

**THE GOVERNMENT OF MANITOBA
AIR AMBULANCE PROGRAM:
AN EVALUATION ASSESSMENT STUDY**

by

Stu Mackay

A Practicum Submitted
In Partial Fulfillment of the
Requirements for the Degree,
Master of Natural Resources Management

Natural Resources Institute
University of Manitoba
Winnipeg, Manitoba
March, 1986



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MASTER OF NATURAL RESOURCES MANAGEMENT

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ABSTRACT

The evaluation assessment study was a planning tool to assist the managers of the new Province of Manitoba Air Ambulance Program in developing an appropriate focus and approach for an evaluation. Its methodology was designed such that the researcher would be working directly and in partnership with a group of identified decision-makers and information users to determine the key evaluation concerns and issues surrounding the program. Evaluation models and options flowed from these concerns and issues and were also formulated in consultation with the decision-makers.

The evaluation concerns were classified into two categories: the first year of operation of the program; and from one to five years of operation. In the shorter term, prioritization (who is using the service, is it being used appropriately) was the most frequently stated concern followed by the level of care (in-flight service to the patients) and the response time (time to mobilize the crews). In the longer term, most people saw their concerns as extensions of the first year's. Other issues that were stressed were: expansion of the program (feeder services); utilization (trends in demand and accessibility); and the level of care (improvement in the health care for the rural communities). The people interviewed also suggested standards of performance for the program and data that would reflect those standards.

The managers of the program, after a review of the findings, directed the study to investigate the use of a microcomputer to fulfill the data storage and analysis functions. The investigation revealed that, due to the limitations imposed by the lack of a microcomputer policy at the Manitoba Health Services Commission and the inexperience of the managers with these machines, only local purchases that could be supported technically and with training should be considered. Eight purchase options were presented which included an analysis of the costs, compatibility with the host, and expandability. Each of the microcomputers, with suitable software packages, would meet the requirements of the program.

ACKNOWLEDGEMENTS

The Bura people of northeast Nigeria, with whom I shared two years of my life, have a saying that is very appropriate for this study. It is - one head cannot carry a roof. In their traditional culture, a man may be able to build the walls of his house by himself and thatch his roof. When it comes time to place the roof on the walls, he will need the cooperation of his neighbours to lift and carry it on their heads to its designated place. The saying holds true for any endeavor and this study also required many heads to carry it through.

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To my wife and best friend, Cindy, must go the bulk of my thanks. Her many hours of proofreading, encouraging, and listening to the typical laments of a graduate student were instrumental in the completion of the work. I dedicate this practicum to her.

CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii

<u>Chapter</u>	<u>page</u>
I. INTRODUCTION	1
Preamble	1
Problem Statement	2
Objectives	3
Organization of Study	4
Delimitations	5
Endnotes	6
II. REVIEW OF RELATED LITERATURE	7
Summary	7
Introduction	8
Historical Overview	9
Present Status	15
Evaluation of Health Programs	23
Air Ambulance in Manitoba	33
Endnotes	37
III. RESEARCH METHODS	42
Summary	42
PHASE 1: Identification of Relevant Decision-Makers	42
PHASE 2: Understanding the Program and Its Environment	43
PHASE 3: Focusing Evaluation Questions and Issues	45
PHASE 4: Determining Evaluation Approaches and Options	46
PHASE 5: Reporting	46
Endnotes	47
IV. PROGRAM EVOLUTION AND DESCRIPTION	48
Summary	48
Introduction	49
Program Evolution	49
Program Description	63

Organization and Responsibilities	68
Communications	69
Staff Training	72
Pre-Hospital Care Medical Advisory Committee	74
Endnotes	76
V. DESCRIPTION AND FINDINGS OF INTERVIEWS	78
Summary	78
Introduction	79
Description of the Responses	81
First Year of Operation	82
One to Five Years of Operation	85
Standards	87
Data	89
Audit	91
VI. MICROCOMPUTER APPLICABILITY	93
Summary	93
August 07 Meeting	94
Clarification of Essential Data	98
Identification of Systems and Components	100
IBM PC/XT	103
Compaq DeskPro, Compaq Plus	104
IBM 3270 PC/XT	105
IBM PC/AT	106
Compaq DeskPro 286, Portable 286	107
IBM 3270 PC/AT	107
Costs	109
Applicability	111
Endnotes	116
VII. CONCLUSIONS AND RECOMMENDATIONS	117
Conclusions	117
General Conclusions	117
Identify Relevant Decision-Makers	118
Develop an Understanding of the Program	119
Determine Program-Specific Evaluation Concerns	121
Review Previous Evaluation Studies	122
Possible Evaluation Approaches and Options	123
Recommendations	123
Limitations	125
Areas of Further Research	126
LITERATURE CITED	128

<u>Appendix</u>	<u>page</u>
A. GLOSSARY OF TERMS	134
Endnotes	137
B. QUESTIONNAIRE AND INTERVIEW GUIDE	139
C. MEDICAL ADVISORY COMMITTEE	148
D. SYNOPSES OF INTERVIEWS	149

LIST OF TABLES

<u>Table</u>	<u>page</u>
1. Alternative Approaches to Evaluation	19
2. Representative Types of Evaluations	22
3. Guidelines for Categorization and Priorization	65
4. Manitoba Airstrips By Location and Service Classification	66
5. List of Concerns	81
6. Suggested Standards	88
7. Essential Data	99
8. Summary of System Features and Costs	108
9. Threats To Validity	114

LIST OF FIGURES

<u>Figure</u>	<u>page</u>
1. Program Evolution Time Line	50
2. Location of Health Facilities in Manitoba	67
3. Communications Lines and Interactions	71
4. Methods of Interviewing	80
5. Occupations of Persons Interviewed	80
6. First Year Concerns versus Total Responses	84
7. First Year Concerns versus MHSC and Non-MHSC Responses	84
8. One To Five Year Concerns versus Total Responses	86
9. One To Five Year Concerns versus MHSC and Non- MHSC Responses	87
10. Model of Program Evaluation	95

Chapter I

INTRODUCTION

1.1 PREAMBLE

Air ambulance services form a part of an evolving and complex health care system and they must be viewed within this context. Since the mid-1940s, the development of health care policy and programs has been marked by the consolidation of a dominant government role and by the progress made at both the federal and provincial levels in establishing a wide range of services[1]. Federal legislation, embodied in the Hospital Insurance and Diagnostic Services Act of 1957 and the Medical Care Act of 1966-67, which was closely followed and, in some cases, preceded by similar legislation provincially, allowed for substantial public expenditures to be directed towards health care. By the 1970s, the spiraling costs of maintaining and expanding these services lead to a reassessment of the system. Several studies and inquiries were launched in an attempt to find ways to restrain the escalating costs without reducing the quality and effectiveness of health care[2]. A trend towards the reorganization and de-centralization of health services to a regional level began[3]. Specialized services, such as acute-treatment hospitals, were centralized to

serve as referral centres for a number of smaller regional or community health units. Air ambulance services became one means of providing the link between the regional units and the specialized centres.

1.2 PROBLEM STATEMENT

In December 1985, the Manitoba Government through the Department of Rural Health Facilities and Ambulance Services of the Manitoba Health Services Commission (MHSC) inaugurated a province-wide, dedicated air ambulance service. The program reflects a significant and sophisticated attempt to improve the quality of health care for all the people of Manitoba. It requires substantial public expenditure which, in the present economic environment of restraint, will have to be justified to a tax-conscious electorate. A program evaluation will be necessary to provide the responsible manager(s) with a system for the gathering of verifiable evidence of the program's results and cost-effectiveness. Its purpose will be to produce credible, timely, useful, and objective findings appropriate for resource allocation, program improvement, and accountability.

Evaluation studies can be costly in terms of both financial and human resources and, unless they are properly planned, can have little resulting value to the responsible manager(s). Services, such as the Air Ambulance Program,

impact on a wide spectrum of health and community groups, each with their own expectations of its worth. Failure to take into account their interests may deter from the effectiveness and usefulness of the evaluation. New programs may also have difficulty establishing acceptable standards and indicators of those standards which are necessary for evaluation. These again may depend on the perceptions and expectations of the affected communities. The assessment study overcame some of these difficulties by assessing the merits of the various evaluation approaches and methods in meeting the identified evaluation issues and needs of the decision-makers.

1.3 OBJECTIVES

The purpose of the evaluation assessment study was to develop for the MHSC an appropriate focus and approach for an evaluation study. Objectives were to:

- identify the relevant decision-makers and information users of an evaluation study;
- develop an understanding of the rationale and structure of the present air ambulance program and the environment in which it is operating;
- determine the program-specific evaluation issues and questions which could be examined in the evaluation study;
- review previous evaluation studies carried out on similar air ambulance programs;
- determine, analyze, and cost the possible evaluation approaches and options available for carrying out an evaluation study based on the identified issues;

- formulate recommendations on the viability of these options; and
- report the findings and recommendations of the assessment study to the MHSC.

1.4 ORGANIZATION OF STUDY

A review of the related literature contained in Chapter 2 assists in setting the framework for the study and provides the necessary background for the readers. A historical overview of evaluation research is presented; followed by a synopsis of the present status. A description of specific problems encountered by health care program evaluations is included and the chapter concludes with an overview of the development of air ambulance services in the province.

The study was conducted in five phases. Each was self-contained and required completion prior to the commencement of the next phase. Intensive interviewing, a questionnaire, document analysis, and transient observation were the primary methods. Two summary reports were prepared as the study progressed; one at the end of Phase 2 and the other after Phase 4. These phases and the research methods by which the study was conducted are detailed in Chapter 3.

Chapter 4 outlines the Air Ambulance Program's evolution and description as documented in the program files and as described by the key individuals during the interviews. This is followed, in Chapter 5, by a summary of the evalua-

tion questions, concerns, and issues raised by the people interviewed. The suggested program standards and the data that would reflect those standards are also outlined. These results were presented to a meeting of the decision-makers of the Air Ambulance Program. Chapter 6 describes the results of that meeting and the subsequent investigation into the applicability of a microcomputer to handle the data collection needs of the program. The study's conclusions and recommendations are contained in Chapter 7.

1.5 DELIMITATIONS

It is important to note that the assessment study was not an evaluation. The data collected was not used to make judgements on the program's personnel, activities, or outcomes. It was used to assess the feasibility of various evaluation approaches and methods in meeting the informational needs of the decision-makers.

1.6 ENDNOTES

- [1] C.S. Meilicke and J.L. Storch, eds., "Introduction: A Historical Framework", in Perspectives of Canadian Health and Social Services Policy: History and Emerging Trends (Ann Arbor, Michigan: Health Administration Press, 1980), p. 8.
- [2] P. Aucoin, "Federal Health Care Policy", Issues in Canadian Public Policy, eds., G.B. Doern and V.S. Wilson (Toronto: Macmillan Company of Canada Limited, 1974), p. 71.
- [3] R.F. White, "The Administration Component in Canadian Health Services: A Comparative View", in Perspectives on Canadian Health and Social Services Policy: History and Emerging Trends (Ann Arbor, Michigan: Health Administration Press, 1980), p. 499.

Chapter II

REVIEW OF RELATED LITERATURE

2.1 SUMMARY

The literature reveals that evaluation research is a relatively new field and that it is just beginning to define its boundaries and standards. Utility appears to be the primary objective and the models and methodologies that accentuate this are seen as being appropriate. With the wide variety of selection, it is important to understand the decision-maker's informational needs in order to choose an approach that will maximize the usefulness of the evaluation.

Health care evaluations have generally been orientated towards the measurement of health services and comparing their delivery to empirical or normative standards. These standards have an impact on the inputs of the service, the process by which it is delivered, and the outcomes of the intervention. The lack of such standards for the air ambulance services has hindered the evaluation of those services. Most programs have documented their inputs and their outcomes, but few have specifically reviewed the quantity and quality of care delivered.

It is very evident that the majority of the literature originates in the United States with some articles from Europe. Readings on the Canadian situation are extremely limited. Although the trends in each country can be considered to be the same, there have been significant incidences in Canada, i.e., the introduction of medicare, that distinguish it from the southern neighbour.

2.2 INTRODUCTION

To understand the rationale for the study and to clarify the approach by which it was carried out, a review of the related literature is required. This assists in setting the framework for the study and provides the necessary background for the readers.

The chapter begins with a brief historical overview of the development of evaluation research. It concentrates on the societal conditions which provided the impetus for the growth of the field and the major issues and debates that evolved. A synopsis of its present status is then presented, followed by an analysis of the standards, methods, and alternative evaluation models currently being practised.

The fourth section is dedicated to describing some of the specific problems encountered in health care program evaluations. Following this, an overview of the development of the air ambulance services in Manitoba is given to help set the context of the study.

2.3 HISTORICAL OVERVIEW

A historical perspective on the development of evaluation research assists in clarifying the present status of the field and gives a background to the current issues and debates.

Rossi and Freeman indicate that, at the turn of the century, the efforts to provide literacy and occupational training and to reduce mortality and morbidity from infectious diseases were a beginning for evaluation research[1]. Attempts were also made during the 1920's and the 1930's to use empirical research methods to determine the effects of programs of directed social change in a variety of settings. The increase in government intervention in society through the "New Deal" brought forward the first concerns for "experimental evaluation"[2] from some academic sources. There were a number of precedents for advocating the application of rigorous social research methods to the assessment of programs. Some of the seminal studies included: Dodd's water boiling experiment, Lewin's field studies, Lippett and White's work on democratic and authoritarian leadership, and the Westinghouse Electric study[3]. Stouffer and associates' work on the "American Soldier" applied research program during the war is also quoted in many sources as a major contribution to the field[4].

The immediate post-war period saw massive inputs of resources into unattended problems and unmet needs such as urban development, technological and cultural education, and preventative health. There were also major contributions to international programs of family planning, health and nutrition, and rural development. By the 1950's, Freeman states that large scale evaluation programs were commonplace in Europe and the United States[5]. Caro sites major contributions made by Lewin and Riecken during this period[6]. Rossi et al. also note that family planning programs in Asia and nutrition and health care programs in Latin America had evaluation components.

The rediscovery of poverty and related domestic issues in the early 1960's led to a renewed interest in evaluation research. Growing critiques of the American school system after the launching of Sputnik in 1957 and of the health delivery system provided an impetus for the federal government to become heavily involved in improving society through the use of evaluations. These program evaluations were characterized by large-scale, quantitative, nationwide forms of research. Brewer indicates that the research was initially conceived as a field of applied methodology and reflected the predilections of the parent disciplines[7]. "The premises and standards of evaluation research could scarcely be differentiated from those of basic researchers in the traditional social and behavioral sciences." [8] Technical quality

and accuracy were the primary concerns and methodological rigor was the dominant criteria by which evaluations were judged. Experimental design which adhered to well-accepted scientific principles for ensuring validity of conclusions and the elimination of rival explanations of observed findings was the main approach taken[9]. Brewer indicates that the field grew rapidly from this point and the related papers and books increased dramatically. By the late 1960's, Freeman describes evaluation research as a "growth industry." [10]

Also by the late 1960's, it had become apparent that the intervention of the social scientists into the arena of social programming would not alone be enough to solve the problems. Coupled with the rising costs of the Vietnam War, increasing inflation, and mounting taxes, the government expenditures on social programs came under the scrutiny of the public. There grew a demand for more government accountability over these expenditures. A further requirement for evaluation research grew as a result of the political response to this perceived demand and to provide an alternative approach to judging programs[11].

The 1970's ushered in the evolution of a separate specialization. Textbooks, anthologies, journals, handbooks, and societies were formed which further increased the rate of growth of the field. Some of the major contributions

were textbooks by Suchman and Wiess; critiques by Bernstein and Freeman; and discussions of the organizational and structural constraints that limit the successful conduct of evaluation research by Riecken and Boruch, and Wholey et al. There was also a proliferation of new methodological models as tension grew between "the scientific "respectability" and policy relevance of research." [12] The role of evaluation research was expanded to cover, not only the knowledge of results, but also political and managerial activities where research data might be informative and useful [13]. Some examples of the new direction include: needs assessments which describe the extent and distribution of a given social problem; policy oriented research which is concerned with those causes that might be amenable to changes in public policy; feasibility studies which are designed to assess whether or how a program can be implemented or delivered with various organizational contexts; and cost-benefit analyses which describe whether a program has had an effect and what is the size of the effect [14]. With the change in roles, different research designs developed. These reflected both the different disciplinary backgrounds of the researchers and the disagreements about the goals and purposes of the evaluation.

One major issue that arose was the non-utilization of the findings of the evaluation studies. Patton quotes from a number of sources which exemplify the problem [15]. Some of these are:

"Producing data is one thing! Getting it used is quite another." [16]

"The literature is unanimous in announcing the general failure of evaluation to affect decision-making in a significant way." [17]

"Evaluation research is meant for immediate and direct use in improving the quality of social programming. Yet a review of evaluation experience suggests that evaluation results have not exerted significant influence on program decisions." [18]

Decision-makers lamented the disappointing results of evaluation research, complaining that the findings did not tell them what they needed to know, while evaluators protested that the results were being ignored.

The principle methodological tool used in evaluations at that time, the quantitative experimental method, also came under criticism. Reichardt and Cook state that the debate was not merely a disagreement over the relative advantages and disadvantages of each method, but a fundamental clash between methodological paradigms [19]. The quantitative paradigm was said to be positivistic, hypothetico-deductive, particularistic, objective, outcome-oriented, and a natural science world view. The data produced was considered "hard" and replicable and from which generalizations could be made. Some examples would be statistical analysis, experimental design, and survey research. The qualitative paradigm was said to subscribe to a phenomenological, inductive, holistic, subjective, process-oriented, and social anthropological world view. The data has been described as "rich" and

"deep" and oriented towards a single case study. Some examples were interviews, detailed descriptions, and field notes. There were two basic assumptions upon which the debate over the methods revolved. It was assumed that a method type was irrevocably linked to a paradigm so that an allegiance to a paradigm provided the appropriate and sole means of choosing between method types. Secondly, the quantitative and qualitative paradigms were assumed to be rigid and fixed, and the choice between them was assumed to be the only choice available[20].

As well as the concerns over the non-utilization of findings and the methodological designs, Rutman describes the issue of the misuse of evaluations. He states that they have been used for covert purposes such as justifying weak programs, covering up program failures, purposefully destroying a program, using evaluation as a gesture of objectivity, and delaying immediate action by pretending to wait for the facts[21]. Other issues to emerge were related to the above and included debates over science versus policy, evaluation versus accountability, large-scale versus small-scale efforts, and internal versus external evaluations[22].

Freeman links the emergence of evaluation to a revised outlook on social responsibility by the members of society and the expanded role of government and international groups in dealing with the improvement of the human condition[23].

The successes and failures of the 60's enabled two important lessons of the 70's to surface. "First, the fact that there is not enough money to do all the things that need doing, and, secondly, the realization that even if there was enough money, it takes more than money to solve complex human and social problems." [24] Underlying these lessons was the belief that most human resource, health improvement, and social development programs had been "misguided, misconceived, badly implemented, and ineffective." [25] The challenge of evaluation was to provide policy-makers, social planners, and the public with a system of determining the consequences of efforts at planned social change and social intervention so they could be judged and improved.

2.4 PRESENT STATUS

Freeman and Solomon indicate that, as the field has grown and its visibility and scope have increased, concern for the purposes and utility of the effort have preoccupied evaluators [26]. The concern for relevance and applicability is related to widespread efforts to identify the appropriate questions, performance criteria, and strategies for evaluation.

The Federal Government of Canada has also perceived the need for greater utilization of evaluations. In 1981, it released a set of guidelines for evaluations through the Of-

office of the Comptroller General. These guidelines stated that the nature and content of evaluations had evolved from focusing mainly on the resources used by a program to examining how the resources are used, the purposes of programs, and their impact and effects on society[27]. The growth of both the number and complexity of government programs has meant an increased need for relevant and objective information in order to improve policy decisions. Evaluation is viewed primarily as an aid to decision-makers and management. It is seen as an input into a complex, interactive process with the goal of producing objective but not necessarily conclusive evidence on the results of a program.

The variations in the approaches, purposes, and goals of evaluation pointed to the need for a set of standards for the field. The Joint Committee of Standards for Education, through a comprehensive effort over a five year period, produced the following four criteria: utility, feasibility, propriety, and accuracy[28]. The utility standard is intended to ensure that an evaluation will serve the practical information needs of the decision-maker. If it does not fulfill this task, the evaluation has failed. To achieve this, the affected decision-maker should be identified and their concerns noted. The information collected should be of such a scope and selected in such a manner as to address particular questions about the object of the evaluation and be responsive to the needs and interests of the decision-

makers. By feasibility, the Committee means that the evaluation ought to be practical. It should disturb the on-going program as little as possible while obtaining the needed information. It should also be politically sophisticated in that it should be planned and conducted with the anticipation of action by various interest groups so that possible attempts, by any of these groups, to curtail the evaluation and to bias or misapply the results can be averted or counteracted. The evaluation should cost a reasonable amount and be cost effective. Propriety standards are intended to ensure that an evaluation will be conducted legally, ethically, and with due regard for the welfare of those involved. The Committee recommends that a formal obligation should be agreed to in writing so that all parties are obligated to adhere to all conditions of the agreement or formally renegotiate it. The last standard and priority refers to the accuracy or reliability of the information. The Committee did not enter the quantitative or qualitative debate. It recognized that either approach is valid as long as it is appropriately used and the data is systematically analyzed to ensure supportable interpretations.

It is important to note that the Committee listed the standards in order of priority. Utilization was seen to be the predominant factor in evaluations. This is in distinct contrast to earlier evaluation research practices or traditional research where the scientist (researcher) produced

information and others used it. Under the Committee's code, evaluators have the responsibility for what information is produced and how it is used by conceptualizing and constructing evaluations that build in utility and practicality. To understand how these priorities can effect an evaluation, a review of the present models and types of evaluations will be useful.

The multitude of evaluation models and methodologies has required researchers in the field to develop systems for understanding and categorizing them. Stufflebean and Webster have attempted to do this by developing a system which categorizes thirteen types of evaluation into three primary models[29]. The first of these models is the political approach which promotes a positive or negative view of a program irrespective of its worth. Study types include politically controlled studies and public relations inspired studies. Their purposes are to acquire, maintain, or increase a sphere of influence, power, or money; or to create a positive public image for a program.

The second model is a question-oriented approach, sometimes titled a quasi-evaluation approach. It addresses specific questions whose answers may or may not assess a program's worth. Table 1 summarizes the five study types grouped under this model. The last model, a values-oriented approach, is primarily designed to assess a program's worth.

Table 1 also summarizes the six study types given under this approach.

TABLE 1

Alternative Approaches to Evaluation

QUESTION-ORIENTATED APPROACHES		
TYPE OF STUDY	PURPOSE	TYPICAL METHODS
1. Objective-based	to relate outcomes to objectives	analysis of performance data relative to specific objectives
2. Accountability	to provide constituents with accurate accounting of results	auditing procedures and mandated testing programs
3. Experimental research	to determine casual relationships between independent and dependent variables	experimental design and quasi-experimental design
4. Testing program	to test performance of selected groups to set norms	selecting, administrating, scoring, and reporting standardized tests
5. Management information system	to continuously supply the information needed to fund, direct, and control programs	systems analysis, PERT, PPBS, computer-based information systems, and cost analysis
VALUES-ORIENTATED APPROACHES		
1. Accreditation/certification guidelines	to determine whether institutions programs and personnel should be approved to perform specified functions	self study and visits by experts panels to assess performance in relation to specified guidelines
2. Policy	to identify and assess the potential costs and benefits of competing policies for a given program	Delpi, experimental and quasi-experimental design, scenarios, forecasting and judicial proceedings
3. Decision-orientated	to provide a knowledge and value base for making and defending decisions	surveys, needs assessment, case studies, advocate teams, observations, and experimental and quasi-experimental design
4. Consumer-orientated	to judge the relative merits of alternative goods and services	goal-free evaluation, needs assessment, cost analysis, experimental and quasi-experimental design
5. Client-centered	to foster understanding of activities and how they are valued in a given setting and from a variety of perspectives	case studies, adversary reports, responsive evaluation
6. Connoisseur-orientated	to critically describe, appraise, and illuminate program	systematic use of refined perceptual sensitivities and various ways of conveying meaning

These categories are useful in that they attempt to bring some order to the field but they are not widely accepted. Other modelling schemes have been forwarded. The National Academy of Science delineates slightly different purposes to be served by evaluation. They include: (1) needs assessment, (2) basic research, (3) small-scale testing, (4) field evaluation, (5) policy analysis, (6) fiscal accountability, (7) coverage accountability, (8) impact assessment, and (9) economic analysis[30]. Patton lists six other categories defined by both the purpose of the evaluation effort and by the kinds of activities that tend to be stressed[31]. These were developed by the Evaluation Research Society Standards Committee and include:

1. Front-end analysis (preinstallation, context, feasibility analysis).

These types of evaluations take place prior to installation of a program to provide guidance in planning and implementing the program as well as deciding if the program should be implemented.

2. Evaluability assessment.

This type of evaluation work includes activities aimed at assessing the feasibility of various evaluation approaches and methods. The scope of the evaluation, technical matters, design limitations, and cost parameters are established prior to undertaking a more formal evaluation.

3. Formative evaluation (developmental, process).

These evaluations are aimed at providing information for program improvement, modification, and management.

4. Impact evaluation (summative, outcome, effectiveness).

These are aimed at determining program results and effects, especially for the purposes of making major decisions about program continuation, expansion, reduction, and funding.

5. Program monitoring.

The kinds of activities involved in these evaluations vary widely from periodic checks of compliance with policy to relatively straightforward tracking of services delivered and counting of clients.

