help to organize physician travel. However, Table 39 does show that emergency calls helped more often than non-emergency calls. 36.8% of emergency calls helped to organize patient travel while 21.5% of non-emergency calls helped. The same cannot be said of physician travel in Table 40. A plausible explanation of these low rates is the following. If the call was a non-emergency, the chances were slight that it dealt with any kind of patient travel, and if the call was an emergency the travel or patient evacuation could well have been pre-determined beforehand, making the call a confirmation. With regard to physician travel, physician visits are not usually of the emergency type and can therefore be pre-arranged by other means.

Tables 41 and 42 examine the same variables as above, but correlate them with the communications system used. Again, the majority of calls, in all possible correlations, were seen as not necessarily helping patient or physician travel. In Table 41, however, a substantial difference between systems is shown. 40.6% of HF radio calls were found to help with patient travel, while the corresponding figure with the Anik system is only 23.5%. In Table 42, the system found most useful to organize physician travel was the Dew Line. Both Anik and HF systems were seen as not helping more often than helping. Once again, the positive responses are low in all categories, and the system used does not seem to create much of a differentiating factor.

Tables 43 and 44 list the subjects of administrative calls and correlate them with the administrative class of call (i.e. emergency and non-emergency). Table 43 concerns only the first subject or topic of the call, whereas Table 44 looks at the secondary subject. It is shown in Table 43 that medical data is the most prevalent subject, comprising 26.5% of all administrative calls. Transportation, supplies, and maintenance are also common items: 22.1%, 16.4%, and 10.6% respectively. Manpower and funds were not addressed often, as the figures show. The highest second subject is also medical data with a rate of 50%, as demonstrated in Table 44. Medical data was by far the outstanding subject matter, whether primary or secondary, emergency or non-emergency. The figures in these tables point to the notion that the transmission of medical data is an essential component of the health care delivery system.

When the same subject matters are tested against which communications system was used (Table 45), medical data is still the leading subject with the majority of its calls (63.6%) being on the Anik system. The other subject categories also have a tendency to be more prevalent on the Anik system than either of the other two. Transportation, for instance, was a topic that occurred 40 times on Anik and only 6 times on HF radio.

Table 46 compares the three communications systems as to their usefulness in easing administrative workload. All systems had a negative response as the majority. In other words, in most cases (55.1% total) the three systems combined were not seen as being instrumental in the reduction of administrative workload. 31.4% of HF radio calls eased the workload, which is

the highest of all categories. 24.1% answered "yes" for the Anik system, and the Dew Line did not have one call seen as easing the workload. However, there were only six calls placed on the Dew Line. The "perhaps" category is relatively high for all systems, but even the combination of both "yes" and "perhaps" does not surpass "no" for any given system. Nevertheless, a total of 23.6% of calls were judged as easing the administrative workload, and it is thus this figure that must be raised to reflect greater integration of telecommunications and health care delivery.

Within the medical category of calls, Tables 47 and 48 examine the variable of "importance of call". In Table 47, the adjusted frequency is the truly representative figure since there is necessarily a high rate of missing cases. (This table represents only medical calls.) The adjusted frequency shows that 33.2% of medical calls were very important, 45.3% quite important, and 21.5% precautionary. 78.5% of medical calls, therefore, were seen as either very or quite important. This figure clearly points to the importance of the telecommunications system in delivering medical care in the Zone. When the system used is tabulated against the same variable (Table 48), the figures are not greatly different. A combined total of 79.3% of all calls were seen as either very or quite important. A perhaps surprising tabulation here is that only 17.8% of Anik calls were precautionary, while 26.7% of HF calls and 30% of Dew Line calls were of that category. However, the Anik system also showed the highest rate of "quite important" at 49.3%. It seems, by and large, that the great majority of calls placed on any system in the Zone are of considerable importance for the delivery of medical services.

Looking somewhat deeper into the variable of importance, Tables 49-50 tabulate how calls actually affected the management of care. Table 49 shows that 35.8% of medical calls resulted in patient evacuation. 29.5% of medical calls reinforced the care management; 23.7% resulted in reassessment; and only 11% caused a change in care management. Table 50 analyzes the same variable and correlates it with the communications system used. Again, the highest category is patient evacuation with all systems. The figures are not substantially different from those in Table 49 which were the sum of all systems used. In other words, there are no major differentiating factors amongst the systems concerning this particular variable. The order in which the categories rank is identical for all systems: patient evacuated, reinforced, reassessed, and changed. It should also be noted that "patient evacuated" may also be a reinforcement of an original judgement by the nurse.

Table 51 also looks at the same variable but in terms of routine or emergency medical calls, and the order in which the care management appears is unchanged. The only significant difference contained in the table is that 32.9% of routine calls reinforced care management, but the corresponding figure for emergency calls is only 20.9%. By the same token, 50.7% of emergency calls resulted in evacuation but only 27.8% of routine calls resulted in patient transfer. The rates of change in care management are extremely low in all categories. It appears, therefore, that the major role of the telecommunications system is not necessarily to reduce travel and evacuations, but rather to reinforce medical opinion and care management.

Table 52 demonstrates that 86.2% of all medical calls had satisfactory quality and reliability. Within the "routine" category, 85.6% of calls were satisfactory, while 87.1% of emergency calls were also satisfactory. There were more unsatisfactory calls within the routine category than in the emergency category.