6. Evaluation of evaluation (secondary evaluation, meta-evaluation, evaluation audit).

This category includes professional critiques of evaluation reports, reanalysis of data, and external reviews of internal evaluations.

Within each of the models, and at times cutting across their artificial boundaries, are numerous types of specific evaluations. Only a selected few are listed in Table 2.

Although the list is only representative of the many types of evaluations presented in the literature, it does reflect the complexity and diversity of the field. With such a wide choice of designs and given the concerns discussed previously, a pre-evaluation or an evaluation assessment study approach has been advocated. It considers such factors as the program's characteristics, currently available research methodologies, and the constraints that inevitably affect the implementation of a desired evaluation method. "The failure to address the problem of program design and implementation before conducting a program evaluation can limit the usefulness of a study's findings." [32]

TABLE 2
Representative Types of Evaluations

Accreditation	Does the program meet minimum standards for accreditation or licensing?
Cost/benefit analysis	What is the relationship between program costs and program outcomes (benefits) expressed in dollars?
Cost-effectiveness	What is the relationship between program costs and outcomes where outcomes are not measured in dollars?
Descriptive	What happens in the program? No "why" questions or cause/effect analyses.
Effectiveness	To what extent is the program effective in attaining its goals.
Efficiency	Can inputs be reduced and still obtain the same level of output or can greater output be obtained with no increase in inputs?
Formative	How can the program be improved?
Goal-free	What are the actual effects of the program on clients without regard to what staff say they want to accomplish?
Impact	What are the direct and indirect program effects on the larger community of which it is a part?
Outcomes	To what extent are the desired client outcomes being attained? What are the effects of the program on clients?
Personnel	How effective are staff in carrying out their assigned tasks and in accomplishing their individual goals?
Process	What are the strengths and weaknesses of day-to-day operations? How are the program processes perceived by staff, clients, and others? How can these processes be improved?
Quality assurance	Are minimum and accepted standards of care being routinely and systematically provided to patients? How can quality of care be monitored and demonstrated?
Summative	Should the program be continued? If so, at what level?
Systems analysis	What are the available alternatives and, given those alternatives, what is the optimum way to do the program?
Utilization-focused	What information is needed and wanted by decision-makers, information users, and stakeholders that will actually be used for program improvement and to make decisions about the program?

2.5 EVALUATION OF HEALTH PROGRAMS

Evaluations in health care have had similar successes and failures as described in the preceding chapter. The growth can also be linked to a greater public concern for health which has been manifested in an expanding government contribution to the payment of health services and medical care costs. With these rising expenditures has come the increasing demand for the rationalization of them and the increased role of evaluation[33]. As with evaluations in the other fields, there has been considerable debate over the non-utilization of evaluation results, the types of evaluation models, and the appropriate methodologies.

Blaxall describes four basic reasons why evaluation research had been of limited utility to the Office on Management and Budget over the period of time she worked there[34]. The first reason was the lack of accepted criteria for measuring health status. Secondly, there was the difficulty of measuring the impact of non-health care factors on health status. Thirdly, much evaluation research in health was self-serving and concerned only with measuring inputs, not the quality of a program or its impact and, lastly, the results arrived too late. The objectives had changed before the evaluation of the old objectives could be completed and, often, the research results were not in line with the policy or political ideology and were therefore ig-

nored. She states that more useful results might have been obtained if evaluation techniques had been built into the program to begin with and modified as the program goals were modified. Blaxall concludes that there is a need for better basic and applied research on defining health status and how to measure it; to identify the thresholds where additional amounts of health care services do not make any difference on health status; and for policy makers and evaluators to work together to design experiments and use information as it becomes available.

Thorner also defines the problem of non-utilization in terms of the non-availability of data when decision-makers need it[35]. The problem, he states, stems from our initial hypothesis of health evaluation. Most health and medical care programs are predicated on the assumption that the level of health is related to the level of effort expended in providing health services. It can be expressed as the following formula:

$$H = f(H_s)$$

where health, H , is a function of health services, (H_s) . H is usually seen as the end result while H_s is the program activity. It is considered desirable to know whether: 1) inputs of H_s result in an increased output of H ; and 2) there are increasing or decreasing increments of units of H with additional (marginal) inputs of H_s . The problem is finding the appropriate quantitative measures for the inputs

and outputs. He concludes that these are generally not available so alternative measures must be used. The first alternative is to study Hs only by assuming H to be beneficial and that it results from the appropriate process or activity. Evaluation then becomes a matter of measuring the quality or the appropriateness or both. These usually entail establishing standards of performance and measuring adherence or conformity to them. The standards can be empirical (derived from actual practice) or normative (derived from sources that set standards of knowledge and practice in the medical care system). The second alternative is the substitution of intermediate goals that are more amenable to measurement. These could be improvement in health knowledge, health attitudes, or health behavior. The third alternative, and the concept most commonly used, is to substitute a negative measure for H, such as mortality, morbidity, or disability.

Thorner also points out that the change in health is not just a function of health services but is also influenced by such factors as education, economics, environment, politics, and many more. The problems of health care evaluations are then not just ones of finding suitable measurements of inputs and outputs or their alternatives, but also in isolating the effects from extraneous factors. He concludes that studies of outcome or effectiveness of health programs are generally too complex and beyond the capabilities and inter-

ests of most persons directing health programs. Evaluations will be more useful if confined to quality control types based on process and intermediate goals. This implies that the decision-maker be willing to accept the premise that a properly conducted program ultimately does have a beneficial effect on health[36].

Relating the above directly to ambulatory health care, Christoffel and Loewenthal state a set of criteria for a methodology to measure the quality of health care. It should measure what happens to the patient; it should be relatively simple, timely, inexpensive to apply; and it should not disrupt the medical program. Further, it should be consistent and objective so that it can be applied repeatedly using the same ground rules and it should be widely accepted by the medical community[37].

The authors suggest three approaches for implementing a quality of care system. The first is called a structural or input study. It focuses on the quality and quantity of resources, i.e., the input of personnel, equipment, and facilities. This type, according to the authors, has not been used extensively and they could not document any meaningful and consistent correlations between input measures and the quality of care as assessed through direct observation[38]. The second is called a process study and involves an assessment of how resources are used as evidenced in patient re-

cords, record abstracts, encounter forms, and direct observation. This kind of review is most objective if standards of care are defined prior to the review. The last approach, outcome studies, involves an assessment of the end result of care. Measures most commonly used include mortality, disability, length of stay in hospital, ill health and complications of disease or treatment. Other measures such as satisfaction of the patient, adjustment, functional status, and change in expected life span have also been developed. The authors conclude, though, that outcomes evaluation in the ambulatory setting are not well enough established to provide real insight into feasibility and effectiveness[39].

The lack of standards and regulations with regard to air ambulance care has been one of the major impediments to effective evaluations. Gibbons traces a brief history of attempts to formulate nationwide standards through federal agencies in the United States and their failure to have any effect. As of 1984, only seven States had regulations and only two had guidelines[40]. The National Highway Traffic Safety Administration of the U.S. Dept. of Transportation is in the process of preparing new guidelines for air ambulances but the author concludes that these, again, may not be effective. He states that regulations and standards will continue to be developed slowly on a state-by-state basis and it will be public pressure, through litigation, that will force their implementation[41].

The Committee on Trauma of the American College of Surgeons has tried to address the problem of standards for air ambulances. They have developed seven minimum requirements which should be considered when moving critically ill or injured patients by air[42]. Their list covers the type of vehicles (sufficient space to accommodate at least 2 trained medical persons and at least 2 litter patients); the skill level of the personnel (physician, registered nurse or emergency medical technician); equipment and supplies to be carried (to meet the needs of an emergency patient both at the scene and during transport); radio capability (ground-to-air, air-to-air, and air-to-ground); the survival equipment; and the minimum data recordings of the medical aspects of the flight (reasons for air evacuation, agency requesting the transport, patient's condition before, during, and at the termination of the flight, therapy administered, and the mode of injury plus an injury severity index).

Poulton confirms that there are virtually no federal regulations governing air ambulances and that this has had a negative effect on evaluations[43]. He states that there have been no studies that have looked at the level of training of attendants or the sophistication of monitoring equipment onboard as determinants of patient outcomes. In the article, he outlines the American Society of Hospital-Based Emergency Air Medical Services (ASHBEAMS) standards for the type of equipment. These include airway management equip-

ment (oxygen, suction, intubation, ventilation); cardiac monitor/defibrillator; advanced cardiac life support drugs and therapeutic modalities; and advanced trauma life support treatment modalities. The author concludes that the trend is towards air ambulances that are more an arm of the hospital rather than simply a conveyance to get the patient to the hospital. Although equipment standards would be helpful, "advanced training of emergency/critical care nurses and paramedics is probably far more important in providing the highest level of care possible than the hardware carried by the aircraft." [44]

Cowart, in her article, outlines some guidelines for patient air transport drafted by Champion and Mattox [45]. They suggested that the guidelines be based on medical criteria and that the decision to use the air ambulance be made with explicit physician involvement. Other suggestions included: the integration of air ambulances into the regional emergency medical services system; the designation of a vehicle specifically for air ambulance activities, i.e., not a multipurpose craft; this vehicle be equipped and staffed to provide advanced life support and have a designated medical director; and that it be deployed to the scene of an accident based on assessment of potential need.

A nationwide survey of civilian air ambulance services by Thomas et al., recommended that air ambulance regulations be

directed at the levels of patient care[46]. They found that hospital air ambulances were better suited for transporting critically-ill patients while many private air ambulances appeared better suited to transporting non-emergency patients. Also, hospital-affiliated air ambulances, although not as consistent in providing the specialized care of hospital air ambulances, appear better able to provide critical care than private air ambulances.

Most of the evaluations of air ambulance services described in the literature have concentrated on either the structural or input study type or the outcome study type. Mayer and Walker conducted a study to clarify if air transport would reduce the mortality of pediatric patients over ground transport[47]. Their results were inconclusive. A similar study was done by Harless et al. on adults with acute respiratory failure[48]. They concluded that a well-equipped and well-trained team of physicians and nurses can successfully transport patients with severe respiratory failure, after adequate stabilization, over distances of hundreds of kilometers, by ground or air. It was uncertain, though, if the air transport was more effective. Baxt and Moody conducted a study of the mortality of 150 consecutive trauma patients treated at the site and transported to a trauma centre by standard land pre-hospital care and the mortality of 150 consecutive trauma patients transported to the same trauma centre by rotocraft. They concluded that

there was a 52% reduction in the predicted mortality of the aeromedical group[49]. In a later publication, Baxt noted that the major improvement in the survivability occurred in the more severe classification groups which constituted less than 10% of all the injured patients brought to the medical centre. He also stated that the decrease in mortality could not be contributed to the helicopter alone as putting the same physician and nurse in a ground ambulance might afford similar improvements[50].

There are examples in the literature of studies that combined both input and output analysis. Calvert reviewed the Scottish air ambulance service over a five year period based on the ambulance call rate, the type of case carried, the time taken by the service to respond, and the mortality figures[51]. Duke and Clarke describe the effects of a hospital-based air transport service in Houston. They compared the total flights to the type of emergency and the percentage of emergency trauma patients versus the mortalities[52]. Marshall Macklin and Monaghan Limited reviewed the Northern Ontario Air Ambulance Services and produced, in substantial detail, a description of the inputs and outputs over a one year period. The study concentrated on the type of patient transfers, aircraft usage and costs, and the management system[53]. Some process analysis was done through the monitoring of patient complaints and newspaper clippings and by documenting the concerns raised by the users of the system

(doctors, nurses, hospitals)[54]. An extensive study of the Aeromedical Evacuation System of the United States Air Force is described by McCann et al. The study incorporates all three of the study types listed above. A team of experts flew in excess of 100,000 miles and observed many thousand patients both in the air and on the ground. They concluded that this system can improve the capability of bringing treatment to the patient rather than merely moving the untreated ill to a facility for treatment[55]. These results have been affirmed in the West German regional trauma care system which relies primarily on the use of helicopters[56]. LaGreca et al. in an article describing the University of Michigan Medical Centre's hospital-based helicopter service, outlines a process evaluation that they have implemented[57]. A critical component is peer evaluation. Individual cases are medically reviewed at weekly rounds followed by recommendations for future medical management. A separate peer review has been established to determine the appropriateness of each transfer using both subjective criteria and objective scoring mechanisms. Outcome statistics are also collected. They conclude that the service, with a focus on the provision of tertiary care, the incorporation of medical direction and consultation services, and the support of highly sophisticated equipment, has proven to be dramatically successful.

2.6 AIR AMBULANCE IN MANITOBA

The Province of Manitoba has 102 provincial and federal hospitals[58]. The majority provide only basic emergency medical services, i.e., airway resuscitation, stabilization of shock, and possible immediate management of major body system injuries[59]. There are two tertiary care facilities, both of which are in Winnipeg. For the rural communities to benefit from them, interfacility transfers are required. Virtually all the interfacility transfers from the rural regions located south and west of Lakes Winnipeg and Manitoba are performed by ground transfer. Northern interfacility transfers are primarily by air.

Initially, the air ambulance service was carried out by bush pilots as needed on an ad hoc basis. It was reviewed in 1965 by the Ambulance Service Committee and found to be a satisfactory system[60]. In the early 1970's, a more specific program to assist in the transport of medical patients was established by the Manitoba Government. It was called the Patient Air Transportation Program (PATP) and was administered by the Department of Renewable Resources and Transportation[61]. This was incorporated into the Northern Patient Transport Program (NPTP) in September, 1977. The program subsidizes ground and air transportation costs for emergency and urgent hospital-to-hospital transfers as well as transportation costs for certain elective cases. To be

eligible, a northern patient must require medical transportation from within the areas north of 53° N latitude from the Saskatchewan boundary to Lake Winnipeg and north of 51° N latitude from Lake Winnipeg to the Ontario border. Subsidies for emergency and urgent transfers are administered by the MHSC while transportation subsidies for elective hospital and medical treatment are administered by the local regional authorities[62]. The transfer may be by any mode of transport as determined by the local physician or health worker if no physician is present.

Air travel constitutes over half (55%) of the transportation warrants issued and this percentage has remained relatively constant over the past 5 years[63]. The costs have not had the same consistency. They have risen from \$863,000 in 1978/79 to \$2,200,000 in 1982/83[64]. The increase in the cost of travel and the number of patient warrants issued (9,083 in 1978/79 to 11,576 in 1982/83[65]) were the major reasons for the additional expenditures. Of the 5,936 air warrants issued in 1982/83, 1,586 (27%) were classified as emergency or urgent[66]. Scheduled airlines transported 72% of these, 15% went by special chartered aircraft, and 13% via the Government Air Service aircraft[67].

The NPTP has come under criticism from a number of different groups[68]. Their major points of concern are:

1. lack of medical equipment available on the aircraft utilized[69]

2. inadequacy of available oxygen on commercial aircraft for seriously ill patients[70]
3. extremely restricted conditions due to improper design of the aircraft[71]
4. health personnel involved in patient transfers have not received basic training in aeromedicine[72]
5. subsidized air service is not available to southern communities with the result that ground transport must be used which may take up to 6 hours[73] and
6. ground and air transfers deplete the sending hospital of staff and/or equipment and, in some communities, may also deplete the community of its only ambulance[74].

All the groups have recommended that the government implement a dedicated, province-wide air ambulance service[75].

On July 24, 1984, Treasury Board approved the establishment of an Air Ambulance program to service all of Manitoba[76]. The approval was subject to further review regarding the selection and basing of the aircraft, development of the administration component, identification of equipment, and the proposed operations. An evaluation of the potential aircraft for the long distance transport of acutely sick and injured patients was carried out by the MHSC and the Department of Highways and Transportation (Government Air) resulting in the Cessna Citation "S" II being chosen[77]. Treasury Board has since given its approval for MHSC to enter into a lease to purchase agreement with the Cessna Corporation[78]. On September 3, 1984, the Air Ambulance Coordinator was appointed for the program and consultations with the various interested professional groups were initiated with respect to equipping and operating the aircraft[79].

A more detailed description of the development of the program is contained in Chapter 4. The manner by which this description was compiled and the methods used to conduct the remainder of the study are the focus of the next chapter.

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Chapter III

RESEARCH METHODS

3.1 SUMMARY

The methodology for this study was designed so that the researcher would be working directly and in partnership with the group of identified decision-makers and information users to determine the key issues and questions. Evaluation models and options flowed from these issues and questions and were also formulated in consultation with the decision-makers. This approach was chosen to ensure that the results would have a high degree of utilization by the users. The primary methodological tools used throughout the study were intensive interviewing, a questionnaire, document analysis, and transient observation. The study was broken into five distinct segments, each complete in itself and each requiring completion prior to commencing the next phase.

3.2 PHASE 1: IDENTIFICATION OF RELEVANT DECISION-MAKERS

The identification of relevant decision-makers and information users was required so that they would have the opportunity to become actively involved in shaping the evaluation. Their input was needed in the focusing of meaningful

and appropriate issues. A decision-maker was a person who has an interest or stake in the evaluation findings and utilization. They would either have the authority or power to use the findings or have the ability to influence others who do have such power and authority.

The identification of these individuals was completed at a meeting of the program managers and confirmed at a later meeting with the program director. Various communities that would be affected by the program were listed along with the some of the constraints that would impact on the program. The managers were asked to suggest people who represented these communities and who would be able to comment on the constraints. The communities identified were: medical (both in the remote area, i.e., the referring community, and the tertiary centres, i.e., the receiving facilities); administration; political; and the operators. Some of the constraints listed were: financial, political (policy); legal; ethical; administrative; and technical. A description of the occupations of the people chosen is contained in Chapter 5.

3.3 PHASE 2: UNDERSTANDING THE PROGRAM AND ITS ENVIRONMENT

Following the clarification of the decision-makers and the information users, a brief questionnaire was sent to the identified people (see Appendix B). The questionnaire formed a basis for discussion in the ensuing interviews.

A face-to-face interview format was used. This allowed for complex, open-ended questions to be asked and a high degree of responsiveness to be achieved[1]. A general interview guide approach, which permitted the interviewer the flexibility of wording and sequence but ensured that specific topics and subjects were covered, was the interview method[2]. The interview guide that was used can be found in Appendix B. Generally, the whole guide was followed when interviewing the MHSC staff while only the section on the program concerns was used for the non-MHSC personnel.

At the beginning of each interview, the person(s) interviewed was asked if the session could be recorded. It was explained that this would assist in accurately reporting their views and that their responses would remain confidential in the sense that no one's name would be attributed to specific concerns. All but two sessions were taped. After each interview, a synopsis of the discussion was prepared and sent back to the person(s). They were asked to verify that the summary was an accurate description of their views and concerns and, if not, to make any corrections. The confirmed and/or corrected versions were then returned to the researcher via a pre-stamped, self-addressed, enclosed envelope. This procedure was adopted to ensure the accuracy of the data collected and to limit any personal bias of the interviewer. Appendix D contains the confirmed/corrected synopses.

A program description was also developed through interviewing, documentation analysis, and transient observation. The use of more than one data collection method allowed the information to be cross-checked from a number of different perspectives. This form of "triangulation of methods", along with feedback from the key decision-makers, also highlighted any research biases[3]. Relevant data that assisted in understanding the nature of the program and how it will work in practice was collected. It included five basic dimensions: organization and political setting, essential program features, key individuals, program evolution, and program standards. This description is contained in Chapter 4.

3.4 PHASE 3: FOCUSING EVALUATION QUESTIONS AND ISSUES

Once a basic understanding of the program had been achieved and each of the identified decision-makers interviewed, a summary report of the findings was forwarded to the program director. The report briefly described the development of the program and the pertinent issues facing the various decision-makers. After the review, the report was circulated to the program managers.

A meeting of the program director and managers, along with the Associate Executive Directors of the MHSC, was then held. Its purpose was to review the findings to date and to determine the most useful and pertinent issues upon which

the study should concentrate its attention. At the meeting, a model depicting the levels of evaluative activity in a health organization was presented. This was done to assist the decision-makers in placing the findings to date in some perspective. A description of the model and the results of the meeting are examined in Chapter 6.

3.5 PHASE 4: DETERMINING EVALUATION APPROACHES AND OPTIONS

The decision-makers at the MHSC identified data collection as their major concern and directed the study to investigate the applicability of a microcomputer to fulfill this task. Prior to examining specific computer systems, the essential data requirements for the program were reviewed with the managers. The primary methods used in this investigation were: interviews; demonstrations of systems; and a literature search. Chapter 6 contains the results of this investigation.

3.6 PHASE 5: REPORTING

Two interim reports were prepared as the study progressed. These reports were delivered to the program director and the managers. This enabled them to review the findings and to suggest changes or new directions for the study that would enhance its utility.

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Chapter IV

PROGRAM EVOLUTION AND DESCRIPTION

4.1 SUMMARY

A review of the program's evolution revealed that the problems of air transportation of patients from the rural areas of Manitoba were well known and documented at the MHSC. A number of submissions and proposals had been received from internal investigations and external organizations.

The new program is designed to meet three areas of need: expansion of the transportation phase of the High Risk Neonate Program; emergency medical patient transport for the North; and emergency medical patient transport for other areas of the Province. This will be accomplished through the use of four components: a specifically designed and equipped aircraft (Cessna Citation "S" II); central coordination and dispatch; trained staff (6 flight nurses, 10 pilots, specialty teams); and central authority (Program Manager, Medical Director, Advisory Committee).

4.2 INTRODUCTION

This chapter outlines the Air Ambulance Program's evolution and description as documented in the program files and as described by the key individuals during the interviews. The description of the evolution starts in 1983. This date was chosen as the beginning point because the program files are relatively complete from this time on. It should be noted that the program was not operational until December 1985. The description was as of July 1985 and, therefore, there may be some aspects of the program that are not listed since they were incorporated after the completion of the research.

4.3 PROGRAM EVOLUTION

Figure 1 shows a time line of the program beginning in January 1983. It depicts the major submissions, decisions, approvals, staff hirings, re-organizations, and other relevant events in the program's history.

In January, 1983, a joint report from the Manitoba Government Air Services and Emergency Health and Ambulance Services (EHAS) of MHSC to the Minister of Highways and Transportation evaluated the current Citation I aircraft and its application in medical evacuations from the North. The report stated that, "the primary role of the Manitoba Government Air Services is to provide a means of transport in

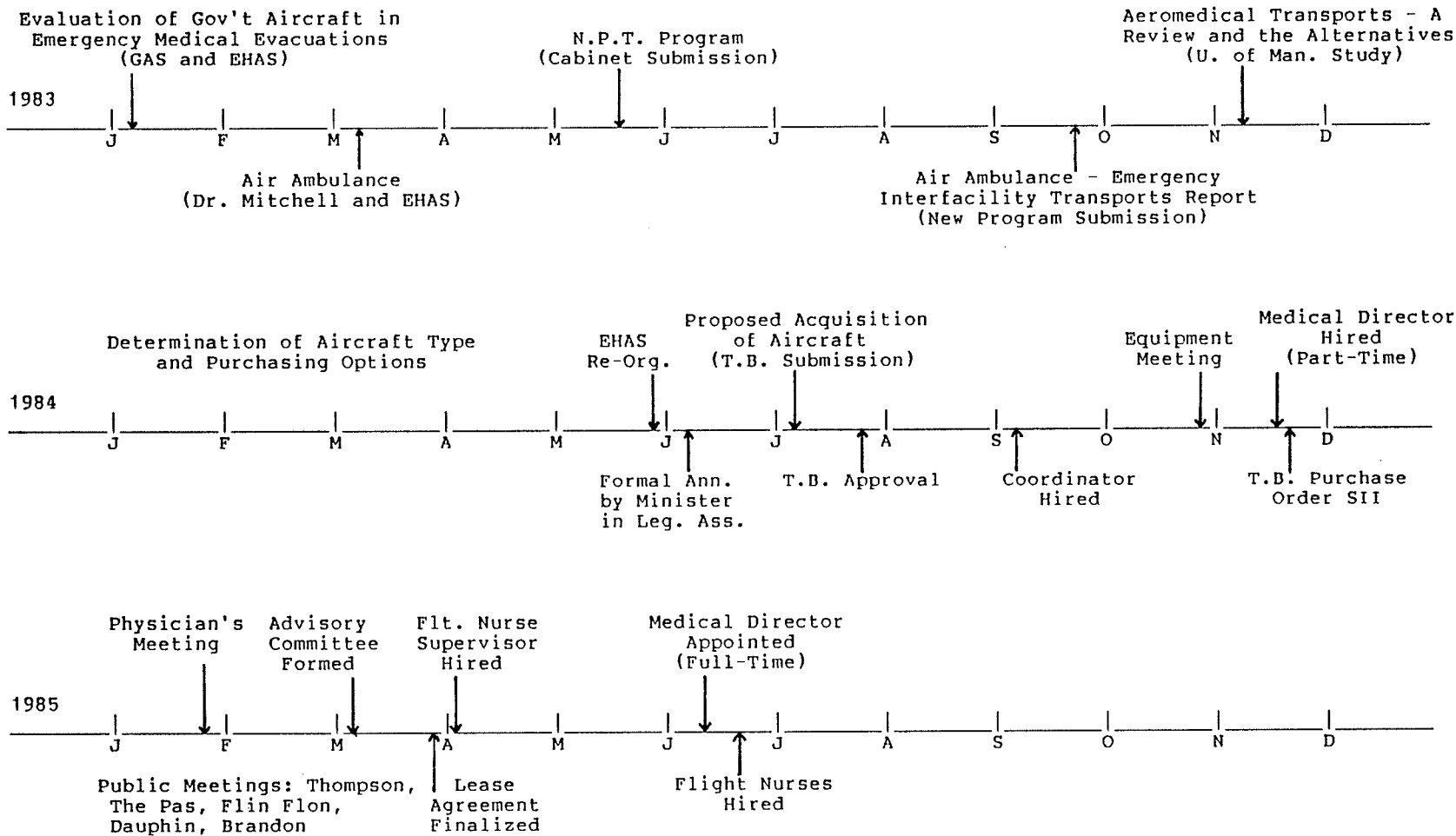


Figure 1: Program Evolution Time Line

emergency medical evacuations to the area served by the Department of Health Patient Transportation Program" and "the aircraft is also utilized in the transport of public servants as well as other duties." [1] Recurrent problems in providing the medical evacuation service were listed as follows:

1. lack of adequate cabin space for medical teams and equipment;
2. a narrow loading door which prohibits use of standard stretchers as well as inhibiting use of the Provincial High-Risk Neonate incubator;
3. difficulties supplying oxygen, suction, and 110-volt electrical power; and
4. lack of trained staff and effective communications[2].

The evaluation report examined the types of aircraft best suited to provide this service, the number and length of landing strips which could be used in Manitoba by the various aircraft, the ongoing maintenance costs of the aircraft, and the cost and limitations associated with the alternatives. The Cessna Citation Jet series were found to be the most suitable as opposed to turbo-prop aircraft because of their shorter runway requirements, their faster speed, and their less costly maintenance. Four alternatives were outlined; three of which included modifications that could be made to the present aircraft and the fourth examined the purchase of a new Cessna Citation "S" II. The report recommended the purchase of a new Citation "S" II as it would

best meet the needs of both the medical evacuations and the continued use of the aircraft as an executive jet.

In April, 1983, another joint submission on an air ambulance was presented to the MHSC Management Committee by Dr. J. Mitchell and EHAS. The main areas of concern listed in the report were:

1. "the high cost to the patient of air transport if not resident north of 53rd parallel;
2. the lack of availability of properly designed and equipped aircraft;
3. lack of availability of trained staff in aeromedicine; and
4. the need for fast expert transport for emergency cases to a tertiary centre." [3]

An air ambulance service was proposed. It would consist of four components: a specifically designed, constructed, and equipped vehicle for transport (aircraft), central coordination or dispatch, trained staff, and a central authority which would provide standards, continuous monitoring, and evaluation of the program.

The report recommended:

1. "that a bonafide emergency air ambulance service be provided to the Province of Manitoba for the area over 100 miles from Winnipeg at an operating cost of approximately \$1.6 million;
2. that ground transport be an insured service to and from the air ambulance at a cost of approximately \$60,000;
3. that the ground transportation of the High-Risk Neonate Program of up to 100 miles be insured; and

4. that the emergency portion of the N.P.T. Program be discontinued and that the monies be added to the elective side to pay for the cost of return transportation to the north." [4]

Throughout the spring and summer of 1983, a number of submissions were brought forward to re-define the N.P.T. Program. They culminated in a submission to Cabinet. This submission listed the following problems with the N.P.T. Program:

1. "none of the aircraft used are outfitted as air ambulances. Loading is a hazard, no oxygen or suction available, provincial incubators cannot be loaded on Citation, impossible to conduct CPR, no 110 volt outlet;
2. equipment supplied by northern hospitals must be returned;
3. staff escorts (nurse and physician) result in short-staffing of local hospital;
4. residents south of 53rd parallel, particularly in Parklands, denied use of paid air evacuation and/or subsidized ground transportation; and
5. costs for "elective" cases escalating (35% in 5 years), despite a decreasing population north of 53rd" [5]

Four options were outlined ranging from maintaining the present program to the provision of a dedicated air ambulance to serve the residents beyond 150 ground miles from Winnipeg. The costs of the options varied from \$2,719,000 to \$4,431,000.

This report was followed by a new program submission in September, 1983. The program, entitled Air Ambulance - Long Distance Emergency Interfacility Transports, identified the

recurring problems of air transfers into two categories:

N.P.T. Program and General. The problems within the N.P.T.

Program included:

1. use of ad hoc attendants, whether professional or lay in capacity, as patient escorts;
2. lack of specialty training in aero-medicine for escorts;
3. the potential to compromise staffing of the transferring facility when staff, sent as escorts, face extended or delayed return;
4. lack of specialized equipment available on flights, compounded by the potential loss or depletion of supplies from the transferring facility;
5. lack of central coordination;
6. inability to communicate between facilities, ground resources, and aircraft; and
7. use of ad hoc aircraft with selection based on availability rather than appropriateness.

Problems identified as General included:

1. long distance emergency interfacility transports occurring south of the N.P.T. Program area receive no subsidization of costs for air travel;
2. due to geographic and time factors, some patients (e.g., Swan River) must travel 6-7 hours by ground ambulance to a tertiary care centre in Winnipeg;
3. the provincial High-Risk Neonate Transportation Program presently is restricted to ground transports and limited to within an 80 mile radius of Winnipeg;
4. the return of Manitoba residents from out of province health facilities as well as the provision of transport to out of province facilities for specialized care (e.g., Toronto Sick Children's Hospital) has lead to repeated requests of the Citation I;
5. the transport of patients under Federal Health and Welfare responsibility, who reside in Manitoba, has been identified as also requiring improved air transport in medical emergencies;

6. the cost of ground shuttles to and from the aircraft is not covered under a subsidization program and these costs are currently borne by the patient;
7. the Citation I jet operated by Government Air, which provides some of the emergency transport, is not outfitted as an air ambulance but rather as an executive jet; and
8. for the initial program consideration purposes, only long distance emergency interfacility transports have been identified as requiring a dedicated air ambulance system. Primary missions, involving the recovery and transport of the critically sick and injured, from locations and situations other than major health facilities with adequate landing strips must in time be addressed. Finally, elective interfacility transports, whether stretcher or ambulatory, will continue to utilize commercial and charter air service or ground ambulance service[6].

The report listed the same four basic components as the previous one: specifically designed vehicle; central coordination; trained staff; and a central authority. It recommended that the N.P.T. Emergency Program be deleted and that a dedicated air ambulance service be established to serve long distance emergency transports (over 100 miles from Winnipeg). The return transportation costs for people covered by the N.P.T. Program would be transferred to the N.P.T. Program "elective" category. Also, it was recommended that a working committee be struck immediately to discuss and provide input into the proposed system and that consideration be given to the feasibility of interprovincial reciprocal agreements, repatriation, and cooperation with Health and Welfare Canada. Finally, it was suggested that a user fee of 10% of the average trip cost be applied to curtail potential abuse of the service[7].

The financial implications for each of the components were reviewed. For trained staff, it was recommended that 6 Flight Nurses be hired at a cost of \$321,000. The central coordination/dispatch could be provided by the Winnipeg Ambulance Service at a cost of \$60,000. The central authority component, which would include a Medical Director retainer along with an Administration Coordinator, was estimated at \$115,000. Three aircraft were considered: King Air 200; Citation I; and the Citation "S" II. Charter/lease as well as purchase alternatives were examined. It was recommended that a charter/lease of a King Air 200 at a cost of \$1,167,000 would be the best alternative. The cost saving to the N.P.T. Emergency Budget was estimated at \$964,985 thus making the cost of the program \$608,415[8].

A later revised new program submission estimated the cost for the trained nurses at \$352,000, the central dispatch at \$25,000, central authority at \$70,000, and the charter King Air at \$965,940. The estimated costs, based upon 600 flights per year, were:

Start-up	\$1,600,000 (if purchase option exercised)
	\$150,000 (if lease option exercised)
Operating Costs	\$1,607,000 (if purchase option exercised)
	\$1,437,940 (if lease option exercised)[9].

The report was reviewed by the Department of Highways and Transportation. There was concurrence with the three compo-

nents of the trained staff; central coordination/dispatch; and the central authority, but they saw a need to further investigate the financial implications of the aircraft. A study was carried out over the winter of 1984 to evaluate four aircraft: Citation "S" II, Gulfstream Commander 1000, King Air 200, and a Citation I. They were compared on their fixed and variable costs, aircraft specifications and performance data, trip profiles, warranties and down time, application to Manitoba airfields and conditions as well as a value analysis of the aircraft and medical applicability. The Citation "S" II was found to be the most feasible[10].

Also during the winter, the University of Manitoba study, Aeromedical Transport - A Review and the Alternatives, was officially received at the MHSC. Its findings were already known to the MHSC as one of its authors was an employee of the Commission. It recommended a dedicated aeromedical system with the primary purpose to recover and transport patients on an urgent or emergent basis. The staff should consist of Intensive Care Unit or Emergency Room Nurses and/or paramedics and the aircraft should allow for a minimum of 2 stretchers plus the escorts. It further recommended that a central communication/dispatch be established as well as a central authority consisting of a medical director, advisory/audit committee, and an administrative coordinator[11].

In June, the Department of Emergency Health and Ambulance Services went through a re-organization. Up until this time, EHAS was under the Administration Division. It was transferred over to the Rural Health Facilities Division. The main reason for the shift was that the past Manager of Emergency Health and Ambulance Services became the new Director of Rural Health Facilities Division and it was useful to merge the two departments[12]. There was a general agreement between the Associate Executive Directors that this was the more appropriate place for the department[13].

On May 31, 1984, the initial announcement of the Air Ambulance Program was made by the Minister of Health in the Legislative Assembly[14]. It was followed by the formal announcement in the House on June 04[15]. On June 26, "Treasury Board approved in principle the proposed acquisition of an aircraft to establish an Air Ambulance Program in 1984/85 pending a further review by Treasury Board." [16]

A further submission on the proposed acquisition of an aircraft to be dedicated for emergency medical patient transport went to Treasury Board in July. Three main areas of need were defined as follows:

1. expansion of the transportation phase of the High-Risk Neonate Program;
2. emergency medical transport for the North; and
3. emergency medical transport for the other areas of the province, in particular Dauphin and Swan River[17].

The Citation "S" II was recommended and two acquisition options were outlined. The first was a purchase alternative at a cost of \$3,625,000 and the second was a lease or lease-to-purchase arrangement at an estimated cost of \$450-500,000 per year. The staffing requirements and cost implications for 1984/85 were estimated to be \$500,000. The costs incurred by the Department of Highways and Transportation for staff years, training of pilots, and aircraft operations would be appropriated to the MHSC. The total gross cost of the program and the fixed costs of the Department of Highways and Transportation attributable to the program plus an hourly rate based on usage would also be borne by the MHSC. The submission recommended that:

1. MHSC be given the authority to lease a Citation "S" II (ambulance configured and equipped) in 1984/85;
2. approval be granted for the 19.0 staff years (MHSC - 7.0 and Government Air Services - 12.0);
3. approval be given to hire the coordinator of the program as soon as possible;
4. no user fee be charged but that ground ambulance cost to and from the aircraft and the hospital be the responsibility of the patient; and
5. the N.P.T. Emergency Program be revised to reflect the impact of the air ambulance program[18].

On 24 July, 1984, Treasury Board approved the establishment of an Air Ambulance Program in 1984/85 to service all of Manitoba. It directed the Department of Highways and Transportation and the MHSC to manage the delivery of the Air Ambulance Program in a manner which will ensure full cost re-

covery by the Department of Highways and Transportation from the MHSC. This approval was subject to further review regarding the basing of the air ambulance aircraft, facilities, and crews in Northern or Southern Manitoba. Treasury Board also authorized the MHSC to enter into a lease-to-purchase agreement for a Citation "S" II Jet Aircraft in 1984/85 to be dedicated to emergency medical transportation. It was requested that MHSC report back on the suitability of the aircraft and seek Treasury Board approval prior to exercising the purchase option. The staff increases for both departments were also authorized[19].

The Air Ambulance Coordinator was hired on September 03, 1984. His job description was simply, "to get the program out." [20] He arranged for a meeting with representatives from various facilities and organizations who would be using the service with respect to equipping the patient care area of the aircraft. This meeting was held on 29 October, 1984.

In November, a part-time Medical Director joined the program to review the aspects of patient care. Also in November, a purchase order for the aircraft was forwarded to Treasury Board. It stated that six tender submissions had been reviewed and that one submission was the most favourable but further negotiations were necessary. To take advantage of the 1984 prices for the aircraft, it was recommended that approval be given for the MHSC to sign a temporary pur-

chase order with Cessna Corporation to affect the acquisition. This purchase order would be followed up by the selected lease-to-purchase agreement at the time of taking possession of the aircraft[21]. Such a purchase order was signed on 30 November, 1984.

A study was also carried out during the fall to determine the best base location for the aircraft. The alternatives were to locate the aircraft in Winnipeg or in a northern community (Thompson). Four criteria were examined: facilities; operations; maintenance and ground support requirements and limitations; and medical requirements. Winnipeg was chosen because:

1. all the facilities are presently in place with no additional cost required;
2. availability of all weather navigation and approach aids;
3. suitable alternate airports available in close proximity equipped with landing approach aids and suitable medical facilities;
4. less airborne time required;
5. less down time for maintenance unserviceabilities, aircraft on the ground (AOG) spares, and the proximity of approved repair facilities;
6. no initial capital expenditures and less yearly operating costs;
7. the resources and facilities of tertiary care teaching hospital and a University for the initial and ongoing specialty training for the flight nurses; and
8. availability of specialists and/or teams in Winnipeg to assist in air evacuations as necessary.

In January 1985, a meeting of interested physicians was held to discuss the progress of equipping and configuring the aircraft and to provide the physicians with an opportunity to relate their concerns. Eleven people were invited, all attached to the Emergency Care or Intensive Care Units in the city. Public meetings were also held at Thompson, The Pas, Flin Flon, Dauphin, and Brandon throughout February and March. On March 6, the Pre-Hospital Care Medical Advisory Committee was formed. Its role is to recommend and advise on training, standards, policy and procedures and audit. A detailed description of its function is contained in Appendix C. The Committee has met monthly since its inception.

Also in March, the lease agreement was finalized. The total equipment costs for the program were estimated at \$4,800,000 (Can) but may be increased to \$5,000,000 (Can). The lease term calls for 60 consecutive rental payments, payable monthly in advance, plus applicable sales tax, if any. A flexible prime rate will be used with the right of the MHSC to fix the rate for the remainder of the lease at a rate based on the leasee's best published rate for leases at that time less 75 base points. MHSC may purchase the equipment in question for a purchase price of 25% of the original cost after 60 months[22].

In March, the manager of the program was informed that the Citation "S" II would not be available until September 1985. At the beginning of April, the Flight Nurse Supervisor was hired and, on June 10, the Medical Director's position became full-time. On June 17, the 5 flight nurses were hired and began their training program.

4.4 PROGRAM DESCRIPTION

The Air Ambulance Program is designed to meet three areas of need:

1. expansion of the transportation phase of the High Risk Neonate Program;
2. emergency medical patient transport for the North; and
3. emergency medical patient transport for the other areas of the Province.

This is achieved through the use of four components:

1. specifically designed and equipped vehicle for air transport;
2. central coordination or dispatch;
3. trained staff; and
4. central authority to provide standards and oversee operations.

The aircraft to be used will be a Cessna Citation "S" II. It will accommodate 2 stretchers and/or incubators plus the flight and medical crews. Built into the aircraft are oxygen, suction, monitoring, and communication equipment.

The service is based in Winnipeg. It is administered by the MHSC and available to all areas of the Province with an adequate landing strip. The Department of Highways and Transportation, through Government Air Services, provides the pilots, maintenance, and servicing. They bill the MHSC on a cost recovery basis. The Citation I also provides a back-up to the air ambulance.

The air ambulance can be accessed only by a physician or, in areas not served by physicians, a nurse or other responsible person. It can be utilized when:

1. the required medical care cannot be provided at the transferring site;
2. the patient requires a stretcher and nursing or medical attendance during the transfer due to their condition and falls within the recommended definitions of emergent and urgent (see Table 3); and/or
3. in special circumstances at the discretion of the Medical Director[23].

All Manitoba residents are eligible for transport within the service although the availability of appropriate airstrips will limit the service to residents with access to such facilities. Table 4 indicates the categorization of the airstrips in Manitoba, their location, and number. The map in Figure 2 depicts the location and type of health facilities throughout the Province. The overlay shows the airports by their categorization.

The conditions which may prevent or restrict the air ambulance from landing at an airport include:

TABLE 3

Guidelines for Categorization and Prioritization

PRIORITY CODE	PATIENT CONDITION	PATIENT REQUIREMENTS	RECOMMENDED MEDICAL ESCORT	PREFERRED MODE OF TRANSPORT
Code 4 EMERGENT Transport re- quired as soon as possible	Acute trauma/illness re- quiring immediate atten- tion not available at patient's location Potentially threatens life or function	Stretcher patient requir- ing intensive medical management while in transit	Aeromedical transport team Specialized transportation and stabilization team	Aeromedical transport
Code 3 URGENT Transport re- quired within 8-12 hours maximum	Trauma/illness requiring medical care and atten- tion not available at the patient's location Patient's life or func- tion not in danger	Stretcher patient requir- ing monitoring and potential medical manage- ment while in transit	Aeromedical transport team	Aeromedical transport
Code 2 SCHEDULED Planned trans- port between 24-48 hours co-incident with pre- arranged pat- ient referral	Non-acute trauma/illness requiring specialized medical diagnosis or treatment not available at the patient's location Stretcher patient requir- ing nursing attendant (discretion of Medical Director)	Stretcher or patient potentially requiring monitoring or medical management while in transit No special medical equip- ment required	Nurse Aeromedical transport team	Aeromedical transport

1. lack of Instrument Flight Regulation (I.F.R.) capabilities at the airport;
2. weather conditions (storms, icing conditions);
3. runway conditions/surface (soft surface, not maintained); and
4. length of runway (less than 3000 feet).

There is no user fee for the service, however, the ground ambulance service which is required at both the transferring and receiving ends, remains the responsibility of the patient. Return transportation for the emergency patients north of the 53° parallel, who have been transported by the air ambulance, is covered under the N.P.T. Program. Those not covered by the N.P.T. Program are required to arrange and pay for their return transportation.



TABLE 4

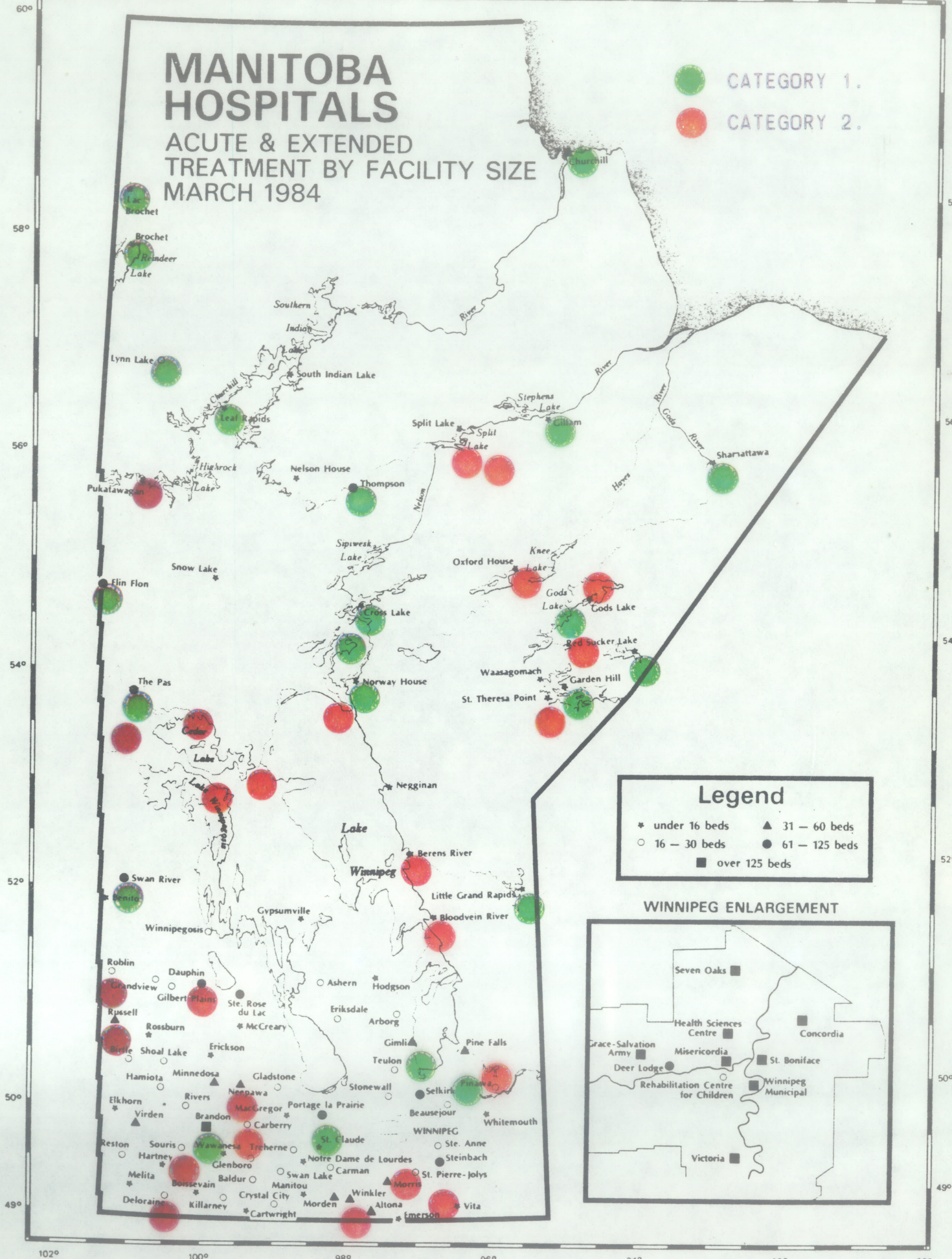
Manitoba Airstrips By Location and Service Classification

CATEGORY	DESCRIPTION	LOCATION		NUMBER
1.	Accessible 90% of the time or more I.F.R. Usable in all but extreme weather conditions	Brandon Brochet Churchill Cross Lake Flin Flon Gillam Gimli God's Lake Narrows Island Lake Jempeg Lac Brochet	Lac du Bonnet Leaf Rapids Little Grand Lynn Lake Norway House Portage Red Sucker Lake Shamattawa Swan Lake The Pas Thompson	22
2.	Accessible 50% of the time or more Subject to weather and runway conditions	Berens River Bird River Bloodvein Carberry Dauphin Deloraine Easterville Elk Island God's River Grand Rapids Grace Lake Gunisao Lake Ilford	Moose Lake Neepawa Oxford House Pukatawagan Roblin Rosenort Russell St. Theresa Point Souris Starbuck Winkler York Landing	25
Total				47

MANITOBA HOSPITALS

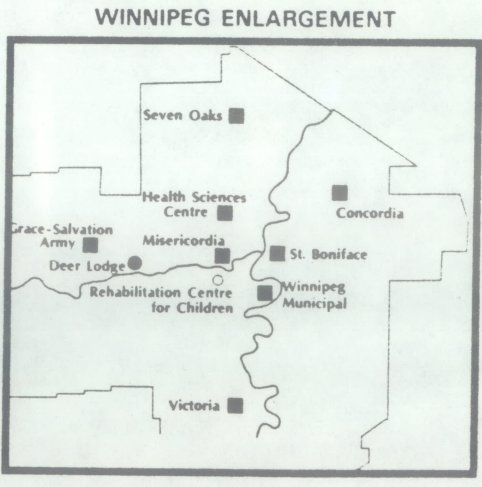
ACUTE & EXTENDED TREATMENT BY FACILITY SIZE
MARCH 1984

 CATEGORY 1.
 CATEGORY 2.



Legend

* under 16 beds	▲ 31 - 60 beds
○ 16 - 30 beds	● 61 - 125 beds
■ over 125 beds	



4.4.1 Organization and Responsibilities

The Air Ambulance Program is under the organizational control of the Facilities Division of MHSC. The Director of Rural Health Facilities and Ambulance Services Division holds the chief management responsibilities. She directly exercises the day-to-day responsibilities for the finances and standards for all the rural hospitals and personal care homes and outreach programs, e.g., dialysis, chemotherapy. Indirectly, the Director controls the training, standards, and licensing of the ground ambulances and the air ambulance through managers[24].

The Air Ambulance Program Manager is responsible for "getting the program out"[25] and reports to the Director on most matters. His official duties include: determining the policies and procedures for an air ambulance service; establishing standards for equipment; liaising with the Director of Government Air Services; establishing medical care protocols and procedures in cooperation with the Medical Director; establishing and ensuring the development of a training program; defining medical and legal responsibilities of the service; assigning work, monitoring progress and evaluating results; participating in budget preparation; and special projects[26].

The Flight Nurse Supervisor is responsible for: supervising staff on a daily basis; participating in the prepara-

tion, delivery, and assessment of all training; reviewing operations and monitoring progress to ensure cost-effectiveness and maintenance of program standards; performing air duty nursing as required; and participating in special projects and other related duties[27]. The duties were described as encompassing the first level of management above the operation[28].

The Flight Nurses are responsible for: providing total patient care during transport; participating, when required, with physicians and other health professionals in preparing the patient for transport; maintaining skills to ensure appropriate levels of patient care; cleaning and maintaining the patient care area of the aircraft; and other related duties[29].

The Medical Director's position in the organization has not been defined as yet. He reports to the Director and to the Associate Executive Director, Facilities and is responsible for monitoring and assessing the medical aspects of the program. This pertains to the pre-hospital care of the patients and the medical training as it applies to that care[30].

4.4.2 Communications

Communication and control are seen as essential elements required for the efficient operation of the Air Ambulance

Program[31]. The Communications Centre will communicate with and dispatch the aircraft and crew while simultaneously coordinating the services of the medical personnel, the hospitals, and the ground ambulances. It will also facilitate: the re-routing of the aircraft for a higher priority call; the organizing of back-ups when necessary; communicating with various airports; activating an emergency contingency plan; collecting data for evaluation and planning; and documenting calls for administration and legal purposes. Figure 3 shows schematically the communication flow.