Table 53 refers to medical data once again in the form of patient information. The table clearly reveals that patient information is transferred via the communications system at a high rate. 91.9% of routine calls and 95.6% of emergency calls were used to transfer at least some patient information. For both classes of calls combined, patient information was transferred on 93.4% of the calls. Transfer of patient information it appears, is one of the major uses of a telecommunications system in a medical care setting.

Tables 54-55 examine the variable labeled "helpfulness of call". As Table 54 shows, 69.4% of all medical calls were referred to as very helpful. Of this total, 34.4% of calls were routine and 35% were emergency. However, if the medical class of call is tabulated individually, 57.4% of routine calls were very helpful; 32.4% somewhat helpful; and only 10.2% had no effect. The corresponding figures for emergency calls are: 87.5% very helpful; 6.9% somewhat helpful; and 5.6% no effect. There seems to be no doubt as to the usefulness of all medical calls, but particularly emergency calls. The fairly high rate of "somewhat helpful" calls in the routine category is almost all transferred to "very helpful" in the emergency category. In both medical types of calls, very seldom did a call have no effect whatsoever.

When looking at the same variable from the point of view of systems used (Table 55), the category "somewhat helpful" assumes a higher rate. This is particularly true of HF radio which has a "somewhat helpful" rate of 32.6% as compared with only 19.6% on Anik. This may be due to the inferior quality and reliability of HF which in some cases may hamper the usefulness of the call. By any means, a very small combined total of 7.7% of all medical calls were seen as having no effect. It seems clear, therefore, that communications are a vital tool of medical service delivery in the Zone.

(3) Social:

TABLE 56

CALL WAS SOCIAL OR OTHER BY SYSTEM USED,
ENTIRE BAFFIN ZONE

TYPE OF CALL	HF RADIO	ANIK	DEW LINE	ROW TOTAL AND % OF TOTAL NUMBER OF CALLS
SOCIAL				
(COUNT)	8	87	3	98
(ROW %)	8.2	88.8	3.1	
(COLUMN %)	80.0	92.6	100.0	
(% OF TOTAL)	7.5	81.3	2.8	91.6%
OTHER				
	2	7	0	9
	22.2	77.8	0	
	20.0	7.4	0	
	1.9	6.5	0	8.4%
COLUMN TOTAL AND % OF TOTAL NUMBER OF CALLS	10	94	3	107
	9.3%	87.9%	2.8%	100%

Discussion:

As can be seen in Table 56, social calls occur much more frequently on the Anik system than on HF radio. 88.8% of all social calls were placed on Anik. The notion that HF radio is only used for necessities is clearly demonstrated here by the extremely low incidence of social and "other" calls. Social calls had a low frequency throughout the Zone, despite the fact that practitioners expressed both the desirability and the need for social communications.

E) INTERVIEWS:

Interviews were conducted by members of the project team at each of the nursing stations in early fall. The interviews served to qualify much of the quantitative data emerging from the log. It provided nurses with an opportunity to voice their concerns and preferences, as well as familiarize the project team with the remote nursing station environment. The information gathered from the interviews is basically divided into three categories: utilization, problems, and possible improvements. The most important aspect of these interviews was to enable the nurses to talk subjectively and candidly about these issues.

(1) Utilization:

Generally speaking, communications equipment was seen as easy to use, but in some cases, particularly with HF radio, the process could tend to be time consuming. This was mostly due to the fact that contact could often not be established when required, which tended to pattern the usage. On HF radio, for example, most nurses felt that usage was determined by the occurrence of emergencies, evacuations, or families inquiring about relatives hospitalized in Frobisher Bay.

No strict procedures exist to route incoming calls. Nurses are usually alerted to an incoming call via the community telephone or a message is left should she be absent. It was mentioned that a tape recorder could prove to be useful for these purposes. Concerning outgoing calls, it was generally agreed that aside from emergencies, the most convenient time for

all concerned to contact the hospital or public health center in Frobisher was during normal working hours. This is the time which consulting physicians and nurses are most accessible.

The types of medical data that are transmitted via the communications system include patient histories, lab results, some x-ray readings, and general diagnostic information. However, these were not seen as necessarily replacing the mail system since most of the above are carried out during emergencies or evacuations rather than on a routine basis.

Communications were not perceived as a substitute for patient or physician travel. Although it was felt that a quality communications system could greatly enhance the organization of travel, it was not seen as a direct substitute. It was generally thought that medical evacuations to the Frobisher Hospital would be continually necessary until such time as hospital facilities and services were made available locally.

Responding to questions pertaining to the possible effects of communications on job satisfaction, professional confidence and staff turnover, the majority of nurses felt that communications could play a role in these matters but the likelihood of it playing a major role was seen as minimal. Professional as well as personal isolation was felt to be one of the major factors contributing to high staff turnover, and communications systems were perceived as very instrumental in combatting this. By far the most widespread use of communications was to obtain reinforcement or a second opinion on diagnosis, patient care management, etc. and this in itself was combatting

professional isolation. It is clear from the interviews that this sense of isolation, both professional and personal, was felt to a much larger degree by nurses posted at HF radio locations rather than those with Anik service. Anik was seen as particularly useful to maintain contact with friends and families, since long distance calls to the south or abroad were much more easily accomplished than on HF radio.

(2) Problems:

With regard to major problems in utilizing the communications system, the responses were generally split according to the system being used. The most often mentioned problem with HF was the poor reliability of the system - the fact that numerous attempts and considerable time are often required to establish contact. This was clearly seen as insufficient for medical purposes, particularly in emergencies. Secondary problems on HF radio consisted mostly of poor signals causing poor reception, static, fading, and sometimes contact being cut off. Maintenance and repairs were of considerable concern to the nurses, since it was not too infrequent that systems would be inoperable for relatively lengthy periods. The fact that the operator was only available at certain times of the day also caused difficulties.

With the Anik system the primary problem was thought to be congested circuits, which made contact impossible. On occasion, several hours were spent attempting to establish contact. Aside from a basic shortage of available circuits, the problem was also perceived as resulting from excessive delays in maintenance and repairs. Other more secondary problems with the

Anik system included contact being cut off, echo, fading, noise and static, "double-hop" delay in establishing contact, etc.

When asked if these problems could hamper the delivery of medical service, the general response was that indeed they could. The most crucial consequences, of course, occurred when contact was cut off or impossible to establish. It was stressed further that poor connections could result in misinterpretations or misunderstanding of vital information. This was seen as particularly significant by HF radio users.

(3) Possible Improvements:

Personal preferences for possible improvement of communications systems varied considerably. Some nurses stated that a higher standard of quality and reliability would suffice, while others favoured more elaborate use of communications in the health care context. Amongst the possible uses envisaged were a greater capability for data transmission, easier access to the hospital in Frobisher (perhaps a direct line), increased public health education and continuing professional education, easier access to other nursing stations, and increased usage for administrative matters.

The subject of teleconferencing was also addressed. It was generally thought that teleconferencing could have some definite benefits in discussing problem cases, discussion and information concerning contagious diseases and epidemics, regular discussions of personnel matters and Zone policy and regulations, and generally providing more and better inter-community commu-

nication. Continuing professional education received widespread support and the possibility of incorporating education into a teleconferencing system was envisaged. Discussions and seminars with other Zone staff via telecommunications were seen as desirable.

Medical data transmission was perceived as a crucial area for improvement. It was suggested that if processing of patient records, x-rays, lab results, treatment reports, drug prescriptions, and the like could be effectively carried out using telecommunications, this type of workload could be both facilitated and reduced. Ultimately, the net effect would be an improvement in patient care and probably an increase in the volume of patients as well.

The most vital area for improvements was thought to be the quality and reliability factor. The immediate priority for those nurses in HF radio locations, for instance, is to receive satellite service. Those from Anik locations generally thought that the establishment of a 24-hour, direct and reliable service would be a marked improvement. When asked to respond to various technical options to provide such a service (i.e. dedicated channel, override button), the majority of nurses supported the concept of a dedicated channel for health and medical services. This would provide direct and immediate access to the Frobisher Hospital which is undoubtedly seen as the foremost priority for the overwhelming majority of nurses.

A final area which received widespread support as a target for future improvements is the entire realm of social interaction and communica-

tion. As was documented from the log, social calls were relatively few. Nevertheless, almost all nurses expressed the need for increased communication amongst themselves as well as with friends and families. This was seen as a major counteractive force to such problems as professional isolation, personal isolation and ultimately staff turnover. It was also considered important that local people have access to their friends or relatives hospitalized in Frobisher. This was perceived to be a distinct community need that entered into the context of health care delivery.

V - RECOMMENDATIONS

RECOMMENDATION I:

IT IS RECOMMENDED THAT TELECOMMUNICATIONS BE FULLY INTEGRATED WITH THE HEALTH CARE SYSTEM AS AN INSTRUMENT OF HEALTH CARE DELIVERY IN THE BAFFIN ZONE.

This would entail the use of telecommunications to fill such needs of the service delivery system as transmission of medical data, consultation and diagnosis, administrative and organizational matters, continuing professional education, and management information services.

Alternatives:

1. To substantially increase physician staff throughout the Zone in order to give access to specialist consultation and treatment for the population of Baffin Zone.
2. To continue to use existing communications facilities and services for health care delivery, and to adapt to communications developments as they occur.
3. To encourage an increase in the number of patient evacuations to hospitals, both to Frobisher Bay and to the south.
4. To increase the extent of physician travel to serve the Baffin Zone.

Discussion:

This study concludes that for the continuation and enhancement of health care services in the Baffin Zone, it is essential that various forms of known telecommunications be fully utilized in the delivery of these vital services. Health and medical services in the Baffin Zone are extraordinarily effective in light of the numerous problems, hazards and constraints facing the delivery system. Telecommunications could eliminate many of these obstacles, and thus facilitate the difficult task of delivering health services in remote regions. Furthermore, it is only the full integration of a telecommunications system with health services that could render the most effective and beneficial results. In order for a telecommunications system to be integrated within the health care environment, it must be seen as a fundamental component of the service delivery system rather than an elaborate technical aid. This perception must permeate the entire health delivery organization, and be fully understood by practitioners most particularly. Full integration, in other words, means the practice of telemedicine.