The program's immediate functional requirements are:

1. 24 hour dedicated staff;
2. hardware to provide the required radio and telephone communication functions; and
3. hard copy of dispatch and vehicle movement.

Its operational requirements are:

1. to receive, record, and confirm all information pertinent to the patient's medical and transportation requirements;
2. to alert the flight team by pager, radio, or telephone;
3. to receive the flight team's acknowledgement of the alert;
4. to provide the flight nurse with the patient information;
5. to coordinate all aspects of the transportation process;
6. to maintain the availability status of the flight team and the aircraft; and
7. to alert and coordinate additional resources.

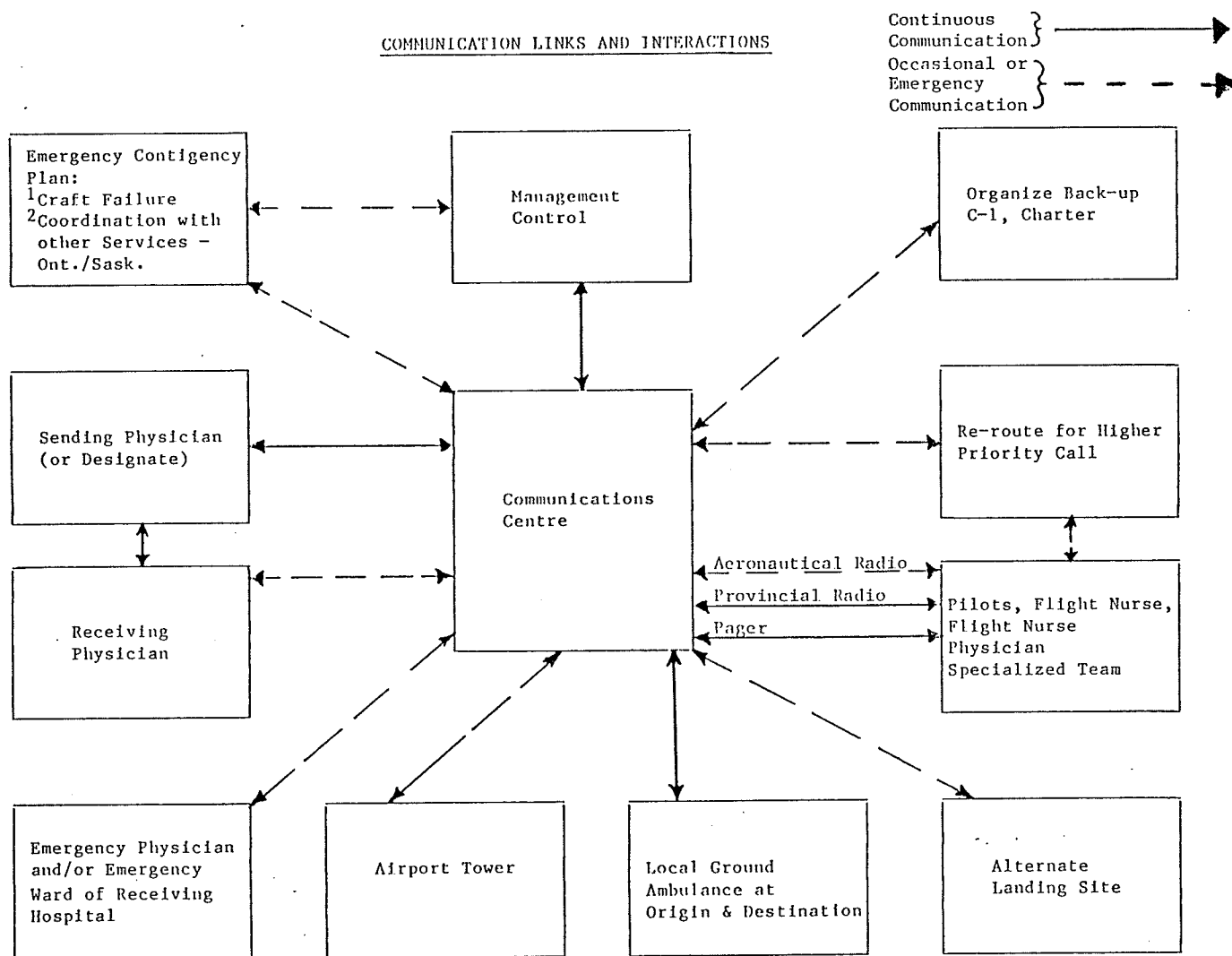


Figure 3: Communications Lines and Interactions

At present, the type of communication system has not been determined and a number of options are being reviewed.

4.4.3 Staff Training

The Manitoba Air Ambulance Training Program has been designed to prepare the flight crew members to competently transport and care for patients utilizing the Air Ambulance Service. It is aimed at 2 target groups: the pilots and the nurses. Captains and first officers have received First Responder training and the nurses have been certified to EMA-1 level. Its intent is to offer knowledge and training to the degree necessary for service start-up and to provide the flight nurses with increasing levels of knowledge and competency through continuing education programs, both didactic and clinical[32].

Upon completion of the Training Program, the participants were able to:

1. Pilots:
 - a) define their role as a member of the transport team;
 - b) assist the flight nurse in the delivery of patient care to the level of training received; and
 - c) recognize the necessity for altitude modifications in the transport of ill/injured patients as recommended by the flight nurse.
2. Flight Nurses:
 - a) categorize and prioritize all incoming requests for transport;

- b) initiate the service response and coordinate with the ground ambulances;
- c) operate all communications equipment;
- d) obtain a thorough patient report prior to assuming patient responsibility;
- e) offer appropriate pre-flight stabilization recommendations to the referring facility;
- f) assist in the pre-flight stabilization of a patient as requested by the referring facility;
- g) provide competent nursing care during the in-flight phase;
- h) provide medical-nursing intervention as recommended and approved by the Pre-Hospital Care Medical Advisory Committee, Medical Director, or the referring/receiving physician;
- i) operate all stabilization and monitoring equipment;
- j) assist specialty transport teams in the delivery of care;
- k) deliver a thorough patient report to the receiving facility;
- l) be familiar with the aircraft, principles of flight, and altitude physiology;
- m) carry out all aircraft safety procedures;
- n) recognize the role of the captain as the person primarily responsible for the safety of the aircraft and all onboard;
- o) record and relay all pertinent patient information;
- p) record all pertinent data necessary for statistical review and quality control audit;
- q) participate in the Community Outreach Program;
- r) survive and help others survive in a wilderness environment; and
- s) demonstrate self-direction in identifying, meeting, and evaluating learning needs.

Levels of knowledge were tested by written and practical examinations and internship assignments.

4.4.4 Pre-Hospital Care Medical Advisory Committee

The Pre-Hospital Care Medical Advisory Committee is comprised of professionals and physicians who have a specialization or expertise in areas related to the types of patients that are carried on ambulances. The physicians hold an affiliation with a recognized teaching hospital and are registered with the College of Physicians and Surgeons of Manitoba. Nurses and paramedical professionals are also represented on the Committee. There is a mix of both rural practitioners and members of the tertiary centres.

In general, the Committee makes recommendations and provides advice on all aspects of pre-hospital care. It also has an impact on the College of Physicians and Surgeons and the Manitoba Association of Registered Nurses relative to the recognition and approval of training programs, medico-legal considerations, professional agency interaction, and related matters. The Committee is responsible for both land and air ambulances. A more detailed description of its responsibilities can be found in Appendix C.

The description of the program presented in this chapter is useful in understanding the growth and development of the program. The next chapter outlines the concerns, issues,

and questions that were raised by the various communities affected by it. Their input completes the picture of the program.

4.5 ENDNOTES

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- [4] EHAS, p. 3-4.
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- [16] Treasury Board, 24/84 - Item 21, June 26, 1984.
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- [30] Medical Director, Interviewed by S. Mackay, May 31 1985.
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- [32] MHSC, Manitoba Air Ambulance Training Program, p. 1.

Chapter V

DESCRIPTION AND FINDINGS OF INTERVIEWS

5.1 SUMMARY

The people interviewed were asked to classify their evaluation concerns, issues, and questions into two categories: the first year of operation of the program; and from one to five years of operation. In the shorter term, prioritization (who is using the service, is it being used appropriately) was the most frequently stated concern followed by the level of care (in-flight service to the patients) and response time (time to mobilize the crews). A comparison was also done between the MHSC staff's responses and the non-MHSC responses. The MHSC group stressed level of care, prioritization, costs, staff training and communications while the non-MHSC group emphasized prioritization, level of care, response time, education, and costs.

In the longer term, most people saw their concerns as extensions of the first year's. Other issues that were stressed were: expansion of the program (feeder services); utilization (trends in demand and accessibility); and the level of care (improvement in the health care for the rural communities). There was good agreement between the MHSC group and the non-MHSC group.

5.2 INTRODUCTION

This chapter briefly outlines the concerns, issues, and questions of the people who were interviewed. It also reviews the standards that were suggested for the program and the various types of data that need to be collected to reflect the standards.

Only a summary of the responses is presented. Synopses of the interviews can be found in Appendix D. Each of these has been returned to the person interviewed for verification.

A total of 36 interviews were conducted. As Figure 4 depicts, most of them were recorded (29 of 36) with the majority being one-to-one encounters. Four interviews were taped in a group setting; one group of four, one group of three, and two groups of two. Five were conducted via the telephone and 2 were not recorded. One of these was at the request of the person interviewed and the other because of the environment of the meeting. The occupations or professions of the candidates are shown in Figure 5. The average length of time for the interviews was 42 minutes. The ones with the MHSC staff had a mean time of 64 minutes and the others 35 minutes. The longer period was due to the need to gather additional information on the program evolution and description from the MHSC staff.

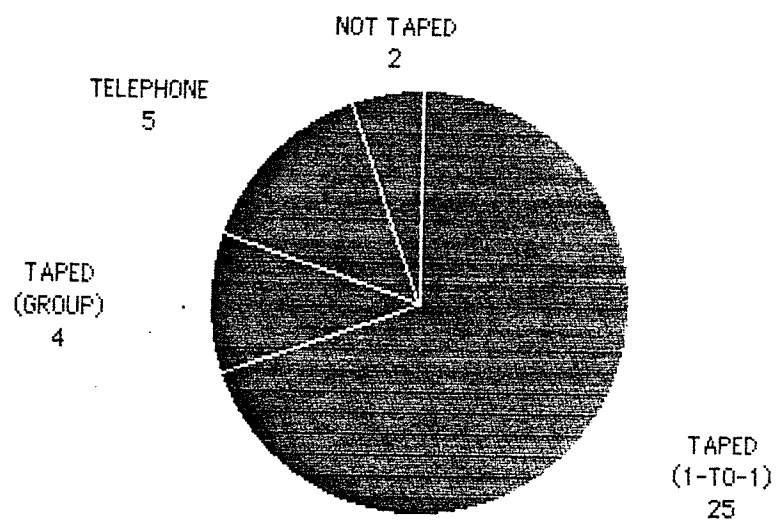


Figure 4: Methods of Interviewing

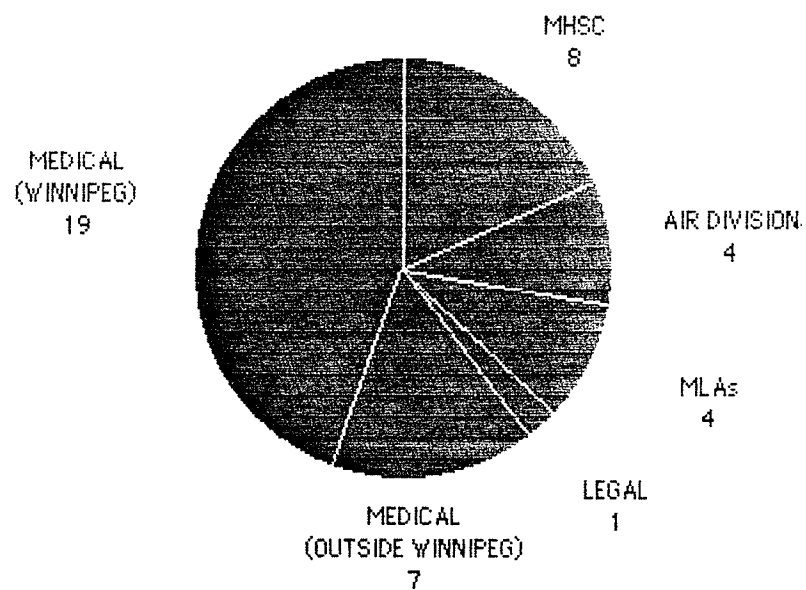


Figure 5: Occupations of Persons Interviewed

5.3 DESCRIPTION OF THE RESPONSES

Table 5 describes the concerns that were raised by the people interviewed and the frequencies of their responses. The categories are somewhat arbitrary as each concern may contain issues that are related to other categories, e.g., concerns over the availability of the aircraft affect its utilization and costs.

TABLE 5
List of Concerns

FIRST YEAR				ONE TO FIVE YEARS			
CONCERNS	TOTAL (36)	MHSC (8)	NON- MHSC (28)	CONCERNS	TOTAL (24)	MHSC (8)	NON- MHSC (16)
Priorization	26 (72%)	5 (63%)	21 (75%)	Expansion	11 (49%)	4 (50%)	7 (44%)
Level of Care	23 (64%)	7 (88%)	16 (57%)	Utilization	9 (38%)	4 (50%)	5 (31%)
Response Time	16 (44%)	2 (25%)	14 (50%)	Level of Care	8 (33%)	2 (25%)	6 (38%)
Education	13 (36%)	2 (25%)	11 (39%)	Equipment	5 (21%)	1 (13%)	4 (25%)
Costs	12 (33%)	3 (38%)	9 (32%)	Audit	5 (21%)	1 (13%)	4 (25%)
Staff Training	10 (28%)	3 (38%)	7 (25%)	Staff Training	4 (17%)	-	4 (25%)
Equipment	7 (19%)	1 (13%)	6 (21%)	Impact on Rural Areas	3 (13%)	1 (13%)	2 (13%)
Ground Amb.	6 (17%)	2 (25%)	4 (14%)	Teams	3 (13%)	1 (13%)	2 (13%)
Availability	6 (17%)	1 (13%)	5 (18%)	Impact on Tertiary Ctr.	2 (8%)	1 (13%)	1 (6%)
Acceptability	6 (17%)	2 (25%)	4 (14%)	Other	2 (8%)	1 (13%)	1 (6%)
Communications	5 (14%)	3 (38%)	2 (7%)				
Impact on Tertiary Ctr.	4 (11%)	-	4 (14%)				
Other	5 (14%)	-	5 (18%)				

5.3.1 First Year of Operation

The prioritization of the patients was the most frequently stated issue. This category covered questions of abuse or inappropriate utilization of the service, who would make the decision for the transfer, how would it be made, and who would monitor its appropriateness. The level of care concerns centered around the in-flight services received by the patients. This included the nurse only transfers and the use of specialty teams. The response time issues focused on the time for the crew to mobilize after a call had been received and the total time it would take make the transfer.

Education concerns centered around the need for information on the goals and objectives of the program. Public relations were also included in this category. Budgetary constraints and the reduction of the costs to the rural facilities were issues in the cost category. Staff training concerns focused on the types of skills or capabilities of the nurses and the on-going maintenance of their skills. The equipment category included issues of maintenance and compatibility of the aircraft equipment. Concerns covered under ground ambulance dealt with the funding base for the operators and the impact on their service by the air ambulance. The ability of the aircraft to access the communities that require the service was the major concern under availability. Acceptability included the perception of the

program from the medical community's viewpoint and feedback from the general rural community on how the program is meeting their needs. Communication issues centered on the ability of the dispatch to receive and coordinate the calls. Bed utilization at the Intensive Care Units (ICUs) and the manpower requirements for specialty teams were the major issues under the impact on tertiary centre category. Other concerns raised included: insurance for flight crews, the Ambulance Act, return trips for escorts, and safety.

Figure 6 depicts the categories of concerns plotted against the frequency of responses as a percentage. Figure 7 shows the same concerns and frequencies for MHSC staff and non-MHSC staff. The MHSC group stressed the level of care, prioritization, costs, staff training, and communications while the non-MHSC group stressed prioritization, level of care, response time, education, and costs. The greatest differences in the responses between the two groups were level of care (31%), communications (31%), and the response time (25%).

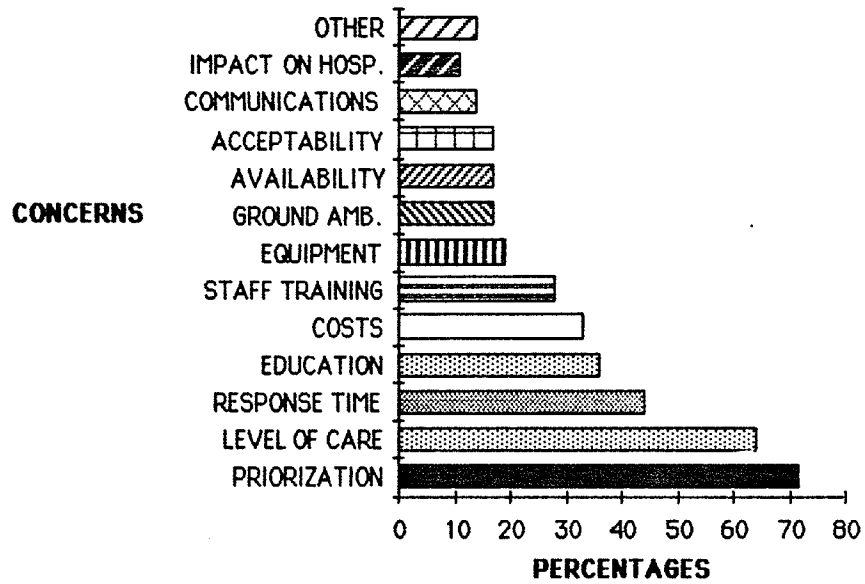


Figure 6: First Year Concerns versus Total Responses

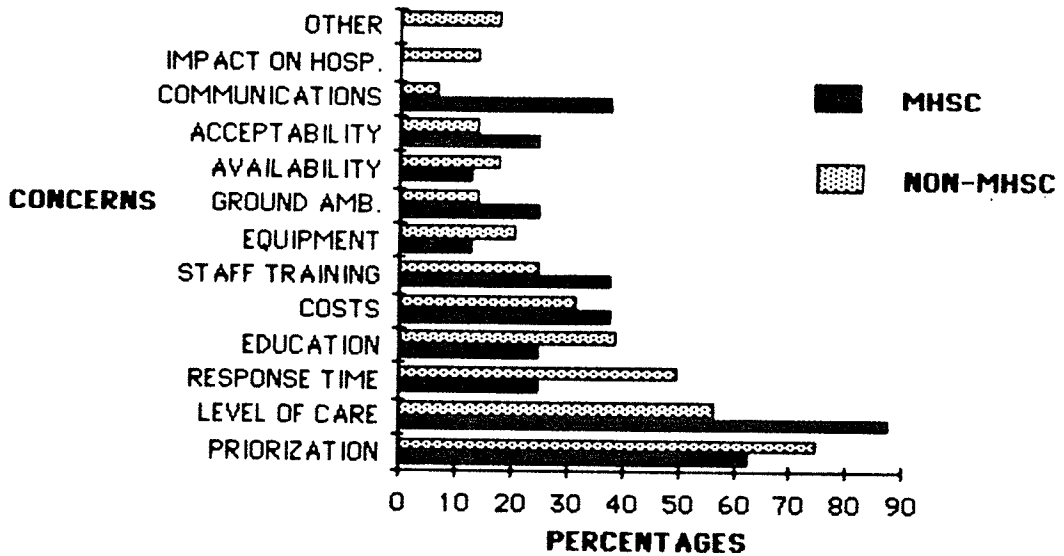


Figure 7: First Year Concerns versus MHSC and Non-MHSC Responses

5.3.2 One to Five Years of Operation

The one to five year concerns were generally seen as extensions of the first year's. Only 24 out of the 35 interviews listed issues that needed to be stressed or were different from the ones stated earlier.

The leading concern was the expansion of the program and the possibility of feeder services using other types of aircraft. The decision to expand was closely linked to the second category: utilization. This included trends in demand and accessibility. The level of care issue in the long term shifted from an emphasis on the in-flight care to the ability of the program to improve the level of health care in the rural communities themselves. Equipment concerns centered around the maintenance and turnover rates. The audit category was seen as an extension of a general audit system from the first year and focused on a re-evaluation of the procedures and the development of specific experiments, e.g., tracer conditions. Concerns over staff morale and turnover were incorporated in the staff training section. Impacts on the rural areas was a broadly based category concerned with the ground ambulance specifically and the socio-economic climate in general. The use of teams and their permanency were included under teams and, closely linked, was the category of impact on the tertiary centres, i.e., staffing and beds. Other long term issues raised included:

sunset clause for the program and the return trip for the escorts and patients.

Figure 8 depicts the long term concerns graphed against the frequency of the responses. As shown in Figure 9, the major concerns for the MHSC group in the longer term were expansion, utilization, and level of care while the non-MHSC group stressed expansion, level of care, and utilization in order of priority. The greatest differences in the percentage of responses between the groups were in the categories of staff training (25%) and utilization (19%).

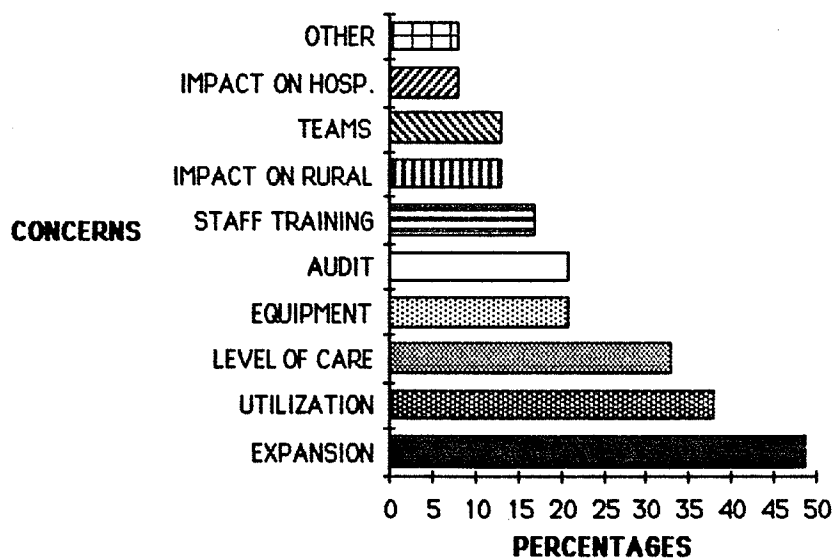


Figure 8: One To Five Year Concerns versus Total Responses

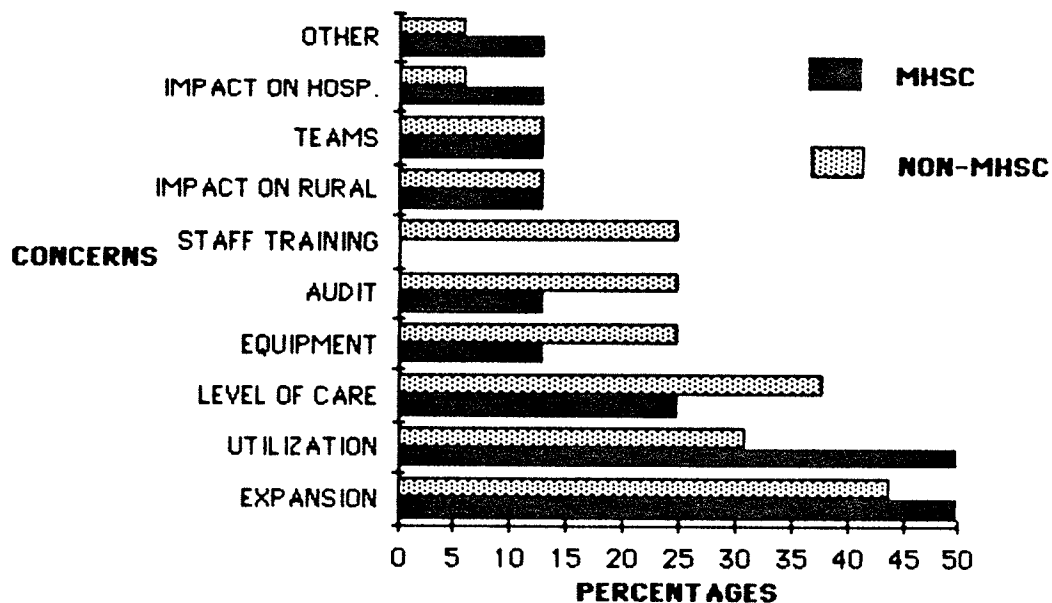


Figure 9: One To Five Year Concerns versus MHSC and Non-MHSC Responses

5.4 STANDARDS

The people interviewed were asked to suggest standards of performance for their concerns. A summary of these standards is contained in Table 6. The numbers in the parentheses correspond to the synopses from which the standards have been taken. For a more detailed description, please refer to the appropriate synopsis in Appendix D.

TABLE 6
Suggested Standards

CONCERNS	STANDARDS
Priorization (Utilization)	Patients properly categorized 80-95% of the time at dispatch. (#11, #29) Aircraft transfers 70-95% of all urgent/emergent cases from health facilities. (#22, #33)
Level of Care	In-flight care at above pre-flight level in greater than 90% of the transfers. (#3, #11) No in-flight deaths. (#11) MARN standards of nursing. (#4, #33) Improved condition of patient on arrival at receiving hospital than before the service existed. (#14)
Response Time	2 hour response on neonatal calls. (#32) 2.5 hour total trip time on calls from Brandon. (#19) Respond within 20 minutes on 90-95% of all calls. (#3) 4 hour total trip time within the Province. (#25) 15 minute turnaround times. (#7)
Costs	Operate within budget. (#27) Comparable costs with alternative transports, e.g., charters. (#2, #21) Improved benefit/cost ratio. (#17) Reduced costs to the rural facilities. (#4, #9)
Staff Training	25% of time spent in a clinical setting. (#11) ACLS, ATLS, ICU, and ER Courses. (#16, #21) Certification of training. (#8)
Equipment	Life saving procedures and equipment used in 20-40% of the flights with a minimum of an 80% success rate. (#25) Reduction in referring facility's equipment used on air transfers. (#24)
Availability	Aircraft accesses 70-95% of the airports it is planning to use. (#2, #25) Promotion of more airports to serve the Citation. (#5)
Acceptability	60-80% positive response to the service in meeting the community's needs. (#1, #3, #13)

5.5 DATA

The types of data that reflect the standards previously listed were often interrelated, e.g., patient condition data are needed to make decisions on the prioritization, the level of care, the equipment, teams, and staff training. The categories below summarize the data that were suggested to be collected.

Demographic - age, sex, residence of patient

Prioritization - number of patients carried
 (Utilization) - types of patients

- call rate
- record of prioritization/categorization at dispatch, at the referring hospital, and at the receiving hospital
- appropriateness of transfer
- number of simultaneous calls
- who made the prioritization decision
- number of urgent/emergent patients who were not carried and could have used the service

Patient Condition

Pre-flight - condition at scene of accident

- condition at referring hospital
- type of injury/illness (severity index)
- initial diagnosis, intervention
- advice sought (who, when, what)
- reason for transfer
- length of time to stabilize, stabilization techniques
- chart numbers
- problems

Enroute - teams or specialists needed (number, type, interventions used)

- treatments, interventions, equipment used
- tape and chart records
- documentation of life saving procedures
- problems

Arrival - condition on arrival (severity index)

- level of stabilization
- immediate treatments required

- chart numbers
- problems

- Outcomes
- patient condition report 48 hours after admission for neonate cases
 - discharge summaries
 - mortality/morbidity rates
 - permanent disabilities, functional state
 - ease of recovery, degree of complications
 - length of stay in hospital
 - amount of treatment required
 - time away from community

- Times
- initial time of injury/illness
 - patient arrival time at referring facility
 - time air ambulance called
 - time for crew to mobilize (if flight nurse at hangar, if flight nurse at hospital, if teams/specialists required)
 - time of arrival at airport serving referring facility
 - time to stabilize patient
 - arrival time at the aircraft
 - enroute time to destination airport
 - arrival time at receiving hospital
 - turnaround time
 - total time for transfer
 - mean flying times to communities
 - average flying time/day/week/month/year

- Costs
- cost/air mile
 - cost/patient mile
 - cost/operating hour
 - fixed and variable costs
 - marginal and average costs as compared to charters
 - change in costs to rural facilities
 - maintenance versus replacement costs
 - operating cost changes to ground ambulance services

- Staff Training
- on-going training (type, frequency)
 - identification of problems

- Acceptability (Education)
- complaints
 - survey of referring and receiving facilities, patients, flight nurses, communities
 - changing practices in rural areas
 - attitudes, knowledge, quality of service, level of confidence in providing health services in rural areas

- stability of medical manpower, ancillary services, development of new transport centres

Availability - number and location of airports accessed
 - number of times aircraft delayed or not available
 - reasons for unavailability

Maintenance - downtimes
 - types of unserviceabilities
 - time to repair or replace

5.6 AUDIT

The Medical Director and the Medical Advisory Committee were identified as being responsible for the medical audits of the transfers(#1,2,7,11,16,17,18,26,28,34,35). Other outside groups, such as the College of Physicians and Surgeons(#23,31), the MMA(#32), the Department of Social and Preventative Medicine(#21), and the public(#34) were also suggested to assist in the process. The medical audit was generally seen as a continuous on-going procedure.

Surveys were seen as an adequate way to gather information on the acceptability of the program and to identify the community's needs. The timeframes for these ranged from immediately (pre-program survey) to after 12 months of operation. Intervals of 3 and 6 months were suggested between the surveys(#1,3,11,13,14,15,16,20,23,27,29,34).

For an evaluation itself, after 6 months and 1 year were identified as appropriate times for a review(#2,8,20,22,28).

Others suggested that the evaluation should be tied to a specific time in the program's life when a major decision must be made, e.g., to purchase the aircraft, a major overhaul(#7,15,27).

These findings were reviewed by the managers of the program and a meeting was arranged to discuss and focus the evaluation concerns. The results of the meeting and the subsequent investigation of appropriate data collection mechanisms is the subject of the next chapter.

Chapter VI

MICROCOMPUTER APPLICABILITY

6.1 SUMMARY

At the meeting of the decision-makers of the Air Ambulance Program on August 07, 1985, most of the discussion centered upon the types of data to be collected and the methods by which it could be processed and analyzed. The meeting ended with a general agreement that the study investigate the use of a microcomputer to fulfill these functions[1]. The investigation revealed that, due to the limitations of the MHSC to support microcomputer systems at this time and the lack of knowledge of these machines by the potential users, only systems that could be supported locally should be considered. Eight optional machine purchases were outlined: IBM PC/XT, Compaq Deskpro, Compaq Plus, IBM 3270 PC/XT, IBM PC/AT, Compaq Deskpro 286, Compaq Portable 286, and the IBM 3270 PC/AT. Each of the systems, with suitable software packages, would be able to meet the essential data requirements of the program. Its applicability will be further enhanced by attempting to limit the threats to the validity of the data.

6.2 AUGUST 07 MEETING

The meeting was attended by the program director, the program manager, the medical director, the associate executive directors of the MHSC, and the members of the study's research committee. Its purpose was to review the findings to date and to provide a direction for the remainder of the study. After a brief presentation of the objectives of the research and the results of the interviews as described in the previous chapter, a model of evaluative activity in a health organization was shown. The model was used to assist in placing the findings in perspective.

The model was developed by Attkisson and Hargraves[2]. It uses a three dimensional matrix to describe the process of program evaluation (Figure 10). The lower axis depicts the evolving levels of evaluative activity from a narrow (internal) focus to a broad (external) one. Its first stage, system resource management, involves management tasks such as clarifying objectives, developing plans and budgets, obtaining the necessary financial support, and monitoring income and expenditures. The typical evaluation activities linked to these tasks are: reviewing the objectives and formulating indicators of attainment; clarifying the role of the evaluator; developing improved informational capability; and assessing the monitoring and feedback efforts. Phase II, client utilization, involves the management tasks of monitoring efficiency, assuring equity of service access,

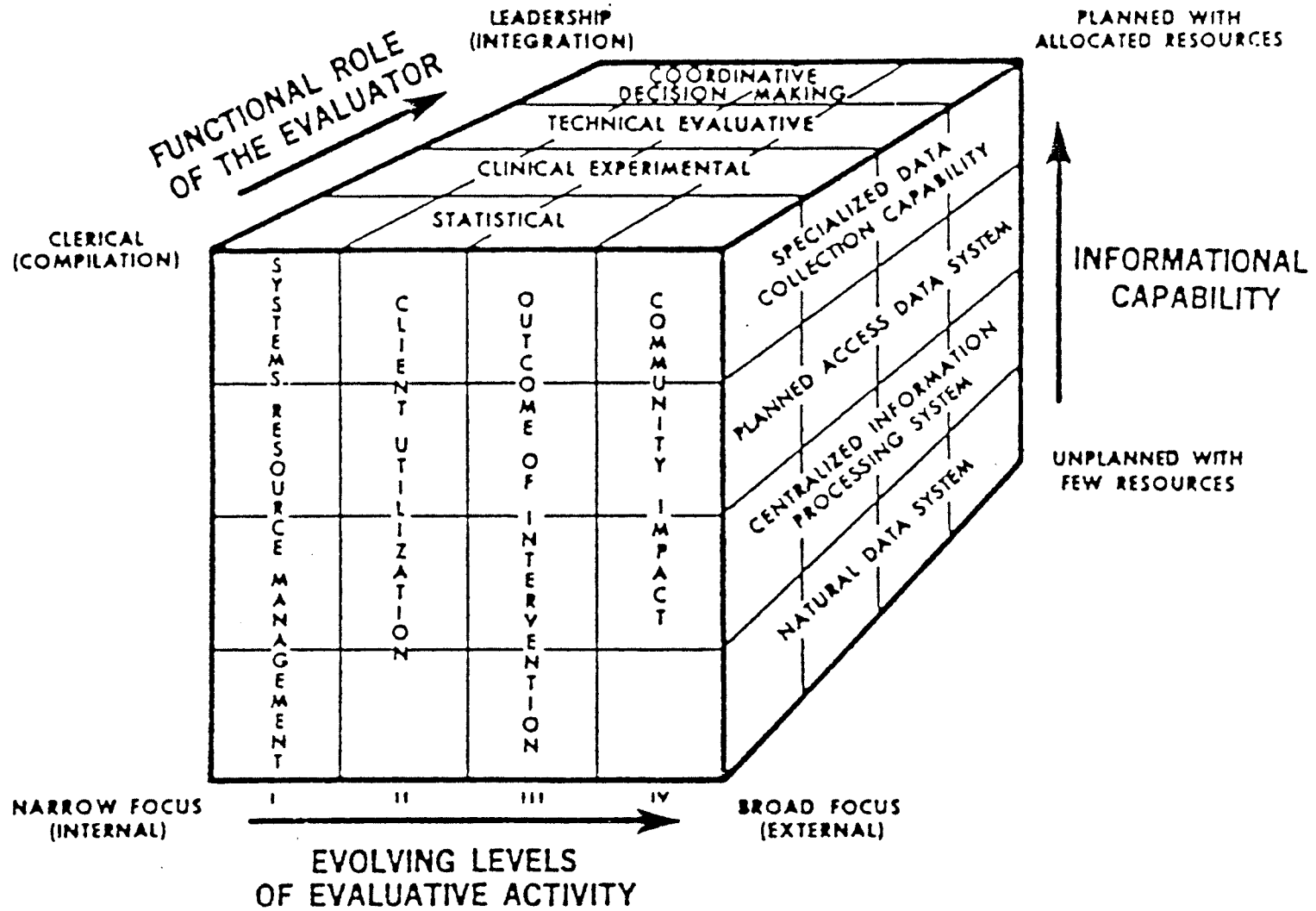


Figure 10: Model of Program Evaluation

appropriate screening and utilization, and establishing a quality assurance program. Typical evaluative activities include: monitoring the count of clients served; analysing reasons for the under or over utilization; assisting in medical audits; and analysing the costs. These two phases would be considered process evaluations.

The third and fourth stages deal with what can be termed outcome evaluations. Outcome of interventions involves management tasks such as providing services acceptable to the client, detecting and correcting inefficient activities, improving the cost-effectiveness, and reallocating resources to facilitate the improvements. Typical evaluative activities include: monitoring client satisfaction, comparing program outcomes to norm outcomes; studying treatment outcomes; undertaking comparative outcome experiments; and comparing cost outcomes of alternative methods of program delivery. The last phase, community impact, involves the management tasks of participating in regional planning, developing joint interagency services and administrative support systems, and the integration of services for the multi-problem client. Typical evaluative activities are: assessing the community's needs; prevalence studies; participating in regional needs assessment; and facilitating citizen and consumer input to need assessments, planning, and evaluation.

The ability of the program to evolve along the levels of evaluative activity will depend upon the reliability and accessibility of its collected data. The vertical axis describes increasing levels of informational capability from an unplanned data system with few resources through to a planned data system with allocated resources. The initial stage, the natural data system, is characterized by uncoordinated and decentralized data collection which impedes evaluation by its fragmented and disconnected nature. A centralized information processing system allows for coordinated data input and makes possible a quantitative description of the program but still lacks the cohesiveness for decision-making and planning. With further improvements in the data reliability, dependability, and accessibility, a planned access data system can evolve. This increases the ability of the program to effectively evaluate their activities. The highest level of informational capability would allow the program to conduct time-limited or investigatory projects which would integrate quantitative and qualitative data.

The third axis depicts another factor that will limit the ability of the program to reach a higher level of evaluability. The more integrated the role of the evaluator in the decision-making and long term planning, the more relevant and useful will be the results of the evaluation.

The first year evaluation concerns and issues raised by the people interviewed generally fell into the levels of evaluative activity I and II. The longer term concerns seemed to correspond to levels III and IV. With the appointment of the medical director and the establishment of a medical advisory committee, the functional role of the evaluator appeared to be well integrated into the decision-making and long term planning. The informational capability of the program was one area where the program had not yet been developed and this could be an impediment to its evaluability. Most of the ensuing discussion centered upon the types of data to be collected and the methods by which the data could be processed and analyzed. The meeting ended with a general agreement that the study investigate the use of a microcomputer to collect and analyze the data on the Air Ambulance Program.

6.3 CLARIFICATION OF ESSENTIAL DATA

A series of meetings were then held with the managers of the Air Ambulance Program to further refine and clarify the essential data that will need to be collected and stored on the microcomputer. Only the data items that are not collected by other departments were considered so as to reduce the amount of duplication. Table 7 describes a consensus of the information that will need to be collected to meet the reporting and evaluation concerns of the program. The glos-

sary found in Appendix A defines the meanings of the specific times.

TABLE 7

Essential Data

Patient Information:	Name	Date of Birth
	Age	Residence
	Sex	MHSC No.
Facility Info:	Referring Facility	Receiving Facility
	Referring Person	Receiving Person
Patient Condition:	Category/Priority - at dispatch	
	- on scene	
	In-flt Condition - patient condition forms	
Dispatch:	Call Rate - no. of calls received/timeframe	
	- no. of calls responded to/ timeframe	
	- delay or cancellation codes	
Aircraft:	Aircraft Registration Number	
	Aircraft Journey Log Number	
	Load Control and Flight Manifest Number	
	Crew - names and designations	
Times:	Time of Call	Flight Time
	Response Time	Patient Time
	Stabilization Time	Trip End Time
	Air Time	Turnaround Time
Distances (Statute Miles):	Total Trip Length	
	Leg Lengths	
	Patient Distances	
Totals:	Number of Patients Carried	
	Types of Patients	
	Air Time	
	Flight Time	

6.4 IDENTIFICATION OF SYSTEMS AND COMPONENTS

The amount of data that will need to be collected and stored for analysis is not extensive. It will be gathered from the in-flight patient condition reports, the flight logs, the load control and passenger manifests forms, and the dispatch reports. It is estimated that the required storage capability of the data will be approximately one megabyte (Mb) for the first year of operation based on a call rate of one thousand patients per year. Additional storage will be required depending upon the type of software programs that are chosen. Most microcomputers will be able to handle this amount or be able to be expanded to cover the storage needs.

Discussions with people at the MHSC Information Services, the Department of Finance Information Services Support Branch, and the Manitoba Data Services revealed some limitations that affect the type of system to be considered.

These are as follows:

1. The MHSC does not have a microcomputer policy at present. There is a steering committee reviewing their applicability but the present policy is to keep patient information on the mainframe (IBM 3084) to ensure validity and integrity of the patient data[3].
2. The MHSC Information Services do not have the capability to support microcomputers at this time. Ex-

expertise in training or technical support must be obtained through other departments or through commercial companies[4].

3. The managers and potential users of the microcomputer do not have much experience on the machines and will require training support in the beginning.

These limitations affect the type of system that should be considered for the Air Ambulance Program. With reference to the lack of a policy, in the short term, a microcomputer will have to meet the essential data needs by "standing alone", i.e., by not having to communicate with the mainframe or host. In the longer term, it will require access to the host to draw on or add to the patient information stored there. A microcomputer's capability to perform this function will depend upon the policy direction that is adopted by the Information Services at the MHSC. To join a microcomputer to a host, three ingredients are required: a transmission line between the microcomputer and the host, applicable software which may be on the host or the microcomputer, and the hardware or software capable of turning the microcomputer into a terminal and of understanding the host's transmissions[5]. Each of these requirements can be met through various methods which will need to be addressed in the policy adopted by the MHSC. Any system chosen by the Air Ambulance Program should have the capability to adapt to the policy decision, i.e., must have the flexibility and expandability to fit into the policy.

The timeframe that the microcomputer will need to "stand alone" is unknown. Its data storage capability should be such that it can accommodate or expand to accommodate the information and yet is convenient for the users. The storage can be done by diskettes (floppy disks) or on a hard disk. The advantage of the hard disk is that it can store large amounts of data yet the information can be quickly accessed[6]. Floppy disks require more manual manipulation and store limited amounts of data. All data will also require to be "backed-up" or stored separately from the microcomputer in case of a mistake by the operator or a malfunction of the machine. Back-up devices are usually floppy diskettes or tape systems. Again, the advantage of the tape systems is that they can contain much more information and are more convenient[7].

The lack of support or knowledge of microcomputers within the MHSC will limit the efficient use of such a machine. Microcomputer training is available through the Government of Manitoba Finance Comptroller's Division, Information Systems Support Branch. Courses and training can be provided on the use of microcomputers and on a number of software packages such as PC File, dB III, Lotus 1-2-3, and Focus. Other courses are given at the Universities and Community Colleges as well as at commercial computer retail stores. Technical support is also available through these commercial outlets.

In summary, the Air Ambulance Program should consider a microcomputer that can be supported locally, both technically and with training; has sufficient storage capability to meet the immediate needs yet is convenient for the operators; is expandable so that it will be able to adapt to the policy directions at the MHSC; and be compatible with those future changes. The systems listed below meet these criteria to varying degrees. A glossary is included in Appendix A to assist the reader with the more technical terms. Table 8, which is found at the end of this section, summarizes the various features and costs of each of the systems.

6.4.1 IBM PC/XT

The IBM PC/XT uses a 16-bit Intel 8088 microprocessor with 256 kilobytes (Kb) of random access memory (RAM) expandable to 640 Kb. A basic system would contain one disk drive which could store 360 Kb of information on a diskette. A second disk drive can be added thus increasing the storage to 720 Kb. The second disk drive may be removed and replaced with a 10 megabyte (Mb) hard disk which would further increase the storage capacity to 10,360 Kb. This corresponds to approximately 5,000 pages of information. Adaptations can be made to the system to further expand the memory to 20 Mb. All versions of the IBM PC/XT have 8 expansion slots but 3 of these are already used on the minimum system.

The IBM PC/XT has been in the marketplace for a number of years and can be well supported locally through IBM dealers, computer retail stores, user groups, and publications. Its expandability allows it to run most of the software available on the market with the exception of the high-powered statistical packages that are emerging.

6.4.2 Compaq DeskPro, Compaq Plus

The Compaq DeskPro uses a 16-bit 8086 microprocessor which runs at a standard speed of 8 megahertz (MHz) but is switch selectable to 4.77 MHz (the IBM PC/XT speed). This allows the machine to perform the same functions as the IBM PC/XT but at a faster rate. The RAM comes with a standard 256 Kb but is expandable to 640 Kb. A basic system contains 1 disk drive and can be built up to 2 disk drives or 1 disk drive with a 10 Mb hard disk. A tape back-up system can be incorporated into the machine which can hold 10 Mb of information. When fully loaded with options, 4 expansion slots are still available.

The Compaq Plus is a portable version of the Compaq DeskPro. It uses a 16-bit 8088 microprocessor at a speed of 4.77 MHz. Again, it is expandable to 640 Kb of RAM and 10 Mb on a hard disk. Unlike the DeskPro, no tape back-up is built into the machine and there are only 3 expansion slots.

The Compaq DeskPro and the Compaq Plus have displayed excellent IBM-compatibility and better operating characteristics than their IBM counterparts[8]. They are well supported locally through the computer retail stores, user groups, and publications.

6.4.3 IBM 3270 PC/XT

The IBM 3270 PC/XT is a multi-application workstation which combines the host-interactive functions on the 3270 Information Display System and the computing power and versatility of the IBM PC/XT. It can be expanded to 640 Kb of RAM and up to 20 Mb on hard disk. The host-interactive function allows the user to operate the computer as a terminal of the host when required. At other times, it can be operated as a normal IBM PC/XT. The combination of these functions allows the user to send and receive data from both systems and process it on either the host or the microcomputer. An Application Program Interface (API) can also be incorporated which can further simplify the task of sending and receiving information.

Although this option gives the most flexibility for the Air Ambulance Program, it requires that a control unit be placed on the host at considerable expense (approximately \$12,000). The system could be configured to interact with the host at a less expensive cost but not all the features

on the system would be available to the user, e.g., the API would be lost[9]. Local support for the 3270 is available only through IBM as they have not authorized the computer retailers to handle these machines.

6.4.4 IBM PC/AT

The IBM PC/AT provides more computing speed, information handling capability, and storage capacity than the other IBM PCs. The main differences between the XT and the AT are:

1. a high speed microprocessor that enables the system to manage data 2 to 3 times faster;
2. a disk drive that can store 1.2 Mb on a single diskette; and
3. a fixed hard disk that can store 20 Mb.

The base model of the IBM PC/AT uses a 16/24-bit 80286 microprocessor with a standard RAM of 256 Kb expandable to 3 Mb. It runs at a speed of 6 MHz. Data storage is accomplished by a new ultra-high capacity floppy disk capable of storing up to 1.2 Mb on one diskette. It can also accept the older 360 Kb diskettes. Hard disks can be added to increase the storage to 41.2 Mb. There are again 8 expansion slots available but 1 is already occupied on the base model and 2 are occupied on the enhanced models. The IBM PC/AT is locally supported by IBM dealers, computer retail stores, user groups, and publications.

6.4.5 Compaq DeskPro 286, Portable 286

The Compaq machines are not just copies on the IBM PC/AT but offer genuine enhancements such as higher operating speed, greater RAM capacity (in the DeskPro 286), portability (in the Portable 286), monochrome graphics at no extra cost, greater hard-disk capacity, and an optional tape backup unit[10]. They use a 16-bit 80286 microprocessor that runs at 8 MHz but can be switch selected to 6 MHz. The RAM in the DeskPro 286 is a standard 256 Kb, expandable to 8.2 Mb while the Portable 286 is expandable to 2.6 Mb. Hard disk storage can be increased to 70 Mb. The DeskPro 286 has 5 expansion slots while the Portable 286 has 3. In each of the machines, 2 of the expansion slots are used (1 for the hard disk controller board and 1 for the 8-bit bus) thus limiting the actual slots to 3 and 1 respectively. Again, the DeskPro 286 and Portable 286 are well supported locally.

6.4.6 IBM 3270 PC/AT

The IBM 3270 PC/AT incorporates all the advantages of the IBM PC/AT with the host-interactive properties of the IBM 3270. It, again, will require a control unit to be placed on the host to fully utilize all of its capabilities and is supported only through IBM.

TABLE 8
Summary of System Features and Costs

MODEL	MICRO-PROCESSOR	DATA BUS	MEMORY (RAM)		SPEED (Mhz)	EXPANSION SLOTS	HARD DISK SIZE	COST ¹
			MIN	MAX				
IBM PC/XT	8088	16	256	640	4.77	8	10 Mb	\$6,330 ²
COMPAQ DESKPRO	8086	16	256	640	4.77/8	6	10 Mb	\$5,900
COMPAQ PLUS	8088	16	256	640	4.77	3	10 Mb	\$6,900
IBM 3270 PC/XT	8088	16	256	640	4.77	8	20 Mb	\$13,000 ³
IBM PC/AT	80286	16/24	256	3 Mb	6	8	40 Mb	\$11,700 ²
COMPAQ DESKPRO 286	80286	16	256	8.2 Mb	6/8	5	70 Mb	\$10,900
COMPAQ PORTABLE 286	80286	16	256	2.6 Mb	6/8	3	20 Mb	\$11,400
IBM 3270 PC/AT	80286	16/24	256	3 Mb	6	8	40 Mb	\$15,000 ³

NOTES: 1. Cost estimates are for 640 Kb of RAM, 1 disk drive, 1 10 Mb hard drive, graphics capability, and an Epson FX-185 dot-matrix printer. Software, communication devices, and tape back-ups are not included.

2. Includes the cost of an Amdek 310A monitor.

3. Includes the cost of a PC monochrome display but not the control unit price.

6.5 COSTS

The costs of a microcomputer can vary considerably depending upon the source of the machine. Substantial cost savings can be achieved by purchasing the equipment through mail-order houses or on the used market. These types of purchases have limited or non-existent service support capabilities. Since technical and training support will be required for the Air Ambulance Program, this study will only consider the costs of the microcomputer systems purchased from the computer retail stores or the manufacturer. The costs should be seen as close approximations as the method of payment can also influence the price, e.g., if the MHSC makes its purchase through Manitoba Data Services, a government discount will be applied. Table 8 does give the relative costs of the systems for a standard package consisting of 640 Kb of RAM, 1 disk drive, 1 10 Mb hard drive and a graphics capability. For the IBM PC/XT and IBM PC/AT, an Amdek 310A monitor was added to the costs and, for the IBM 3270 models, a PC monochrome display was included in the price. An Epson FX 185 dot-matrix printer is also added to the price of all the systems. Not included in the table are the costs of the software, the communication devices, or tape back-ups.