It is the contention of this study in submitting this recommendation that nurses presently practicing in remote areas (the North as well as other isolated areas) are amongst the best trained and most capable in the country. If telecommunications can effectively link this expertise with physicians and specialists, the standard of health care delivery will be comparable with that available to Canadians in the South.

Telemedicine systems may contain many elements and bear several definitions. For the purposes of this study, and as it applies to the Baffin

Zone, telemedicine is defined as the utilization of any telecommunications system that is instrumental in delivering health care. It has been shown in this study that present usage is extensive in areas of medical data transmission, consultation and reinforcement of care management, as well as administrative matters. These practices could be extended to include conference consultation, remote diagnosis, more elaborate data transmission such as x-rays, ECG's, and lab results, continuing professional education and staff training, organizational and management matters such as Zone staff meetings and a central information system. All of these practices have been successfully tried in various remote regions (in Canada and elsewhere, notably Alaska), and have been found to facilitate the delivery of care as well as enhance its accessibility and ultimately its quality. In addition, the practice of telemedicine as briefly sketched above does not necessarily require sophisticated broadband technology, but can be carried out utilizing narrow bandwidth.

There are several possible alternatives to this recommendation, and a few of them are stated above. Alternative 1 would be ideal. If more physicians were available to practice in remote regions, the critical need for telecommunications could be greatly diminished. Although communications systems would nonetheless have an important role to play, they would not assume the present crucial role as a fundamental agent of service delivery. If physicians were readily available throughout the Zone, it would obviate the need for the full integration concept addressed above. One of the prime virtues of a telemedicine system is to render physician and specialist expertise accessible to a designated population. Should that expertise be available by face to face contact, then telecommunications would simply be utilized as support equipment, similar to other

equipment presently being used in medical practice. Unfortunately, such is not the case. Physicians are in very short supply and personnel resources at all levels are generally limited. Hence the paramount importance of effective and reliable telecommunications systems.

Alternative 2 is basically a remain "as is" alternative. Since the present standard of health services in Baffin Zone is of high quality, it would not necessarily be detrimental to follow this alternative. However, the major drawback would be that if the health care delivery system was to merely adapt to communications developments as they occurred, telecommunications would likely not evolve as an integral part of health care delivery, and thus the communications needs of the remote health service and its practitioners would never be specifically met.

Alternatives 3 and 4 are derived from the same premise: if physician care and expertise is not presently available, either take the patients to the physicians (Alternative 3), or bring the physicians to the patients (Alternative 4).

Alternative 3 would require a considerable revamping of the present service delivery system, and some of its goals. At present, one of the main aims is to extend health care, locally, to as many communities as possible. A marked increase in patient evacuations would clearly negate this goal, since fewer patients would be treated locally. In addition, the escalating costs of travel and fuel would likely render it unfeasible. Alternative 4, however, would yield some benefits. Although the same escalating costs would be encountered, the volume of travel would be smaller. If physician visits were substantially

increased, the results would likely be that more communities could have direct access to physician consultation and treatment. A seemingly unsurmountable obstacle in pursuing this alternative, however, is the ever-present shortage of physicians. If the present physician staff were to travel extensively throughout the Zone, the shortage would be felt at the hospital. In short, the same personnel resource constraints hampering Alternative 1 apply directly to Alternative 4.

RECOMMENDATION II:

IT IS RECOMMENDED THAT A 24-HOUR, HIGH QUALITY COMMUNICATIONS SYSTEM BE MADE AVAILABLE IN THE BAFFIN ZONE, SPECIFICALLY DESIGNED TO MEET THE NEEDS OF THE HEALTH CARE DELIVERY SYSTEM.

The criteria governing the system design should include the following:

- reliable and immediately accessible audio and data transmission capability,
- immediate access to the Frobisher Bay Hospital, as well as direct station to station communication,
- conferencing capability amongst the nursing stations and the hospital,
- the availability of quality and rapid data and document transmission via narrow bandwidth. (e.g., facsimile, slow-scan),
- the capability of developing a management information system including data storage, reference, and retrieval,
- the assurance that privacy and confidentiality be maintained.

Alternatives:

1. To make the best possible use of the presently existing communications facilities and services.

2. To implement an emergency override capability which would give immediate and automatic priority to medical calls, particularly emergencies.

3. To implement a full audio-video broadband system serving the health care delivery system.

4. To implement a high-powered radio network particularly designed for the health care delivery system.

Discussion:

This study concludes that for the communications needs of health care delivery to be met adequately, telecommunications must be central to the health care system rather than auxiliary or peripheral. In other words, it must be specifically designed to accommodate the health care system, and thus become an integral component of it. The project team believes that the best means by which to achieve this is through the provision of a reliable, high-quality dedicated telecommunications system. In practical terms, this would mean making available to the health service system one channel from present satellite facilities (Anik). This could presumably be carried out with relative ease for those nursing stations presently receiving satellite service, but would require the installation of ground stations at those locations with HF radio. A gradual expansion of Anik terminals would therefore be mandatory.