The above systems can run literally thousands of software packages. Data management remains the immediate requirement

for the Air Ambulance Program and, as mentioned earlier, dB III and Focus are supported through the Information Systems Support Branch. The cost of these packages are \$795 and \$1,899 respectively yet substantial discounts are available if purchased through the government agencies. Focus does require that a special emulation board be placed in the microcomputer at an additional cost of approximately \$1,000. A multitude of word processing software is also available locally at prices ranging from \$500 to \$1,000. Integrated packages which combine data management, spreadsheets, and word processing can be purchased for around \$1,000.

Most warranties on the equipment are for 90 days. Additional coverage and servicing can be purchased from the dealer. The cost of the additional service will vary depending upon the type of agreement negotiated, i.e., on-site or carry-in servicing.

The computer retail stores will also arrange for leasing agreements. The lease rates vary with the length of the term and the total cost of the microcomputer. Approximate rates range from \$30-\$35/\$1000/month for a 3 year term to \$25/\$1000/month for a 5 year term.

6.6 APPLICABILITY

The acquisition of a microcomputer for the Air Ambulance Program can increase the capability of meeting some of the evaluation concerns expressed in the previous chapter. Its ability to store the essential data requirements in such a manner that the information can be quickly and easily retrieved is its main attribute. This increased informational capability will assist the managers in understanding their program and identifying its strengths and weaknesses.

The five primary concerns identified for evaluation during the first year of operation were: prioritization; level of care; response time; education; and costs. The computer will be able to store the categorization/prioritization codes given to a patient at dispatch and those recorded by the nurse/team on the scene. These values can be compared and any discrepancies listed. The managers will then be able to review those cases and verify the reasons for the change. Patient condition information at the time of their arrival at the tertiary centre is stored on the hospital databases and on the claims database. This information could potentially be accessed by the microcomputer and assist the managers in deciding whether or not the patient condition was affected by the transfer.

The level of care statistics will depend upon the type of data collection forms developed for the program. Again, the

computer can quickly summarize the number and types of patients carried, the reasons for the transfer, the kinds of treatments administered, and the condition of the patient. These results can assist the managers in identifying trends or problem areas and in making the appropriate adjustments in procedures or training. The response time calculations are very well handled by a microcomputer. By entering the times from the dispatch and flight log forms, the managers will know immediately the response of the crews, the flight times, stabilization times, patient times, and the total trip time. Comparisons can easily be made between these values, e.g., the patient time and the total trip time, which may assist the managers in analysing the efficiency of the program.

The education evaluation issues are more qualitative in nature. If surveys are used to evaluate the level of public/professional awareness of the service, the microcomputer can assist in the analysis of those results. Each of the systems indicated in the previous sections can run a number of statistical packages which could process the results. The cost figures on the program will continue to be handled through the financial department of the MHSC. Managers have access to those figures and can use them with the computer to make planning decisions. Cost forecasting is easily done with spreadsheet software packages. The costs can also be compared with other data, such as total trip distances or

times, to develop ratios that could be compared with other services operating similar programs.

The one to five year evaluation concerns can also be met with the use of a microcomputer. The expansion of the program may well be decided by the efficiency of this aircraft to deliver quality care. Utilization data can be retrieved to help the managers compare alternative delivery modes that may increase the efficiency. These comparisons can be quickly analyzed on the microcomputer. The level of care issues are again more qualitative in nature. If the surveys were conducted over a long period of time, the data could be stored on the computer. This information could then be analyzed to detect any shifts in community attitudes.

The microcomputer, therefore, can be not only a labour and time-saving device, but a powerful tool to assist the managers in analysing and improving their program. It is not, however, without its limitations. Any computer is susceptible to the GIGO (Garbage In, Garbage Out) syndrome. The managers must have some assurance that the data that they are collecting on the program are valid and reliable. Various types of threats to the validity of the data and its results are described by Cook and Campbell[11]. Table 9 lists some of the threats which may affect the Air Ambulance Program.

TABLE 9
Threats To Validity

<p>Threats to Internal Validity</p> <ol style="list-style-type: none"> 1. History - an observed effect might be due to an event which takes place between the pretest and the posttest when this event is not the treatment of research interest, e.g., a change in staff at a rural facility may cause a change in the utilization of the aircraft eventhough the community's health remains the same. 2. Maturation - an observed effect might be due to the respondent's growing older, wiser, stronger, more experienced, etc. between the pretest and and the posttest, e.g., as a new doctor in a community becomes more experienced, he/she may change their practice of usage of the air ambulance. 3. Instrumentation - changes in calibration, observers, or scores may produce changes in obtained results, e.g., new monitoring equipment may change the categorization of the patients. 4. Selection - an effect may be due to differences between the kinds of people in one group as opposed to another, e.g., if it was attempted to compare ground transfers versus air transfers, the composition of the patients should be as close as possible. 5. Mortality - an effect due to different kinds of persons dropping out of a particular treatment group during the course of an experiment, e.g., a longitudinal survey can change if the same people are not interviewed at each time frame.
<p>Threats to External Validity (Generalizability)</p> <ol style="list-style-type: none"> 1. Interaction Effects of Testing - the effect of a pretest may increase the respondent's sensitivity to the experiment variable thus making the results unrepresentative, e.g., the fact that one community is being surveyed may bias their results and make it unrepresentative of the region. 2. Interaction of Selection and Treatment - unrepresentative responsiveness of the treated population, e.g., the medical community may be surveyed and the results may be positive towards the service but users may be unsatisfied. 3. Interaction of History and Treatment - the results obtained at one time may not be representative of the actual results, e.g. a negative reaction to the program at a particular time may be due to other factors and could change over time.

It is virtually impossible to eliminate each of the threats described as, many times, they are not controllable by the program. An awareness of them can assist the managers in correctly analysing the results of the data or improving the data collection mechanisms to decrease their effect. For example, instrumentation error can occur if the nurses do not have a consistent rating system. If a wide fluctuation of patient categorization is taking place, it may be due to the non-standardized scoring and not the variation in the patients. A review of the procedures for patient categorization may reveal the problem. This may be more evident when comparing the severity indices from the tertiary centres on the patients. Their scoring system may not align with the one used by the air ambulance and, therefore, give misleading results.

In summary, the use of a microcomputer system can enhance the ability of the Air Ambulance Program to conduct an evaluation of its efforts. The utility of the evaluation will be further increased by attempting to limit the threats to validity.

6.7 ENDNOTES

- [1] Minutes of the Evaluation Assessment Study Meeting, August 07, 1985.
- [2] C. Clifford Attkisson and William A. Hargraves, "A Conceptual Model for Program Evaluation in Health Organizations", in Program Evaluation in the Health Fields, Vol. II (New York: Human Sciences Press, 1979), pp. 53-72.
- [3] Conversation with Mr. H. Wilson, MHSC, August 23, 1985.
- [4] Conversation with Mr. H. Wilson, MHSC, August 23, 1985.
- [5] Janet Goldenberg and Raymond Panko, "From Here to Mainframe (and Back)", in PC World, Vol. 3, No. 9 (Sept 1985), p 112.
- [6] Christina J. McClung, John A. Guerrieri, and Kenneth A. McClung, Jr., Microcomputers for the Medical Professional, (Toronto: John Wiley and Sons, Inc., 1984), p. 97.
- [7] Tan A. Summers, "Hard Disk Tape Backup Systems," in Popular Computing, 4, No. 11 (1985), 59.
- [8] Computer Buyer's Guide and Handbook, July 1985, p. 73.
- [9] Conversation with Mr. G. Blaine, IBM, September 05, 1985.
- [10] Lamont Wood, "The Compaq DeskPro 286 and Portable 286," in Popular Computing, 4, No. 11 (1985), 84.
- [11] Thomas D. Cook and Donald T. Campbell, Quasi-Experimentation Design and Analysis Issues For Field Settings (Chicago: Rand McNally College Publishing Company, 1979), p. 41-74.

Chapter VII

CONCLUSIONS AND RECOMMENDATIONS

The assessment study was described by the program director as a worthwhile exercise which assisted the Air Ambulance Program in focusing its evaluation issues and concerns. With an understanding of the issues, the managers were better able to plan their data collection needs or modify the implementation process to meet the concerns. The director stated that such a study should be carried out with all new programs at the MHSC.

This final chapter draws together the findings of the study. First, the more general conclusions are outlined, then each objective is considered individually and the conclusions related to it are listed. Recommendations, limitations, and areas for further research conclude the study.

7.1 CONCLUSIONS

7.1.1 General Conclusions

1. The study was able to describe a cross-section of opinions about the evaluation concerns at a specific period in the program's evolution. As a planning tool, the managers can now anticipate the issues that are facing the communities impacted upon by the pro-

gram. The suggested standards and data stated by the people interviewed will also assist the managers in meeting the evaluation concerns.

2. A major contribution of the study was its ability to document the evolution and description of the program at the time of its implementation. It provides a basis or foundation from which comparisons can be made in the future. This will allow the managers to evaluate their progress or see the changes that have occurred.

7.1.2 Identify Relevant Decision-Makers

1. The program director and the program managers were able to identify relevant decision-makers and information users from the suggested categories of communities.
2. There was no lack of interest in the program from the identified people. All but three agreed to be interviewed and gave the researcher substantial amounts of their time. The three individuals who deferred did so because they knew of other people in their organizations who were more familiar with the program and who would be more qualified to comment on it. These people agreed to be interviewed.
3. All of the people interviewed are affected by the program. They are also able to exercise influence in

how the program will operate by virtue of their senior positions in the medical community, political office, and the administration.

7.1.3 Develop an Understanding of the Program

1. Through a review of the program's files, the interviews, and transient observation, a description of the program from 1983 was compiled. This description was reviewed by the program director and managers and was found to be accurate.
2. The problems of air transportation of patients from the rural areas of Manitoba were well documented. Numerous submissions for improvements to the system had been forwarded from both internal studies and external investigations.
3. The reorganization of the Department of Emergency Health and Ambulance Services (EHAS) from the Insured Benefits and Administration Division to the Facilities Division was seen as an appropriate shift.
4. Responsibility for the finances and standards of the program ultimately rests with the Director of Rural Facilities and Ambulance Services. Managerial control is exercised by the Manager of the Air Ambulance Program. The medical aspects of the patient care are the responsibility of the Medical Director and the first level of administration above the operational

level is held by the Flight Nurse Supervisor. The provision of the pilots, maintenance, and servicing of the aircraft is the responsibility of the Department of Highways and Transportation. MHSC is billed on a cost recovery basis for these services.

5. The program is designed to meet three areas of need: expansion of the transportation phase of the High Risk Neonate Program; emergency medical patient transport for the North; and emergency medical patient transport for the other areas of the Province. It is to be achieved through the use of four components: a specifically designed and equipped aircraft (Cessna Citation "S" II); central coordination and dispatch; trained staff (6 Flight Nurses and 10 pilots); and central authority to provide standards and oversee operations (Manager, Medical Director, Pre-Hospital Care Medical Advisory Committee). To date, all the components with the exception of the central dispatch have been functioning.
6. The air ambulance can only be utilized by meeting certain medical criteria. All Manitoba residents will be eligible for the service although the availability of suitable airstrips will limit the usage to residents with access to such facilities.
7. The assurance of the quality of care, medical audits, and the evaluation of the performance of the Flight

Nurses are the responsibility of the Medical Director and the Flight Nurse Supervisor. The Medical Advisory Committee will assist and advise in these matters. Financial audits will continue to be conducted through the Audit Division of the MHSC.

7.1.4 Determine Program-Specific Evaluation Concerns

1. The people interviewed were able to identify program-specific evaluation concerns from their various perspectives. These concerns were verified through the confirmation of the accuracy of the synopses. The most frequently stated evaluation issues over the first year of operation were the prioritization of the patients followed by the level of care, response time of the aircraft, education, and costs. There was general agreement between the MHSC group and the non-MHSC group on the issues of prioritization, level of care, and costs but the non-MHSC group stressed response time and education while the MHSC group emphasized staff training and communications.
2. The one to five year concerns were generally seen as extensions of those of the first year. Other issues that were stressed include: expansion; utilization; and level of care. There was agreement between the MHSC group and the non-MHSC group. The people interviewed also suggested standards of performance and

data that would reflect those standards. These findings were reviewed by the program director and managers as well as the associate executive directors of the MHSC.

7.1.5 Review Previous Evaluation Studies

1. Evaluation research is a relatively new field and it is just beginning to define its boundaries and standards. Utility appears to be a primary objective and an understanding of the decision-maker's needs is required to maximize the usage of the evaluation results.
2. Health care evaluations have generally been orientated towards the measurement of health services and comparing their delivery to empirical or normative standards. The lack of such standards for air ambulance services has hindered the evaluation of those services.
3. Most of the evaluations of the air ambulance services have been descriptive in nature. Few controlled experiments have been carried out and the results of these have been inconclusive. The benefits of the services may be more in the ability to bring highly trained staff and specialized equipment to a patient than in the actual transportation of that patient.

7.1.6 Possible Evaluation Approaches and Options

1. The decision-makers of the Air Ambulance Program had the opportunity to respond to the findings of the interviews. They agreed that the program lacked the capability to collect the required information and requested that the study investigate the feasibility of using a microcomputer to fulfil this task.
2. The investigation revealed that, although the amount of essential data that would need to be collected was not great, there were limitations imposed by the lack of a microcomputer policy at the MHSC and by the inexperience of the managers with these machines. These limitations would be best met by considering microcomputers that could be supported (technically and with training) locally.
3. Eight machine purchase options were outlined based on their cost, compatibility with the host, and expansion. Each, with suitable software packages, would be able to store and analyze the essential data requirements of the program.

7.2 RECOMMENDATIONS

1. The Air Ambulance Program should consider the purchase of a microcomputer to handle the data collection, storage, and analysis functions of the program. Each of the suggested purchase options would be suf-

ficient for the needs of the program and the final decision should be based on the managers' requirements for portability, the cost and purchasing options in relation to their budgetary constraints, and the degree of expandability of the systems.

2. The staff and managers should undertake training in the use of the microcomputer. This could be achieved through government departments or through commercial companies. The amount of training required to make the users conversant with the machine is not great and could be done in a relatively short time period.
3. The managers of the program should continue the discussions with the Information Services at the MHSC and with the managers of the hospital record database to devise ways in which the microcomputer could access their systems. With the increased informational capability that these systems offer, the program would enhance its own ability to evaluate itself and reduce the amount and costs of the data collection.
4. The lack of standards for the air ambulance services in general is inhibiting the evaluation of those services. Close communications with other air ambulance programs or organizations that are studying this problem should be established. There is a particular need to set consistent patient condition ratings and diagnostic scores so that pre- and post-treatment

data can be analyzed to determine effectiveness. Consistent indices or scores would also increase the ability of the program to compare itself to other similar services. Maintaining good liaisons with other air ambulance operations would also assist the managers in keeping in touch with new technologies or designs relevant to their operation. In the long term, this would assist them in making decisions on the more fundamental aspects of the program such as the type of aircraft, the medical equipment, and other technological or procedural questions.

5. Surveys were seen by many of the people interviewed as an adequate way to gather information on the acceptability of the program and to identify the community's needs. Consideration should be given to establishing a longitudinal survey study to measure these factors. A more closed questionnaire study which deals with the stated evaluation issues could be implemented at a relative low cost. It is recommended that this be done on a yearly basis.

7.3 LIMITATIONS

Although the individuals' concerns were able to be verified, the aggregation of these concerns led to some difficulties. The study chose an open-ended format which allowed for free expression by the respondents. The summation of

these concerns was somewhat arbitrary as the choice of category in which to place each one was made by the researcher. Compounding the problem was the fact that many of the concerns overlapped, i.e., the availability of the aircraft will affect its utilization and costs. The trade-off between the need for openness of response and the difficulty in aggregating the results posed the major limitation upon the study.

7.4 AREAS OF FURTHER RESEARCH

The concept of assessing the evaluability of a program as part of its implementation process is relatively new. There are many questions of its usefulness that remain unanswered and may not be answerable until the program reaches a level of maturity. How well did the people interviewed predict the actual evaluation concerns of the program? Was the suggested data adequate to meet the needs of the program? To what degree can a microcomputer system analyze the data and produce meaningful results for the managers? Were the managers able to overcome the technical and training limitations of these systems?

There are methodological questions that require further research. Was the inclusion of the verified synopses an adequate way to present the concerns to the decision-makers given the amount of time and effort it takes to read and di-

gest them? Could a different method of data collection, that would enable easier aggregation of the results, have been employed and yet have left the respondent the freedom of expression? Are there research designs that would have allowed the researcher to make more generalized conclusions from the study?

The hospital and claims databases in Manitoba should be available for evaluation purposes. How well can a program, such as the Air Ambulance Program, utilize their capabilities within the technical, administrative, and ethical constraints? What are the interactive qualities of microcomputers with these systems and how can it be improved?

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Appendix A

GLOSSARY OF TERMS

Activities - the major work tasks and any powers and functions that characterize a given program which are performed or administered by the program personnel[1].

Air Time - the time the aircraft is physically in the air.

Bit - acronym for binary digit, an electronic signal or a piece of data, or a number which is viewed as having exactly two states which might be: on or off, one or zero, yes or no[2].

Byte - a group of bits, usually eight, universally used to represent a character[3].

Compatibility - the ability of two units to work in harmony, usually software and hardware. In most cases, computer compatibility refers to software compatibility[4].

Data Integrity - the quality of data that exists as long as accidental or malicious destruction, alteration, or loss of data are prevented; preservation of data for its intended purpose[5].

Disk Drive - an electromechanical device that stores or recalls information from a disk[6].

Diskette (Floppy Disk) - a thin, flexible magnetic disk and a semi-rigid protective jacket[7].

Document Analysis - the systematic gathering of information on a program from a review of its records and reports[8].

Elective - medical services that are required but are not available to the patient within their own community facilities. Patient's disorder is not considered to be acute[9].

Emergency - a situation requiring immediate medical treatment. A delay would be harmful to the patient as the disorder is acute and there is a potential threat to life or function[10].

Emulation - the imitation of all or part of one computer system by another, primarily by hardware, so that the imitating computer system accepts the same data, executes the same program, and achieves the same results in the imitated computer system[11].

Evaluation Assessment Study - an analysis of the nature and extent to which evaluation issues can, and perhaps should, be addressed and would consider options for actually carrying out the ensuing evaluation study[12].

Evaluation Study - the systematic collection of information about the activities, characteristics, and outcomes of programs, personnel, and products for use by specific people to reduce uncertainties, improve effectiveness, and make decisions with regard to what those programs, personnel, or products are doing and affecting[13].

Expansion Slots - connectors on the inside of the computer used to add peripheral devices, extra memory, or special functions[14].

Flight Time - air time plus any taxi or manoeuvring time.

Floppy Disk - see diskette.

Hard Disk - a mass storage magnetic medium that uses a rigid-material disk for mass storage of data. Usually nonremovable, hard disk systems are faster and can store many times more data than is possible on same size floppy disks[15].

Hardware - the physical components of a computer; some examples are the central processing unit, the printer, the keyboard[16].

Host (Mainframe) - the box that holds the computer's main memory, associated controllers, microprocessor, and logic components. Also used to distinguish very large computers from minis and micros[17].

Kilobyte - 1,024 bytes or approximately half a typed page[18].

Mainframe - see host.

Megabyte - 1,048,576 bytes or approximately 500 typed pages[19].

Microcomputer - an integrated, complete, small computer system built around a microprocessor, memory and input/output devices, and containing a powersupply. All personal computers are microcomputers[20].

Microprocessor - an integrated circuit that performs all of the mathematical and logical operations necessary for the functioning of the computer system[21].

Objective - a normative statement of what impacts and effects the program is specifically designed to accomplish or contribute to[22].

Outputs - the goods, services, regulations, or provisions in tax law which are produced or directly controlled by program personnel and distributed outside the program organization[23].

Random Access Memory (RAM) - a type of temporary storage device in which data can be written into or retrieved. Data stored in RAM is irretrievably lost when power is shut down[24].

Patient Time - the flight time that the patient is onboard the aircraft.

Response Time - the time between the official notification of the transfer and the engines on time of the aircraft.

Results - the collection of outputs, and impacts and effects associated with a program[25].

Software - the detailed instructions or programs that tell the computer what to do in a certain order to achieve specific results[26].

Stabilization Time - the time from when the flight nurse or team first attends to the patient until they leave the referring facility.

Time Of Call - the time the referring facility, after consulting with a receiving physician, informs the dispatch that a transfer is required.

Transient Observation - the process of observing a program as an outsider without disguise within a tight time constraint[27].

Trip End Time - the signover time at the receiving facility.

Turnaround Time - time between the engine off time and the signover time or the engine off time and the time the aircraft is ready to respond to another call, whichever is the greater.

Urgent - a situation requiring medical attention within a few hours. The patient is in danger if not attended to as the disorder is acute but not necessarily severe[28].

A.1 ENDNOTES

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- [7] Rosenberg, p. 151.
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- [9] MHSC, Northern Patient Transportation Program, p. 4.
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- [12] Minister of Supply and Services Canada, p. 17.
- [13] M.Q. Patton, Practical Evaluation (Beverly Hills, California: Sage Publications, Inc., 1982), p. 35.
- [14] Willis, p. 339.
- [15] CBG&H, p. 191.
- [16] McClung et al., p. 147.
- [17] CBG&H, p. 192.
- [18] McClung et al., p. 148.
- [19] McClung et al., p. 148.
- [20] CBG&H, p. 192.
- [21] CBG&H, p. 192.
- [22] Minister of Supply and Services Canada, p. 84.

- [23] Minister of Supply and Services Canada, p. 84.
- [24] CBG&H, p. 192.
- [25] Minister of Supply and Services Canada, p. 84.
- [26] CBG&H, p. 192.
- [27] Murphy, p. 112.
- [28] MHSC, p. 4.

Appendix B

QUESTIONNAIRE AND INTERVIEW GUIDE

Questionnaire

The Air Ambulance Program will be providing a 24-hour, emergency airlift service throughout Manitoba commencing in the fall of 1985. From the viewpoint of your needs and experience, please list the major concerns, issues, and/or questions that you believe the program should address within the categories provided. For each concern, please indicate what would constitute an acceptable standard of performance for the program and the type(s) of data that would describe that level of performance. Lastly, please briefly describe how this data, if generated, would assist you in making decisions about the program and its improvement.

CATEGORY 1: THE FIRST YEAR OF OPERATION

1. Please list the three most important concerns, issues, or questions that you need to have answered within the first year of operation of the air ambulance program.
 - a) 1.

 - b) 2.

 - c) 3.

2. What would constitute an acceptable standard of performance for each of the above concerns, issues, or questions?
 - a) 1.

b) 2.

c) 3.

3. What types of data would describe the acceptable standard of performance for each concern, issue, or question (please be as specific as possible)?

a) 1.

b) 2.

c) 3.

4. What decisions would you make if the results of the data showed that:

a. the performance was acceptable;

b. the performance was unacceptable.

a) 1. a.

b.

b) 2. a.

b.

c) 3. a.

b.

CATEGORY 2: FROM ONE TO FIVE YEARS OF OPERATION

1. Please list the three most important concerns, issues, or questions that you need to have answered from the end of the first year of operation to the fifth year.

a) 1.

b) 2.

c) 3.

2. What would constitute an acceptable standard of performance for each of the above concerns, issues, or questions?

a) 1.

b) 2.

c) 3.

3. What types of data would describe the acceptable standard of performance for each concern, issue, or question (please be as specific as possible)?

a) 1.

b) 2.

c) 3.

4. What decisions would you make if the results of the data showed that:

a. the performance was acceptable;

b. the performance was unacceptable.

a) 1. a.

b.

b) 2. a.

b.

c) 3. a.

b.

INTERVIEW GUIDEBackground

1. Personal

- a) As the _____, what is your role and what are your responsibilities with the department?

- b) Please briefly describe how your position fits into the organizational structure of the department, i.e., vertical and lateral directions.

- c) How much control or decision-making power do you exercise in the department?

- d) How does your role fit into the objectives of your department?

2. Program

- a) How long have you been involved (were you involved) with the air ambulance program?

- b) What was your role in the conception of the program?

- c) How has the program changed since you have been involved and what inputs did you have into the changes?

- d) What were some of the reasons or concerns that may have caused any changes in the program as it has evolved?

- e) Please outline how you influenced and/or interacted with other people during the evolution of the program?

- f) How has its development meshed with the general health care objectives of:
 - i) the department?
 - ii) the MHSC?
 - iii) the province?

Program Concerns (Based on the Questionnaire)

1. Please briefly explain each of the issues, concerns, or questions that you have listed.

2. Looking at each one separately, what sort of output or process must the program produce to meet each issue?

3. What form of data would best describe the output?
4. How could a decision be made from the data?
5. How would you change your operating procedures or practices if the data indicated a negative result? a positive result?
6. If this data would not allow you to make any conclusive decisions, what other data would you require to supplement it?
7. If you had to pick the 3 most pressing concerns or issues that needed to be addressed within the next year, which ones would you choose?
8. Which concerns should be evaluated within 1-5 years? longer than 5 years?
9. What criteria or accepted notions of a well-implemented program exist that would show the program managers that they are meeting the issues?

Organizational and Political Setting

1. What have been the constraints that have or could inhibit the department in meeting the issues you have outlined?

2. Which of the constraints do you feel will be of primary concern to a new program?

3. From your experience, how have the procedures and practices of the department met the constraints that you have listed?
 - a) Overall, has the department been successful with its procedures?

 - b) Where has it been the most successful?

 - c) Where has it been the least successful?

Essential Program Features

1. What would be the components or the characteristics of the air ambulance program?

2. How do you see these components working together in the program?
 - a) Who are the individuals who would be running the components?

 - b) How would they operate?

3. How will the program be regulated?

4. Who will be the major beneficiaries of the program?
 - a) How will they benefit?

 - b) Who will not benefit?

Appendix C

MEDICAL ADVISORY COMMITTEE

TERMS OF REFERENCE

Recommend and advise on levels of training as recognized by the Province for air and land ambulance service.

Recommend and advise on provincial standards relative to the operation of ambulance services, levels of care and training for ambulance personnel.

Recommend and advise on equipment and adjuncts relative to the safe operation of the ambulance and the care of the patient.

Recommend and advise on new types of vehicles specific to patient care and consideration.

Recommend and advise on policies and procedures for treatment and/or acts relative to training programs.

Recommend and advise on medico-legal considerations relative to treatments and/or medical acts performed by non-medical staff of air and ground ambulance services.

Recommend and advise on changes to applicable legislation.

Recommend and advise on audit and review of provincial programs and data collection relative to quality assurance.

Recommend and advise on public and professional education and development, as well as inservice program and function-related training.

Recommend and advise on advanced programs or desired programs which are not currently part of ambulance function but might be considered in whole or part in future, i.e. ACLS, ATLS, etc.

Recommend and advise on involvement of teaching institutions, professional agencies and such, relative to appropriate professionals being utilized in training programs and recognition by professional agencies or institutions of training programs.

Appendix D

SYNOPSIS OF INTERVIEWS

SYNOPSIS OF INTERVIEW #1

FIRST YEAR OF OPERATION

CONCERN 1: Public Relations

"One of the most major concerns that I have is that the system be nothing but totally professional and accepted as such within the system." It has to be presented as an extremely capable service and not just a taxi. "When these people (air ambulance) come into the community, the medical society in that community have to realize that these people know what their job is far better than they do and, during the time that the patient is in the care of the air ambulance personnel, they've got to have total confidence in the ability of these personnel." There is a need for "a high public relations profile before the service gets into operation and you just can't do that in 20 minutes in a community with your fancy politicians and all the rest. You've got to get down to the meat and potatoes of the situation, you've got to talk to the doctors, you've got to explain to them, you've got to present this program."

The suggested indicators that the service is being favourably perceived were "the flight attendants have got to be of the highest calibre" and by surveys. These surveys should be sent to "all the hospital administrations that have been involved with the air ambulance service, all the doctors in those communities who have been involved, and the nursing staff that have been involved." They should be conducted at 6, 9, and 12 months. "I would suggest that if you can't get an 80% positive opinion by the 12 month survey then something is wrong."

CONCERN 2: Communications

"If we can get some kind of a coordinating centre put together for Air Ambulance and maybe Government Air Service and start working ground, long distance transfer coordination into it, it's going to be a big step toward a centrally controlled coordinating and dispatch centre for the Province." The centre should show that it works well by keeping the air ambulance on time and properly coordinated, that the

people have one number that they can call to get both information and have the air ambulance dispatched, and to coordinate long distance transfers. Feedback on how well the communications are working can be achieved by monitoring the general gossip. "We've got to have our feelers out there, our eyes and ears have to be open, and we've got to be able to listen to some of this gossip to see if there is any basis to it and follow it up."

CONCERN 3: Availability

There was a concern expressed over the "aircraft being tied up and not being readily available." This could occur by the fact that, if it is a good service, there will be an increased in demand or by abuse of the aircraft. The standards for judging this was the patient criteria. Along with this, "you've got to have a back-up system to tell this doctor that this patient doesn't meet the criteria and other transport is more suitable." There is a need for a peer group review.

CONCERN 4: Improvement in the Ground Ambulance System

"Air ambulance personnel presenting themselves as professionally as they plan to is also going to reflect on the professionalism and the general attitude that the ambulance service on the ground is met with by the peer professions." This program is starting to make a major awareness in this province of pre-hospital care and with that awareness will come more financial support which will lead to an improved service. The indicators of this improvement would be higher training levels, more coordination and more full-time services.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Primary Response Using Rotary Craft

"I certainly see rotary craft response out of Thompson into the isolated districts for primary response." It was suggested that the communities within 150 miles of Thompson be looked at to ascertain the types of injuries that are occurring and the number that are coming in by bush plane, cross-country, or by other means of transportation.

SYNOPSIS OF INTERVIEW #2

FIRST YEAR OF OPERATION

CONCERN 1: Is the service meeting the primary objective of being available to transport the acutely sick and injured within this province to an appropriate level?

The criteria stated that would indicate if the objective was being met were the number of airports the aircraft was getting into and the types of patients that were being carried. "There is no reason we can't get into major airports with appropriate landing distance in IFR 90-95% of the time." The appropriate airports are the ones stated in the report from the Government Air Services. Further, the service should be able to respond in 20 minutes, that is, from the time that the aircraft team is contacted to the time that the aircraft is airborne. This does not include the times that the service is already in use. "Our time away, never mind the additional down time, is going to be somewhere between 6 to 10 hours on the average per day where we are "out of service" because we are responding to a call, actually have a patient onboard or delivering a patient to a facility." How long it takes to respond to a call depending if the nurse is at the hangar or at the hospital needs to be assessed as well as the time it takes to get to the destination, have the patient placed onboard, and fly to the desired facility.

The types of patients will need to be categorized according to the injuries and the severities. To judge if the equipment and training is adequate, the location of the transfer will also need to be recorded. It is "important from our point of view to make sure that we have the necessary equipment and training to deal with those kinds of things and also to complain to Rural Health Division or Medical Services if the people were not prepared in anyway shape or form and its putting an unfair burden on us." This data would also be useful in the justification for the development of specialty teams.

CONCERN 2: Costs

The service should have a cost per mile that is in the running ballpark with charters. "If we are costing 2 to 3 times what a comparable service might give, I mean that if we're not improving the health care, there is no way that I'm going to be able to justify having another aircraft or expanding the program or anything else." It was stated that many of these questions are going to be asked 6 months after the program is started, just before the new fiscal year. Some the cost decisions that could be made included the need for a 24 hour service, the number of crew members, and the use of teams.

CONCERN 3: Level of Care

It was felt that this issue is very subjective and could not be accurately measured in the first 6 months due to the "green" period of the staff. "In fact probably a more valid one (evaluation) would be 2 to 3 years. I would be very excited to see a 5 year evaluation because then you have worked through all the seasons, all the lean years as well as good years, changes like going from Lynn Lake to Limestone, green periods and carry over of staff." It was stated, though, that an evaluation is necessary after 6 months and one should be conducted at 12 months. A mechanism is needed to flag any questionable cases so that an on-going review could be done on the quality of care. An audit process was required right from the beginning.

ONE TO FIVE YEARS OF OPERATION

The longer term was seen as an extension of the first year's issues. There was a need to access a data base to cover the total patient care. Some assessment of the impacts of the program on both the transferring and receiving hospitals will be required. Indicators could include the increase use of beds in the ICUs in Winnipeg or the decreased time that the patient spends in hospital. Trends or patterns of the demand for the service in the remote/rural areas will also have to be examined. The impact of the High-Risk Neonate Team will also be important. Such data as the timing involved in the transfers, the problems with the ground ambulances and the decreased stress on the patients need to be analyzed. Lastly, the socio-economic impacts should be looked into, especially with regards to the commercial and charter companies.

SYNOPSIS OF INTERVIEW #3

FIRST YEAR OF OPERATION

CONCERN 1: Patient Care

"The patient care must be at or above the acceptable standards. The pre-flight preparation of the patient and inflight care must be comprehensive and competent." It was stated that it will be difficult to gather objective data on the level of care. Measurements of the vital signs before and after the transfer, the level of consciousness, and whether or not the patient remained in a stable condition inflight were some suggestions. The patient's records would be the primary source of data. It was felt that these records should be as complete as possible and should try to include police, fire, or ambulance reports from the scene of the accident. One problem that was outlined was the lack of information from the emergency departments of the hospitals. "The reports are written but never entered into a computer so whatever happens in emergency sort of goes into a black hole." A suggested solution was to ensure that the forms used to collect the information on the patient be consistent throughout the system and that this information be able to be stored in a computerized data base. An acceptable standard of care for the service was stated to be at or above the pre-flight level in "at least 90% or higher" of the cases and this standard is expected right from the beginning of the service.

CONCERN 2: Staff Training

"The previous experience and training of the flight attendants and pilots should be sufficient to equip them to perform patient care to the level that we've described." This would include both training and clinical experience. "Basically you're looking for a data collecting and an evaluation process that has to be able to tell you what you are doing and also, hopefully, how you've handled it." The types of data would include: from where the transfer was made, the reason for the transfer, the origin of the patient and the means of transport from the community to the transferring facility, the time enroute for that transfer as well as the time for the air ambulance transfer. The condition of the patient on arrival at the receiving hospital should also be incorporated. Through analysis of this, some decisions as to "whether the patient has presumably received any further injury or been made worse because of the type of transport" should be able to be made. By collecting statistics on the length of stay in hospital or the outcome of the transfers, i.e., mortality/morbidity, some inferences as to the costs of the service relative to other types of transports could also be made.

It was felt that the data stated above would not tell the whole story and that it was needed to be supplemented by qualitative analysis. Questionnaires were seen as an appropriate means of collecting this. The receiving hospitals should be surveyed starting right away then after 6 months and 1 year. The referring facilities should also be surveyed as well as the patients who received the care and the general community. This could be a time consuming process and the assistance of a profession service to carry it out or a research assistant at the MHSC would be necessary. If the standard proved to be acceptable, the personnel should be informed and encouraged to continue their good work. If the performance was unacceptable, again personnel should be informed and further in-service training should be considered.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Patient Care

The concerns of the first year will be extended to the following years but there will be an emphasis on the training and equipment needs. A review will be required of the new technological advancements in equipment.

CONCERN 2: Community Needs and Referral Hospital Needs

"We would then have the data coming in after a year or so of where our hot spots or our problem areas were and maybe other things that we could do to improve the level of care right in the community." The data that was suggested included the proportion of the patients carried who suffered death or disability as a result of their transportation and the proportion of the remote communities and referral hospitals who felt that the needs of the patient and the hospital have been met. It was stated that an acceptable level of service would be if 60-70% of the communities surveyed found that it was meeting their needs.

SYNOPSIS OF INTERVIEW #4

FIRST YEAR OF OPERATION

CONCERN 1: Improved Standard of Care for the Patients in Flight

The criteria suggested for judging the quality of care was the M.A.R.N. Standards. This would include an analysis of inputs, processes, and outcomes in some form of medical audit. The data would be information that indicates that the patient was "safely transported". Although this is difficult to measure, such things as morbidity and mortality rates could be collected. The comparison with other statistics from other sources such as Health and Welfare Canada and studies done at the M.H.S.C. would also indicate if the service was being effective.

CONCERN 2: Cost Effectiveness

One criteria for measuring the cost effectiveness of the program would be to measure the impact on staffing on the rural facilities. Does the service reduce the time the nursing staff spends away from the facility? Will it reduce the regional budget requirements? The types of data that could be collected include the cost per patient transfer, the reduction (if any) of nursing hours for critically ill patients in the rural facilities, the reduction (if any) of the education costs for in-flight training for the nurses at those facilities, and the cost to maintain the service. Not only should the data indicate if there is a reduction but it should show by how much.

Another cost factor has to do with the cost to the patient. Presently the patient is liable for the costs of the nursing staff on an air transfer. How will the patient now be billed with the new service? What will happen if the new service is not available? How will the patient be billed?

CONCERN 3: Impact on Tertiary Care Centres

Bed utilization in the transferring and receiving facilities would be one of the criteria of measuring this impact. Some indicators would be changes in the use of the beds, more beds being freed up in the rural facilities, and the ability of the receiving facilities to handle the amount of incoming patients. These factors will also have an impact on the regionalization of services.

OTHER CONCERNS: Need for Public Information About the Program
Audit of the Training Program of the Flight
Attendants

ONE TO FIVE YEARS OF OPERATION

The long term concerns were generally extensions of the ones described in the first year of operation. Mortality and morbidity rates would still indicate the effectiveness of the service. Cost effectiveness would remain a concern as well as bed utilization. The acceptable standards of the service could be judged relative to other programs in the United States and in Canada.

An additional concern was how to decide on whether "add-ons" would be required, i.e., helicopters or other aircraft. The data that needs to be collected to indicate if feeder systems will be required include: locations of the initial transfers, the number of transfers, and the cost alternatives to implementing such a system. There would also be a need to investigate the stabilization techniques used prior to the transfers, the degree of alleviation of the difficulties in the rural facilities, the social changes in the communities, and the changes in the attitudes and expectations of the people in the rural areas towards the health care system.

In summary, the largest concerns were the improved standard of care and the cost effectiveness of the service. The impact it will have on the staffing in the rural facilities and on the bed utilization in the transferring and receiving facilities will be a major factor. The expectations of the people receiving the service will also be critical.

SYNOPSIS OF INTERVIEW #5

FIRST YEAR OF OPERATION

CONCERN 1: Just which airstrips in Manitoba can serve the Citation jet aircraft?

"The statement saying that this will serve all of Manitoba is basically incorrect because you have to have an airstrip that can handle the Citation." It was stated that the plans for equipping the aircraft were excellent but there will be a need for evaluation by maintaining logs of the flights accepted, the times involved, those that are delayed or not accepted with reasons and, essentially, very complete records of all requests. Part of this would be to "evaluate emergency calls from centres not served by the aircraft" in terms of volume, timing, and service to the patient. Then the question of "how can it (air ambulance) serve the rest of the province that might need air service" should be looked at. It will be necessary to know to what extent will the emergency service of the Citation be supplemented by smaller aircraft or commercial flights. Most of this data could be stored and analyzed through a computer. An acceptable level of service would be indicated by the promotion of better and more airstrips in the southern part of the Province that can serve the Citation jet.

CONCERN 2: Abuse of the Service

"I'm very concerned about the abuse of the service from the North because if this service is available by a phone call are there going to be less transfers by commercial aircraft?" Will the calls be evaluated for true emergencies? At the same time, it was stated that the service itself could just be forgotten if it isn't used sufficiently. "I think somewhere they're going to have to work out a happy medium of keeping people busy without overtaxing the system." The types of data that need to be collected included: the age of the patient, the diagnosis, and the severity of the situation.

CONCERN 3: Effect of Aircraft Flight on Patient

Concerns were expressed about the effects of pressure, ascents and descents, and transfers from the hospital to the aircraft and the aircraft to the destination hospital. "It's just as important that if you're going to have a super aircraft to transport the patient that the patient get out to that aircraft in a decent vehicle and lifted into that aircraft under horrible weather and out again with minimal exposure to weather and trauma." It was suggested that a system be devised to allow the ambulances to back up to the doors of the aircraft as closely as possible. A feedback

system will be required to ascertain if the patient arrived in reasonably good condition as compared to what they were like when they left. Also, "you have to have some official way of Medical Director to coordinate the management of the people that are here at this end" to see what improvements could be made.

ONE TO FIVE YEARS OF OPERATION

"Five year plans are for the birds." It was believed that the service must be planned for 5 years but changes and concerns will developed from year to year. "Get your first year through first then sit down and look at a five year plan." After this time, comparisons could be made with similar programs.

SYNOPSIS OF INTERVIEW #6

FIRST YEAR OF OPERATION

CONCERN 1: Avoiding Abuse of the System

"I feel that there could be undue harassment or the doctor is going to be under a lot of pressure from time to time that why not call it an emergency case so he (the patient) can fly at no cost." A set of guidelines would be required to be provided to all the doctors. It was stated that there will be a problem of consistency in the interpretation of the guidelines so statistics from other jurisdictions will need to be collected for comparison purposes. Even with this data, "it is pretty difficult to put some kind of value or assessment on what would be a minimum of abuse."

CONCERN 2: Response Time

"How much quicker will the air ambulance be when you take into account the ambulance at each end?" It was stated that the service should demonstrate a clear saving of time and "if there isn't much saving in time, is it worth the extra cost?" On this issue, he felt there were many question marks as to how it is going to work.

CONCERN 3: Impact on Surface Ambulance Service

"If the loss of these long trips makes his operation (surface ambulance) unviable then I guess the whole grant structure and financing has to be examined at that time." Although the community perceives the present service as a good one, there is concern over the mounting costs of the ground transports. "I'm concerned as to maintaining that viable ambulance service complimentary to the air ambulance and whether the municipalities that are involved in the hospital district here can resolve this satisfactorily with the ambulance operator." It was stated that the program should have some component that allows them to go out and speak with the ground operators. "It has to be right off the bat and not allowed to fester away."

ONE TO FIVE YEARS OF OPERATION

The issues and concerns expressed in the first year were seen to carry over to the following years. One additional concern was the upgrading of the airport in the district but it was felt that this would be completed in the near future.

SYNOPSIS OF INTERVIEW #7

FIRST YEAR OF OPERATION

CONCERN #1: Communications

"One thing that we all see here is that we are going to need a proper dispatch/communication system." Specifically, "we need something that we are capable of communicating with one person in a dispatch centre at any time from any point in the Province." The system would have to access weather information, runway conditions, facility information, doctor listings, hospital stations, international communication capabilities, and the air inventory of the Province. It should then be able to coordinate not only the air ambulance traffic but other hospital patients coming in or out of facilities. "It needs to be computer enhanced." The primary source of data to indicate that the system was working properly would be the response time and the ability to complete the mission. It was stated that there could be substantial cost savings by having such a system through the provision of better information to the pilots as to the feasibility of the flight and through the coordination of patient transfers. It was estimated that such a system would require 6 personnel and hardware at a cost of \$100,000. "I figure we in Air Services could use 60% of that system so we should contribute appropriately." The system should also be "capable of being developed as technology, systems, and methods change and conditions improve." The system would need to be assessed on its adequacy for the patient, the attendant, the hospital, and the ground ambulance interface.

CONCERN 2: Decision Making on Transfers

In the past, "it all pointed that the pilot was making this decision and he shouldn't be and when the original inception of this, it was to have a qualified doctor/medical coordinator. Now, as I see it, it's down to a nurse level again which is going to pose a problem because you're going to have a nurse arguing with a nurse in a hospital." There is a need for a doctor to make the decisions. Concern was also expressed on what will happen when the nurse is on a trip. How will other emergency calls be handled?

CONCERN 3: Turn Around Times

With the present system, as seen from Air Services, "we are now going to make the system go into a delay mode." It was felt that the time it takes for the nurse to accompany the patient to the hospital and return with the equipment will be excessive and the "efficiency of the system will go right down the tubes." The standard for turnarounds should be no more than 15 minutes. Data needs to be collected on

the number of occurrences where the responses were delayed and the reasons for the delays. There is also a need to know the demand for the service. It was stated that, originally, Air Services planned to fly the aircraft 1000-1500 hours per year but now estimate that, with the built in delays in the turn around times, they will probably fly 500-600 hours per year. The average number of hours per day, week, and year will also need to be collected. This data will also assist in crew and maintenance scheduling.

CONCERN 4: Technical Equipment

A concern was raised over where the responsibility for the Air Services maintenance personnel starts and ends. It was stated that at present they are not trained in handling or repairing any of the medical equipment onboard the aircraft. "It would be a good idea to set somebody up to give us a briefing on the individual equipment." There will be a requirement for a qualified person to inspect and test this equipment. Periodical maintenance schedules should be established and testing procedures need to be examined. The equipment also should be certified and any potentially dangerous uses specified. A good reporting system between the medical staff and the maintenance staff will be needed to ensure that the aircraft systems are functional. Data should be collected on the number of hours out of every day and the number of days out of every month that the aircraft is serviceable. The reasons for any unserviceabilities should also be specified along with the times it took for the repairs.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Additional Aircraft

"An identification of the second airplane is going to appear if this system does work the way we think it will work." A feeder system may be required. This will depend upon the ability of the Citation to access the strips that the service is needed, the hours of utilization of the aircraft, and the cost analysis.

CONCERN 2: Maintenance

It was suggested that a maintenance life be placed of the aircraft based on hours or cycles with a maximum life of approximately 10,000 hours. The projected increasing maintenance costs due to the age of the aircraft should be compared with the replacement costs. Advances in technology should also be considered as the inside of the aircraft may need to be upgraded.

CONCERN 3: General

A concern was raised over the need for a general policy manual which outlines the duties and responsibilities of the personnel involved in the program. It was also stated that it was important that a member of Air Services sit on the Medical Advisory Committee. "We are not there to advise on medical matters, we want to be an observer and if there is an air question, it comes from the people who are doing it and not somebody who thinks that's the way it should be done."

SYNOPSIS OF INTERVIEW #8

FIRST YEAR OF OPERATION

CONCERN 1: Ambulance Act

It will be necessary to "go through it in terms of what we anticipate is the actual application of the service and see if at this stage there are discrepancies and, if there are any problems, to see what should be fine-tuned in the Act itself." As far as the legal aspects, it was stated that the aircraft is capable of being utilized for the purpose of an air ambulance, it can be brought into Canada and operated by the Government, and "there is a place in the existing infrastructure to operate it." "I guess the main thing is to have some system for some on-going evaluation so if there are problems that they are not just left." In terms of the ability to make changes to the Act, it was stated that the Act can only be amended when the legislature is in session. Regulations under the Act can be amended relatively quickly by an Order in Council. Any evaluation then should consider "a timeframe that would allow you to identify some problems and to then bring them through into changes to the Act." The best process was seen to be one which allowed for consultation with Legal Services.

CONCERN 2: Certification of Staff

"The nurses have a pretty broad role to play in the health care system and the critical thing is to see that they are trained to enter into these areas." It was important to get the people in the professions and the system together so that everyone recognizes that the nurses have the skills required. This was not necessarily seen as having to be a formal legal process. "The fundamental thing is that the people hired to do the work are properly trained within their sphere of authority, that is, if it is within the parameters of nursing."

CONCERN 3: Impact of Existing Businesses

It was stated that it was difficult to predict the legal effects of the air ambulance service as it relates to its impact of existing transportation services. There is a need for a feedback system such that the managers of the program would be aware of any legal decisions that would effect the air ambulance service.

SYNOPSIS OF INTERVIEW #9

FIRST YEAR OF OPERATION

CONCERN 1: Effectiveness of the Air Ambulance Program

"The patient care that is being provided by this service has to prove itself that it is a better service than what we had before." Some indicators of the better service included: decreased length of stay in hospital, a decline in the amount of treatment provided to the patient on arrival at the hospital, decreased morbidity and mortality, and a decrease in the time the patient spends away from their community. Comparisons could be made through a retrospective audit of the last year of the N.P.T. Program of similar cases.

Effectiveness would also have to be measured by costs. "Northern hospitals that have been providing the service prior to this, which is the escorts and the equipment, they should no longer have that cost." It was anticipated that there should be a 10-20% decrease in their costs which would be transferred to the Air Ambulance Program.

CONCERN 2: Use of Medical Teams

Data will need to be collected on the number of patients that required a doctor onboard, what kind of doctor, response times of the teams, and the actual frequency that the teams were used. Decisions will then have to be made on the feasibility of having specialty teams of standby.

CONCERN 3: Communications

"The air ambulance does not get called by the transferring facility but by the receiving facility." The number of misdirected calls will need to be known so that the education component of the program can be assessed.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Extension of First Year's Concerns

An continuing evaluation of the first year's concerns was seen as necessary. As a supplement, "how many patients are coming in that really should have come in by air ambulance and are not" was also deemed necessary to ascertain. It was suggested that this data could be collected through a survey of all the emergency departments of the receiving hospitals. Conversely, the survey would also indicate if "we are transporting patients that really don't need to be transported by air ambulance."

CONCERN 2: Expansion of the Program

A feeder service in the North is "probably one of the biggest ones (issues) that we'll have to deal with very quickly after the program gets started." Decisions will have to be made on whether an extra aircraft will be required, helicopters will be more feasible, and if charters should be used for the additional service. Information will need to be gathered on the locations of the initial transfers and the means by which these transfers were made.

SYNOPSIS OF INTERVIEW #10

FIRST YEAR OF OPERATION

CONCERN 1: Flight Nurse Capabilities

"If we are transporting critically ill patients, who is going to take care of those patients." It was stated that the Flight Nurses can handle most of the patients who are not critically ill but a concern was expressed that "there may not be enough time to cover everything that they are supposed to know" during their training. "If they require a doctor that is a specialist in critical care to take care of that patient, how are they going to get him?" Statistical data will need to be collected on the number of transports per year, the number of those that were critically ill, and the response times of the specialists.

CONCERN 2: Neonate Transports

"We definitely need respiratory technologists(RTs) if we will be going for very sick patients." "If we have a ventilator that is failing on us, we need the RT to figure that one out. We don't have the expertise to be trouble-shooting with our equipment." "If they don't give us the RTs then it's going to be dangerous for just a nurse and doctor to fly up North and come back with a very sick baby." It was estimated that each neonate call would average 6-8 hours before the team was back and since there is at present only one team, a back-up may be necessary. Of the 162 neonate transports conducted last year, 28% were airport pick-ups. This would be approximately 50 calls per year that a back-up team would be required. The data that needs to be collected to help make the decisions on the neonate team included: the location of the transfer, the mean time for a round trip, the length of time it takes to stabilize, and the number of babies that were transported that should have used the team.

CONCERN 3: Communications Between the Users and the Providers

"Part of our problem at the beginning (of the neonate program) was communications. People just didn't know who to call for neonatal transport." This problem was overcome through an outreach program (posters and visits), a survey, and by informing the users of what happened to the babies after transfer.

CONCERN 4: Response Time

"Even with our ground ambulance, we have at most one half hour from the time of the call to the time the team leaves the hospital and we still have difficulty with that." There

will be a need for a good time log whenever the team is utilized.

CONCERN 5: Insurance

A concern was raised over the coverage for the team itself when they are flying.

ONE TO FIVE YEARS OF OPERATION

The longer term concerns were seen as extensions of the ones outlined in the first year. It was expected that mortality and morbidity rates for neonatal transports would decrease but it was stated that there is not much documentation of past occurrences.