The system characteristics listed above are based on the perceived needs of the health care system as extrapolated from the quantitative and qualitative data of this study. Of paramount importance are the capability

of immediate access to the Frobisher Bay Hospital, improved inter-nursing station communication, and medical data transmission. Perhaps the easiest means by which to provide these services is through a conferencing capability. Tele-conferencing within the Zone was generally seen as desirable, but if it were the means by which to establish immediate contact with the Frobisher Hospital as well as other nursing stations, it would be vital. The other characteristics listed above are important nonetheless as design options, but do not necessarily form the nucleus of a telecommunications-based delivery system.

The four alternatives to this recommendation are plausible though they contain certain constraints. Alternative 1 is once again a remain "as is" alternative. This type of option is always possible in contrast to change and development. With the advent of the Cabinet approved Northern Communications Assistance Program (NCAP), which will bring satellite service to some 28 communities in the NWT within the next five years, it is likely that marked improvements in telecommunications would ensue should this alternative be followed. However, these improvements would apply to northern communications generally, and their applicability to health service would be indirect as well as dependent on the health care delivery system's ability to adapt. It is the contention of this study that health care services warrant more specific telecommunications planning geared to meet their needs.

Alternative 2 is a technical alternative. An override button would have the advantage of processing medical calls as a priority over other calls, which could prove extremely useful in emergency situations. It does contain

drawbacks, however. An override capability would not allow for the other varied uses of telecommunications in health care delivery (as depicted above). It would simply provide a technical improvement of the present Anik system, and would of course have no effect on HF radio locations. In addition, there is the possibility of resentment from the rest of the community since their service would be altered for the benefit of the nursing station.

Alternatives 3 and 4 comprise the end points of a communications technology spectrum. At one end of the spectrum is a full audio-video system (Alternative 3) and at the other is a radio network (Alternative 4). Audio-video systems can yield many benefits and the vast array of possible uses of such a system has been tested at length (notably in the US). Though definite advantages can ensue from broadband systems, that level of technological sophistication (and its accompanying financial burden) is not seen as necessary to meet the present needs of the health care system in the Baffin Zone. At the other end of the spectrum (Alternative 4), it has been shown repeatedly in this study that high powered radio systems are not sufficient for effective use of telecommunications in a health care setting, mostly due to irregular quality and poor reliability. Radio communications clearly do not suffice for an efficient integration of health care delivery and telecommunications.

As in most other "spectrum" situations, a reasonable middle point is probably the best solution to aim for. Making full use of less expensive narrowband technology with direct applications for health care delivery (as conveyed above) is thought to be that reasonable mid-point.

RECOMMENDATION III:

IT IS RECOMMENDED THAT A PILOT PROJECT BE UNDERTAKEN IN THE BAFFIN ZONE, UTILIZING PRESENT SATELLITE FACILITIES, TO FULLY EXPLORE AND DIRECTLY ASSESS THE VARIOUS POTENTIAL CHARACTERISTICS OF A SYSTEM WITH A DESIGN SUCH AS PROPOSED IN RECOMMENDATION II.

The pilot project, as envisaged, would be on an experimental basis and should provide an evaluative mechanism for the planning, design and operationalization of a permanent telehealth system in the Baffin Zone.

Alternatives:

1. For the health care delivery system to adapt to communications developments without prior specification of health care needs.
2. To implement a telemedicine system according to the presently defined needs of the health service delivery system, without practical experience in testing the feasibility and desirability of various alternative system characteristics.

Discussion:

In submitting these recommendations, there is one qualification that should be made explicitly clear: telemedicine is not a panacea. There are inherent constraints and numerous possible operational difficulties, over and above the high financial price of operationalization. Though telemedicine can yield unquestionable benefits, particularly in remote regions such as Baffin Zone, implementation of a telemedicine system must be approached with caution

and careful planning. It must firstly be designed to "fit" the region it intends to serve in terms of technical capabilities, site locations, volume of operational utilization, etc. Secondly, health practitioners utilizing the system must be fully familiarized with all its facets, as well as harbour a general attitude of acceptance of the system. The basic attitudes of health care practitioners towards the use of a telemedicine system are sufficiently potent to mold its success, mediocrity, or outright failure. Thirdly, it is important that the desirable and feasible uses of the system be specifically defined, as well as its limits and constraints.

It is imperative, therefore, that all of the above aspects be defined and tested prior to implementation of an operational system on a permanent basis. The best means by which to arrive at such an assessment seems to be the initiation of a temporary pilot project in the Zone. The project would probably link three or four existing Anik locations in the Zone through a private dedicated channel which would also provide a conferencing capability amongst the sites involved. Each of the participating nursing stations, as well as the Frobisher Hospital, would be equipped with a telephone, a loud-speaker, a faxcom telecopier, and perhaps an extension telephone in the sleeping area. Both voice and facsimile transmission would be possible through the dedicated facility on a 24-hour basis. Immediate contact with the Frobisher Hospital, as well as the other participating sites, would also be available 24 hours a day, and any of the nursing stations involved could join in at any time during the transaction. Privacy and confidentiality would also be assured at all times.

The content as well as the varied uses of the proposed system would have to be determined by the health practitioners since they are in the best position to define their needs. However, consultation would likely be necessary with other representatives of Health & Welfare, Bell Canada, Telesat and the DOC.

An integral component of the pilot project would be a comprehensive evaluation of the system's capabilities, its benefits and constraints, its applicability to the remainder of the Zone, its cost, and its overall usefulness for health care delivery as perceived by health practitioners. In order that a sound and representative evaluation be performed, an approximate three-month duration should be envisaged for the pilot project.

Discussions and negotiations to this effect have been held with Health and Welfare Canada, the DOC, Bell Canada and Telesat Canada, but nothing official has thus far ensued. It is anticipated, however, that the results of this study will provide further impetus for the realization of such a project.

RECOMMENDATION 1V:

Although it is appreciated that the primary purpose of this study was to investigate the present usage and possible integration of telecommunications and health care delivery in Baffin Zone, the project team recognizes that health care delivery is only one of the four identified components of the total health field, as outlined in "A New Perspective on the Health of Canadians", M. Lalonde, 1974. It is considered imperative, therefore, that other uses of telecommunications in the total health field pertinent to remote regions be explored.

IT IS RECOMMENDED THAT AUXILIARY USES OF TELECOMMUNICATIONS SERVING THE TOTAL HEALTH FIELD IN THE BAFFIN ZONE (WITH POTENTIAL APPLICATIONS FOR OTHER REMOTE AREAS), BE FULLY EXPLORED AND ASSESSED.

The assessment would define present needs for such services and establish priorities for future use. The following items should be included in the assessment:

- continuing professional education for nurses and physicians,
- training of para-professionals and community health representatives,
- public health education,
- organizational and administrative usage (i.e., announcements of Zone policy; staff meetings; data systems, etc.),

- social uses of communications,
- access by relatives in the home community to a patient being hospitalized in Frobisher Bay.

Alternatives:

1. To concentrate on the utilization of telecommunications for medical consultation and treatment, and to let auxiliary uses develop as the system itself evolves.
2. To fulfill the same needs via other mechanisms. (e.g., educational leaves; centralized training center; mail service, etc.).

Discussion:

Though the various items depicted above are not central to the practice of telemedicine or the actual delivery of health care, they do comprise an extremely important component of the total health field. One of the principle aims in utilizing telecommunications for health care in remote areas is to overcome the severe difficulties involved in bringing health services to isolated regions, and thereby attempt to offer a service comparable with that enjoyed by other Canadians. Such a service involves more than the actual delivery of health care (i.e., diagnosis, treatment); it encompasses the total health field or the total health care system. Inherent in this system are the development of personnel resources, administrative, organizational and managerial goals and procedures, education and training, preventive care, outreach programs, and so forth. Although there is presently only limited use of telecommunications in

these activities in the Zone, a great deal of potential exists as well as a keen willingness amongst most practitioners. It is thought advisable, therefore, that these uses be fully explored in order to extend and make accessible a total health service system. It is believed that telecommunications can greatly facilitate the achievement of these tasks.

The items recommended to enter the assessment are not the only services available, but they form the core of what can be labeled as "auxiliary" uses emerging from this study. All of them were in one way or another expressed as a need or at least a desirable development.

Much of the assessment could take place during the proposed pilot project (Recommendation III) on the Anik satellite. The same theme of identification of needs relevant to these possible uses would prevail. Furthermore, the explorations could easily be merged with present practices and would therefore not necessarily imply the launching of all new programs. In the area of continuing professional education, for example, seminars over the conferencing system (i.e., pilot project proposal) could follow the distribution of video cassettes that are presently regularly distributed to all nursing stations. The area of education would seem to call for the use of broadband technology (i.e., video) to be most effective. This is not necessarily so. Much can be achieved via narrowband and the specific purpose of the proposed assessment is to test exactly this - what can and cannot be effectively used given that broadband is unavailable?

All of the items proposed for inclusion in the assessment can conceivably be carried out on a narrow bandwidth. In public health education, for

instance, a session could be held at the nursing station where video cassettes on various topics would be presented, while consultation, questions and answers, etc., could be available from a consulting physician in Frobisher via the voice transmission. Various other configurations are also possible.

Both alternatives to this recommendation are quite feasible. Alternative 1 ranks priorities as they obviously should be (i.e., consultation and treatment as foremost), but it is questionable whether auxiliary uses would indeed develop as the communications system gradually evolved. It is likely that testing and experimentation would be required, and at no time would this seem more appropriate than during the proposed pilot project. Alternative 2 would almost completely avoid the use of telecommunications in performing these auxiliary tasks. Additional staff would be required to allow for educational leaves, a data and information storage and retrieval system would not be possible, access to the Frobisher Hospital for local relatives would not be facilitated, etc. In short, this alternative would not permit telecommunications to assume the vital role for which it has proven potential.

This study has hopefully demonstrated that these services are useful, desirable and attainable. To delay their exploration at this time would be tantamount to opposing the extension of the total health field to remote regions of Canada.

APPENDIX

DATA COLLECTION INSTRUMENTS

- 1) Communications Traffic Log
- 2) Interview Questionnaire
- 3) Operator Checklist



BAFFIN ZONE COMMUNICATIONS STUDY

NURSING STATION	DATE			CALL PLACED	CALL COMPLETED	<input type="checkbox"/> INCOMING CALL <input type="checkbox"/> OUTGOING CALL	SYSTEM USED <input type="checkbox"/> HF RADIO <input type="checkbox"/> ANIK <input type="checkbox"/> DEW LINE		
	DAY	MTH.	YEAR						
				AM PM	AM PM				

COMMUNICATIONS TRAFFIC									
1. CALL WAS		2. LENGTH OF CALL							
FROM	TO	SPEAKING		TRAVEL TO TELEPHONE		ATTEMPTING CONTACT		TOTAL	
		HRS.	MINS.	HRS.	MINS.	HRS.	MINS.	HRS.	MINS.
3. CALL WAS COMPLETED		INCOMPLETE							
<input type="checkbox"/> EASILY <input type="checkbox"/> WITH DIFFICULTY - SPECIFY		<input type="checkbox"/> BUSY <input type="checkbox"/> NO ANSWER <input type="checkbox"/> PERSON ABSENT <input type="checkbox"/> CONTACT NOT POSSIBLE							
<input type="checkbox"/> POOR SIGNALS <input type="checkbox"/> OTHER - SPECIFY									
4. NUMBER OF ATTEMPTS WHETHER COMPLETE OR INCOMPLETE		5. PERSON TO BE REACHED							
		<input type="checkbox"/> PHYSICIAN <input type="checkbox"/> NURSE <input type="checkbox"/> ADMINISTRATOR <input type="checkbox"/> FRONT OFFICE <input type="checkbox"/> COMMUNITY HEALTH AID <input type="checkbox"/> SOCIAL WORKER							
		<input type="checkbox"/> OTHER - SPECIFY							
6. CORRECT PERSON WAS REACHED				NOT REACHED				7. QUALITY/RELIABILITY OF CALL WAS	
<input type="checkbox"/> EASILY <input type="checkbox"/> WITH DIFFICULTY				<input type="checkbox"/> ALTERNATE PERSON <input type="checkbox"/> RE-SCHEDULE				<input type="checkbox"/> SATISFACTORY <input type="checkbox"/> UNSATISFACTORY	

PURPOSE OF CALL THE PURPOSE OF CALL WAS: (answer more than one if call served more than one purpose)				
ADMINISTRATION				
8. CALL WAS	9. DID THE CALL HELP TO ORGANISE TRAVEL FOR		10. HAS THE CONSULTATION EASED YOUR ADMINISTRATIVE WORKLOAD?	
<input type="checkbox"/> ADMINISTRATIVE EMERGENCY <input type="checkbox"/> NON-EMERGENCY	PATIENT <input type="checkbox"/> YES <input type="checkbox"/> NO	PHYSICIAN <input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> PERHAPS <input type="checkbox"/> NO	
11. CALL WAS MAINLY WITH:				
<input type="checkbox"/> SUPPLIES <input type="checkbox"/> FUNDS <input type="checkbox"/> MAINTENANCE <input type="checkbox"/> TRANSPORTATION				
<input type="checkbox"/> MEDICAL DATA <input type="checkbox"/> MANPOWER				
<input type="checkbox"/> OTHER - SPECIFY				
MEDICAL				
12. CALL WAS:		13. AS A RESULT OF THIS CALL THE CARE MANAGEMENT WAS:		14. WAS PATIENT INFORMATION TRANSFERRED VIA THIS LINK?
<input type="checkbox"/> ROUTINE <input type="checkbox"/> EMERGENCY		<input type="checkbox"/> REINFORCED <input type="checkbox"/> REASSESSED		<input type="checkbox"/> YES
<input type="checkbox"/> VERY IMPORTANT <input type="checkbox"/> QUITE IMPORTANT <input type="checkbox"/> PRECAUTIONARY		<input type="checkbox"/> CHANGED <input type="checkbox"/> PATIENT EVACUATED		<input type="checkbox"/> WAS ALREADY AVAILABLE
15. CALL WAS				
<input type="checkbox"/> VERY HELPFUL				
<input type="checkbox"/> SOMEWHAT HELPFUL				
<input type="checkbox"/> NO EFFECT				
SOCIAL AND OTHER				
PLEASE SPECIFY				

COMMENTS:

BAFFIN ZONE COMMUNICATIONS STUDY

DEPARTMENT OF COMMUNICATIONS, HEALTH & WELFARE CANADA

QUALITATIVE QUESTIONNAIRE

Nursing Station: _____ Communications System: _____
Interviewer: _____
Interviewee: _____
Date: _____
Time: _____

This questionnaire consists of two sections: a descriptive section and an exploratory section. Included in the descriptive part are follow-up questions to the communications traffic log that was administered during the month of July. The exploratory section is meant to identify usage patterns, problems encountered, and possible improvement.

I - DESCRIPTIVE:

- a) Equipment: This section should be completed by the interviewer. Upon observation, he or she should give a short descriptive account of the equipment presently being used at the nursing station, and possibly in the community. Noteworthy advantages or disadvantages could be helpful as well.

nursing station equipment: _____

community: _____

b) Background of Respondent:

- 1) number of years in medical service: _____
- 2) length of time period in the North: _____
- 3) length of time in this nursing station: _____
- 4) highest level of formal education completed: _____

- 5) other education: _____
- 6) previous experience with HF and/or Anik service: _____

c) The Log:

- (1) Did you find the log to be accurate and precise? _____

- (2) Did you log all calls, both incoming and outgoing? _____

- (3) Did you feel that there was a need to log all calls, or could a sample have been taken? If so, what would be an appropriate sample? _____

- (4) Did you find the time period of the administration of the log too long, too short, just right? Why? _____

- (5) In what ways would you suggest the log could be improved for the second phase of data collection, or would you like to see the same log? _____

- (6) When calls are completed, but with difficulty, what would you say are some of the main causes of difficulty? _____

- (7) What were some of the main reasons for unsatisfactory quality/reliability? _____

- (8) When the correct person was reached, but with difficulty, what were the main reasons of difficulty? _____

- (9) Could you give some examples of administrative emergencies? _____

- (10) What kinds of medical data are easily transmitted via the link, if any, and what kinds are more difficult? _____

- (11) Did the log cover all uses of this communications system, or are there others? _____

II - EXPLORATORY:

(a) Utilization:

- (1) How difficult or easy is it to operate the existing system equipment? What instances are particularly difficult? _____

- (2) Can telecommunications contact be established when required with the present system? In what instances "yes" and in what instances "no"? _____

- (3) If yes (to the above question), does this pattern your use of the system? (e.g. certain times, frequency) _____

- (4) What procedures exist, if any, to route incoming calls for consultation? _____

- (5) In the case of non-emergencies, what are the most convenient times for consultation? Why? _____

- (6) What kinds of medical data are transmitted via this system, if any? Who interprets them? What is the turn around time? _____

- (7) In what instances does medical data transmission replace the mail system? How much is mail used? _____

- (8) Which is used more often, data transmission or mail? _____

- (9) How often, and in what ways, is the link used to organize periodic visits? (e.g. physicians, zone nursing officer, other visitors). _____

- (10) How often, and in what ways do you think communications can substitute transportation? (for both patient evacuations and physician visits). _____

- (11) Must an evacuation be authorized by a physician or can you act on your own discretion? If the former, are these exceptions to the rule? _____

- (12) The preliminary results of the logs showed that not many patient management decisions were changed as a result of tele-consultations. What do you perceive as the most beneficial use(s) of consultation? _____

- (13) Does this (the above) differ according to routine or emergency cases? _____

- (14) Does the communications system give you a greater feeling of professional confidence and/or higher job satisfaction? If no, would a better system do so? _____

- (15) Generally speaking, do you think that effective communications in a nursing station can have an effect on staff turnover? If so, in what ways? _____

- (16) As a summary question, what would you say are the major uses of this communications system? _____

(b) Problems:

- (1) What would you say is the greatest single problem with your present communications system? Describe. _____

(2) What are some of the secondary problems with the system? _____

(3) As a result of the above questions, could you give a ranking order of communications problems that you experience? (from worst to least).

(4) Are there any particular medical problems that are caused by poor communications? (e.g. diagnosis, treatment, etc.) _____

(5) Have you any other comments concerning problem areas? _____

c) Improvements:

(1) What additional uses of communications systems can you envisage for health care in this community? _____

(2) Would continuing education programs be of some use to you here? If so, on what topics and in what format? (i.e. public health, education programs, continuing professional education, etc. through videotapes or other means). _____

(3) Do you think that a conferencing capability would be beneficial? If so, in what purposes? (e.g. consultation, management and administration, etc.), And with whom? (e.g. other stations, hospital). _____

- (4) What technical provisions would be useful to handle emergencies?
e.g. dedicated channel, override button.
- (5) Which administrative tasks and medical data transmission could be taken over by telecommunications? e.g. facsimile transmissions.
- (6) Would this substantially reduce your workload?
- (7) How much time (approximately) do you presently spend on matters that could be handled via telecommunications? (e.g. duplication & processing of paper work).
- (8) What additional uses of the system could be made to reduce your workload?
- (9) What effects would near real-time interpretation of medical data (e.g. X-rays, EKG's) have upon patient management at the nursing station?
- (10) What general effects would a reliable communications system have on the quantity and quality of medical care provided?
- (11) What effects, if any, do you think reliable communications can have on medical manpower planning problems in remote areas? e.g. turnover, professional isolation, continuing education, career development, etc.

(12) As a final question, what is your general idea of a good communications system for this nursing station? _____

(Do you have any additional comments on this study, or any other aspects of communications at this nursing station? _____

FROBISHER BAY HOSPITAL OPERATOR CHECKLIST

1. Date _____, Time _____
2. Call was incoming ☐ or outgoing ☐
3. Call was from _____, to _____
4. System used HF ☐, Anik ☐
5. Call was: emergency ☐, non-emergency ☐
6. Person calling was: physician ☐ administrator ☐
nurse ☐ other ☐ specify _____
- If unsure of position (above) please give name _____
7. Person requested was: physician ☐ administrator ☐
nurse ☐ other ☐ specify _____
8. Correct person was reached ☐ not reached ☐ reason _____

9. By what means was the correct person reached?
incoming calls: paging ☐ ringing office ☐ other ☐ specify _____
outgoing calls: _____

10. Number of attempts to reach correct person _____
11. Length of time to reach correct person _____ mins.
 If considerable delay, give reason: hop to Ottawa ☐
 local exchange (destination) ☐
 person absent ☐
12. How many calls came in simultaneously? _____
13. Quality/Reliability of call was satisfactory ☐ unsatisfactory ☐

COMMENTS