SYNOPSIS OF INTERVIEW #11

FIRST YEAR OF OPERATION

CONCERN 1: Are we meeting our mandate?

"Are we serving the urgent and emergent patients as we ought to be?" The standard suggested was stated to be "if 90-95% of the flights are properly categorized as emergent or urgent." It was explained that there may be differences of opinion from the flight nurse, referring physician, and the tertiary care facility as to the patient's status. "The flight nurse will have to make that decision when we finally do our stats, she'll have to decide whether for his (the patient's) area it was appropriately urgent or emergent and whether they maintained that status inflight." Data that need to be collected are whether, initially, the dispatch assigned category of urgency was correct. "If we can correctly categorize it at dispatch and that category is correct when we are on scene, then we can say that this data reflects to us well that we are serving urgent and emergent cases." If it found that the 90% was not being reached then the problem would need to be pinpointed as to its cause, e.g., inadequate information, incorrect categorization by the dispatch or flight nurse, or improper utilization.

CONCERN 2: Are we maintaining the pre-flight level of care?

Inflight deaths on nurse only transfers was seen as an indicator of this standard. "If the nurse can attend the patient prior to the flight and maintain a level condition then a nurse should be able to maintain the inflight level of care." Mortality and morbidity statistics will need to be collected. Tape and chart reviews would also require examination to identify if any inflight care was inadequate or inappropriate. If the level of care was found to be inadequate, it would have to be established if an MD should have attended and, if so, why didn't the doctor accompany the patient.

CONCERN 3: Staff Training

Are the staff "trained to the level of function necessary to fulfil their job description." It was stated that the program is attempting to guarantee 25% of the nurse's work period in a clinical setting. Tape and chart reviews as well as direct observation by supervisory staff would indicate if the standard was being met. The tapes and charts would be audited by the supervisors and possibly by a third party who would be a specialist in the field related to the patient's illness or injury. This would be done after any flights in which problems were encountered and on a random basis. Unacceptable performance would indicate that the training program would need to be re-examined.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Are we meeting the patient's needs?

Again the standard would be if "the inflight level of patient care was at or above the pre-flight level." Tape and chart reviews would form the data and an audit of them would identify problems and solutions.

CONCERN 2: Are we meeting our communities' needs?

The standard was stated to be "if the communities are pretty well satisfied with our role and our service." The outreach program was seen to be the mechanism to collect information on these attitudes. All the rural facilities will need to be visited on a regular basis and public forums and community awareness sessions will be required to be held.

CONCERN 3: Do we have an adequate audit/quality control System?

"The information that is offered ought to be pertinent, reveal the data that we really need in order to assess our system." This information would need to be accessed quickly by the managers. If a computer system was devised, it would have to be able to be used without a lot of training. The data would be collected from log forms, patient charts, checklists, and tape system.

A final concern was expressed over the lack of time that was allowed for the training program. It was felt that this would impede a proper evaluation program.

SYNOPSIS OF INTERVIEW #12

FIRST YEAR OF OPERATION

CONCERN 1: Rapidity of Access

The questions raised included: how is the service to be accessed, how quickly will it respond, and will it take a greater time to access or respond than the present charters that are being used? It was stated that only 6 airports on Indian Reserves or local communities to which they access will be able to take the Citation and only three of those airports have sufficient lighting for night operations. The data that will need to be collected concerned the case identification (date, time, location, diagnosis, status, medical need identified) and response time (time called, time arrived, action taken, transit to and from where, medical needs identified and activated, outcomes). Also, statistics on how many patients could have gone out by air ambulance should be gathered. It was suggested that Dr. P. Markestyn of the Coroner's Office could possibly give an estimate of this statistic. Decisions that could be made from this data included: potential service expansion (fixed or rotary wing hardware), identification of alternative programs, and airstrip upgrading.

CONCERN 2: Cost to Medical Services Branch

The air ambulance program would need to demonstrate that it can deliver the service at a lower cost or with a greater cost effectiveness than the present system.

CONCERN 3: Cost-Benefit Improvement versus Existing System

The costs of the program would need to be compared with the benefits incurred such as the higher level of patient care, the saving of time away from the community by the local facility's staff, etc. Not only existing services but parallel services (Australia, Alaska) should be considered in the analysis. The ability of the Citation to provide a nation-wide capability, i.e., equipment compatibility and interchangeability with services in other provinces, will need to be examined. Ms. Lorraine Davies, Director of Emergency Health Services, in Ottawa was suggested as a source of information on this matter.

ONE TO FIVE YEARS OF OPERATION

The longer term concerns were seen as a continuation of the first year's. The program should demonstrate its effectiveness by improved morbidity/mortality rates in the areas that it served. Other concerns expressed were that the program should have a sunset clause incorporated into its description (not greater than 5 years) and that there will be a morale problem with the nurses due to the possible low activity level of the work.

SYNOPSIS OF INTERVIEW #13

FIRST YEAR OF OPERATION

CONCERN 1: Standards

The program should demonstrate that "it has improved health care." Mortality and morbidity rates would be indicators that an improved standard has been reached. Specific data related to the types of injuries and illnesses also need to be collected along with follow-up studies that would measure the degree of complications and the ease of recovery after the transfer. It was stated that it will be difficult to draw any definitive conclusions from this data.

CONCERN 2: Service

"It will have to be the service part where people say that the program has not been an improvement. If that happened then I think that we would have to re-consider the program or probably re-direct it." An evaluation should bring out the differences between standards and service. Questionnaires, incident and transfer forms were seen as methods to collect the data and they should be filled in by the pilots, nurses, the hospitals at both ends, and the patients. A longitudinal study should be considered to measure the changes of attitudes over time. It was suggested that the study could be done at 3, 6, 9, and 12 months. "I would expect at least 75%" of the people who use the service find it acceptable. Other data that would indicate the service was performing satisfactorily included: the communication and coordination at both ends, the response times of the pilots and nurses, and the timings throughout the mission.

CONCERN 3: Costs

The costs should be broken down into costs that do not change with time, fixed costs, and the costs per trip, variable costs. "If the cost per trip gets too high and if the reason it is so high is that the volume is down, we can do something about the volume", i.e., slacken off the protocol. The average costs and marginal costs as compared to commercial and charter rates would also need to be collected. The cost information should be available on an on-going basis and through monthly reports.

"I would like to see, probably on a weekly basis, reporting mechanisms that provides the number of trips, the location of the transfer, the initial location of the patient, to where the transfer went, some idea of the diagnosis or procedure, and if there were any problems."

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Utilization

A decision will be required to be made "as to whether the one plane is satisfactory for the service we projected." If one plane is not enough, another should be considered. If one plane is too much, consideration should be given to expanding the service to cover other types of transfers, e.g., out-of-province airlifts. "Somebody has to establish what is a reasonable amount of flying time we should have for one plane in an ambulance service." The data suggested included: the number of times the plane was not available for a true emergency, and the average flying time per 24 hour day.

"I don't think that we will back off in the decision to have an air ambulance. I think we will only re-direct, re-prioritize, change protocols."

SYNOPSIS OF INTERVIEW #14

FIRST YEAR OF OPERATION

CONCERN 1: Patient Condition

It will be necessary to know "the condition of the patient pre-transfer and post-transfer." This could be done by recording the chart number of the referring hospital, documenting the inflight care, and following up the chart numbers at the receiving hospital. "It's going to have to be initially a subjective feeling on the receiving physicians that the patients are in better condition when they arrive than they were before." These feelings should be collected by the medical director of the program or one of the staff people through conversations with the emergency departments.

CONCERN 2: Community Utilization and Acceptability

The frequency of use by the various communities should be documented along with the types of calls and how they were prioritized. Some means will need to be devised to measure how the community perceives the service and how it is impacting on them. A concern was raised on how easy it will be to get the patients back to the referring centre. Some feedback system will be required so that the referring physician is better informed about the patient after the discharge from the hospital.

CONCERN 3: Receiving Hospital

The questions that will need to be answered included: how they are accepting the patient, and how they feel that the quality of care has gone. The issue of the acute shortage of critical care beds was raised and the need for good communications between the referring physician, the receiving physician, and the tertiary care centre was stressed. Again, it was suggested that the medical director visit the hospitals on a regular basis to ascertain this information.

CONCERN 4: Costs

"The cost is an important evaluation of the number of times you use the aircraft and to what category of patient do we use the machine." It was stated that it maybe economically viable to transfer Priority One patients if the level of utilization for the higher priorities is low. In this regard, a further concern was raised over who will be making the decision as to the prioritization. Some analysis of this will be required. In terms of cost, the cost per mile will need to be collected as well as the type of patient transferred. Even if the costs were high, "I can't see them

handing the airplane back, it's on a lease-to-purchase, the only place I can see (any cost reduction) is in the manpower."

SYNOPSIS OF INTERVIEW #15

FIRST YEAR OF OPERATION

CONCERN 1: Is the level of service appropriate?

The first year was seen as an evaluative year. Some of the questions raised included: "do we need a 24 hour service with pilots and staff ready to go", "is there a need for more nurses or less nurses", "are we going to be able to serve Brandon, Dauphin, Swan (River) and the other areas outside of the North that haven't previously been served", and "are we going to reach a point from a cost-benefit perspective that it's just not paying for itself." The main cost-benefit issue was seen to be whether the use of the aircraft should be restricted to emergency transfers or extended to cover non-emergency inter-hospital transfers. This could include its use as part of the Northern Patient Transportation Program. The factors that need to be considered were stated to be: the ability to get there quickly when there is an emergency, the cost utilization, how the service is used, and the impact on the ground ambulance services. Suggested data to be collected included: usage figures (types of emergencies, volume, location, response times with and without teams), cost (cost per patient, cost per total program, cost per operation hour, cost of the down-time), and the ability to access the communities (number and location of trips).

CONCERN 2: Level of service from the clientele perspective.

It will be necessary to ascertain if the clients are of the opinion that they are being served well. The clients were defined as the patients, their families, and the medical communities both at the referring and receiving ends. It was suggested that an evaluation be done by each client to determine whether or not it met their expectations. The data should consider the time factors, the outcomes of the trip, and indicate if the plane made a difference. The evaluation should also attempt to answer if "we are going to start creating a demand there that is going to increase expectations of the general population over a period of time."

CONCERN 3: Policy Issues

"What areas does it serve, what is the level of emergency that triggers the jet use, are we serving the right populations?" There will be a need to review the policy framework with the purpose of re-evaluating the types of patients carried and possible expansion of the program. This review should be looking at more efficient ways to run the program and not call into question the program itself. "Whether or not there should be a system, that decision has already been made and should not be re-evaluated."

ONE TO FIVE YEARS OF OPERATION

The longer term concerns were seen as extensions of the first year's. An additional issue was the impact of different technologies. There will be a need to "evaluate on a constant basis whether or not there is a more efficient air travel mode becoming available or emerging, e.g., helicopters, STOL." The program should determine the points at which it would be cost effective to change if one wanted to change. Some considerations would be the projected downtime as the aircraft's use increased versus the expected downtime on other machines and the relative advantages of new vehicles. It was suggested that there are some decisions that would need to be made in the future that would trigger an evaluation. The first will come when it must be decided to continue to lease this aircraft or to purchase it. Another will be when it is time for a major overhaul of the aircraft.

SYNOPSIS OF INTERVIEW #16

FIRST YEAR OF OPERATION

CONCERN 1: Lack of Objectives

It was stated that, due to a lack of specific objectives, it was difficult to consider any evaluation issues or concerns. There were many questions that had been forwarded to the MHSC in the past and these have not been fully dealt with as yet. "What I see happening is that they are throwing it back at us and saying, what are your concerns, what are your objectives. We have already said what are our concerns, we've already told them -- let them do their work and get the stuff together." Strong concerns were expressed over the planning and implementation of the program.

A proposed objective was "to transport patients from remote areas who need tertiary care - successfully, alive, and have a positive effect on those patients." There would be a need to have a proper index applied so that we could have an idea how sick they were. Some suggestions were: a trauma index, Apache score, or physiological index. Demographic information and some information on outcome survival would also be required. With this data, it would be important to discern if the patient had to be transported and if the patient suffered because of the transfer that they would not have otherwise. A medical audit could assist in answering these issues.

CONCERN 2: Nurse Training and Performance

It was felt that there is not sufficient time for the nurses to be fully trained on the equipment in the aircraft. A concern was also expressed over the fact that only one nurse will accompany each flight. It was stated that this would not be enough if a patient had any complications enroute. The capabilities of the nurses "should be stated and it should be public and it should be made known to the physicians in the receiving and sending institutions." This would assist in making the decision to perform the air evacuation and what sort of extra staff would be required.

The nurses should be examined regularly on their knowledge of procedures. There should be an on-going teaching process to improve or maintain their skills. The suggested standards were: the Advanced Cardiac Life Support and the Advanced Trauma Life Support Courses. This standard could be verified by a medical audit.

CONCERN 3: Development of Teams

It was stated that, in the past, fellows or intensivists have been called upon to take part in air evacuations. The reason for this was not only to assist in the transport of the patient via the aircraft but also to help stabilize or to perform some intervention that cannot be performed by the staff in the remote area. It was felt that this need will continue to exist and, depending on the frequency and the mean time of the total trip, a permanent team may be required. "One of things that is going to be necessary for the team to be established is that we're going to have to have permanent fellows." At present the funding is not available for such a position which constitutes a real constraint. Also there will be a requirement for an in-service for any of the staff who may become involved in the air ambulance so they can become familiar with the equipment on-board.

ONE TO FIVE YEARS OF OPERATION

One concern that was expressed was over the accessibility of the service. "It would be good to know what percentage of the patients who actually require the service are getting it." This information could be gathered by surveying most of the smaller hospitals in the North. Other long term concerns were: the maintainance of the equipment, the turnover of the staff, core training programs, and the upgrading of skills and equipment.

At the end of the interview, one member stated that he still had a great deal of dissatisfaction with the way the program was being planned while the other member stated that, although he was slightly happier than 6 or 7 months ago, there is still a need for more information on the program.

SYNOPSIS OF INTERVIEW #17

CONCERN 1: How are medical priorities going to be set?

There will be a need for a medical director to set priorities in a conflicting situation, i.e., this person will have to act as a medical referee. It should be a physician as it would be difficult for a nurse to make the decision especially if doctors are involved. Whoever makes the decision, there will be a need for documentation on how it was arrived at so it could be audited at a later date.

CONCERN 2: Saving of Time

With the air ambulance, it is anticipated that 4 transfers of the patient in and out of vehicles will be required to complete a journey from Brandon to Winnipeg. The questions raised were how much faster will the air ambulance be than the ground transport and does the saving in time warrant the disruption to the patient.

CONCERN 3: Cost Effectiveness

What are the costs of the service and are those costs justified, i.e., what are the benefits of the higher costs? It was suggested that the benefits could be measured by outcomes such as the morbidity/mortality rates, savings in time over ground transfers, and the response times of the aircraft. Linked to the cost effectiveness is the question of the appropriateness of the referral. Is the air ambulance being inappropriately utilized? It was felt that there will be patient pressure on physicians in the rural areas to use the aircraft since it will be an insured service.

CONCERN 4: Utilization of the Service

It will be important to ascertain why some communities are not using the service. These communities could be identified through the death reviews conducted by the College of Physicians and Surgeons.

It was suggested that an annual review be done on the program by a group composed of the user community. This would be a multi-disciplinary team made up of members of the medicine and nursing communities representing each region of the province.

SYNOPSIS OF INTERVIEW #18

FIRST YEAR OF OPERATION

CONCERN 1: Method of determining what is a true "emergency" or life threatening condition.

"There are going to be many situations that fall in the gray area" and, as already seen in the N.P.T. Program, "where out of convenience, the patient has been determined to be an emergency." It should be the function and responsibility of the medical director to make the final decision in collaboration with the medical advisory committee. Through a process of peer review of these decisions, a series of protocols should be developed. The review should not only be conducted whenever there is a questionable case but also on a random basis. To assist the review, "we have to make sure that there is a means of transferring information from the referring facility initially to the crew and subsequently to the receiving hospital." The information should be placed on concise forms and not be verbal if possible. It should state the condition of the patient when first seen, the initial diagnosis, the treatment, subsequent diagnosis, and any further treatment or condition that might arise in transit.

CONCERN 2: Protocols to ensure that the patient is properly stabilized for transport.

"There is a learning process to understand what is involved in a medical transfer by air." The referring physician will have to know what the onboard staff is capable and trained to do so that they can make the decision to accompany the patient or not. They will also need to know the procedures for stabilizing a patient for an air evacuation. This can be evaluated by collecting information illustrating the pre-transport treatment which then could be reviewed by the audit committee.

CONCERN 3: Onboard staff and equipment adequate for patient care.

"The staff have to have some means of keeping up their skills." It was suggested that an in-service training schedule be devised. Also, "we have to evaluate the compatibility of the ground and aircraft equipment." This could be accomplished by an on-going review of the equipment and supplies to identify any deficiencies. The review should collect data on the equipment used and the treatments provided in transit. Again, the medical advisory committee was suggested to conduct the review.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Feeder Services

"There is no doubt in my mind that, if we are going to provide the proper service to these communities, we are going to have to look at a proper arrangement of feeder services by air to ensure that we get as near as possible the same type of care delivered to the small place as a major centre." This was seen as a natural extension of the air ambulance program but "it will hinge on whether we get an insured service." The lack of an insured service was seen as the major roadblock to providing equal access.

CONCERN 2: Return of patients to their communities.

"Their ability to get well is enhanced if they are back in their communities once they have got over the major portion on the illness." It was stated that there is nothing at the moment that encourages transfers back. A properly coordinated dispatch would assist the returns plus reduce the wasted trips caused by ambulances "dead heading" back.

SYNOPSIS OF INTERVIEW #19

FIRST YEAR OF OPERATION

CONCERN 1: Response Time

It was stated that it would be important to know the "time lapsing between the request made by the doctor at the hospital for the air ambulance service and the actual arrival and delivery time of the patient at the receiving hospital in Winnipeg." At present, it takes the ground ambulance approximately 2 and a half hours to come to Winnipeg from Brandon. "If the air ambulance service were not able to meet that then people would not think it was of much value." Time data would be required to be collected which would include: records on the time the request was actually made, time of arrival at the transferring hospital, time of arrival at Winnipeg, and the time the patient reached the hospital. It was also expected that the aircraft would be available at least 50% of the time that it was requested.

CONCERN 2: Escort's Return Trip

It was stated that under the present system of ground transfers, an escort can immediately return to their community via the ground ambulance. "With the air service that doctor would be stuck in Winnipeg because the air service isn't going to fly back unless there is another call." It will be necessary to document the frequency that doctors or escorts must accompany a patient. Some provision may have to be made to ensure they can return promptly to their communities.

ONE TO FIVE YEARS OF OPERATION

In the longer term, the program must "demonstrate that we've saved lives or helped people in a demonstrative way." It will be important to show that we are taking people into centres where their lives could be saved and doing it more quickly or efficiently than at present. Again, it was stated that the 2 and a half hour lapse time from Brandon to Winnipeg would be a good standard to evaluate the program.

SYNOPSIS OF INTERVIEW #20

FIRST YEAR OF OPERATION

CONCERN 1: Develop Objectives

The objectives will be required so that a framework can be established for the evaluation. Efficacy and cost efficiency were considered to be mandatory components of the objectives and the evaluation. Some fundamental questions to be looked at were: to what extent is the program achieving the capability of handling the critically ill patient who is being transferred and is the level of care reasonable.

CONCERN 2: Support for Rural Areas

"The actual management of the air transport service isn't the total. It has a certain responsibility to the referring and receiving ends." The program must be well coordinated to make optimum use of the critical care facilities in the tertiary care hospitals. Communications and support for the referring centres will also be important. The service should attempt to ensure that the rural physician "can get, not only transport for their patients, but can they get advice, can they get adequate clinical feedback when they are having difficulties with patients. The only alternative can not be transport. There has to be another alternative and that is helping them maintain the patients locally." "I would hope that at the end of the year, you are able to evaluate not only the survival and the usual kinds of things that go into the air ambulance system but do some sort of evaluation on how well these centres have emerged. Further, there should be some evaluation of the quality of communications and education given to these out-lying communities."

An audit of the written records of the transfers would be one source of data on how well the rural facilities are handling their problems. It was also suggested that a pre-program survey would be useful. It could provide "some sort of picture of their current attitudes, knowledge, and quality of service provided to them from Winnipeg in the area of clinical consultation in critical care." After a set period of time, an exit survey could be done to see if there had been any changes. It would be important to know how well the providers feel their capabilities are being sustained or increased, how confident they feel or how confident they are to deal with critical care medicine, and how has the air ambulance made it worse, the same, or better. Essentially, the service needs to know "whether the community, in the opinion of the providers of the care, is providing a more satisfactory response to critical care."

ONE TO FIVE YEARS OF OPERATION

The distribution of manpower throughout the Province was seen as a long term concern for the air ambulance. "If the air ambulance program is successful, it may create a re-distribution of communication patterns." It was explained that now the traffic funnels into Winnipeg. The changing nature of the services and the dynamics of the overall provincial system would need to be assessed. Some indicators of the changes would be: the stability of manpower, the attitudes of the rural physicians, ancillary services, level of preparation of the patient, and the development of new centres as the preferred point of transport. To fully examine this issue, it was felt that a Provincial Director of Critical Care Services will need to be appointed.

SYNOPSIS OF INTERVIEW #21

FIRST YEAR OF OPERATION

CONCERN 1: Is the program cost-effective?

"I have been told that the program is going to cost \$70 million. I do not know if this is true or not." It was stated that this represents approximately 40% of the Health Science Centre budget for one year. The cost of the program per patient should be examined in relationship to the cost of alternatives to the present service. It was felt that the "program must fly a huge number of people to make it cost-effective and we don't have that many emergencies in Manitoba." The service should also demonstrate that the patients benefited significantly by being flown down and that the flights were necessary. Data would need to be collected on the types of patients, how many were transported, and who were the medical people involved.

CONCERN 2: Training of the Nursing Staff

"We've received a request to train nursing staff." Although 6 nurses would not be difficult to accommodate, without a curriculum or objectives, this would be a "horrendous task." There will also be a problem created by the fact that the nurses are not employees of the Health Science Centre "so legally these people cannot take care of patients." As an acceptable standard for the training, it was felt that all the nurses should have the Intensive Care Unit Course or the Emergency Course prior to coming into the program. If there is a need for more training, the courses provided in Ontario or taught by qualified people at the Health Science Centre should be considered. It was generally felt that this is an expensive and redundant means to train these people when there are already trained staff at the ICUs who could carry out the flights.

CONCERN 3: Objectives

"The objectives of the program need to be stated and need to be stated very clearly." An evaluation can then be done based on the objectives. It was suggested that the evaluation be carried out by people with experience and no vested interest in the program. Personnel from the Dept. of Social and Preventative Medicine would be well qualified to perform this task.

CONCERN 4: Coordination

"What we will be expecting is that the patients arrive in hopefully a fairly stable condition and the continuation of their care can be easily facilitated between the air ambu-

lance people and our people up at ICU." This was another reason why it was felt that the ICU personnel should be the attendants on the flights. The need for courses and in-service training for northern nurses and physicians in stabilization was also expressed.

SYNOPSIS OF INTERVIEW #22

FIRST YEAR OF OPERATION

CONCERN 1: Are we transporting all the patients we should be?

"All the patients who should be transferred down, are they being transferred down by air ambulance or are ground ambulances being used, or feeder aircraft." It was stated that a reasonable acceptable minimum standard should be "if 95% of the patients who should have been transported by air" actually are. If not, a general audit after the first year should determine why this is so. The audit will need to examine the communication system, the receiving and referring hospitals to determine if the program has been adequately advertised, the level of awareness, and if the service is being used properly. It will also be necessary to document from where the initial transport was made and by what vehicle to the transferring facility. Much of this data could be collected from the present ambulance form and then sent to the audit committee.

CONCERN 2: Were the patients adequately prepared for transport?

Did the sending and receiving hospitals have enough information to properly prepare the patient for the flight and to prepare for their arrival. It was felt that much of this information could be gathered through a questionnaire and from the flight nurses. A secondary survey of the referring facilities to find out how things were working out from their end was also thought to be necessary.

CONCERN 3: Were the patients managed adequately in transit?

"How many patients did the nurse feel that she could adequately cope with by herself?" If a specialty team was used, did it make a difference and what sorts of patients did the team specifically make a difference in? From this data, it will be necessary to document the capabilities of the nurses so as to better determine when a team will be required. An acceptable level of care did not mean that the patient survived the flight. It was stated that patient comfort, the types of management, and the satisfaction of the flight nurse or specialty team will also have to be monitored.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Frequency of specialty teams.

Prior to determining if specialty teams should be developed and the cost implications of that decision, it will be necessary to know how often they were used, the time taken for the team to mobilize, in what types of cases were they needed, and what sorts of interventions were handled by the team that could not have been handled by the nurses.

CONCERN 2: Training of the nurses.

In the longer term, there will be a need to determine if the nurses have been trained for the correct illnesses or injuries. Data will be required to be collected on the frequency and kinds of patients that have been transported, the interventions used, and whether they were able to handle the problems adequately in flight. From this, decisions to change or modify the training program could be made and the types of nurses necessary for the service could be further specified, i.e., ICU, ER, etc.

CONCERN 3: Is our audit system satisfactory?

The audit system should be able to tell the managers what the program is doing. It should also be able to bring data to bear on the following questions: is one aircraft enough, can it supply the needs of the Province adequately and safely, is our training program and utilization of the nurses optimized, have we really made a difference -- cost-wise, morbidity/mortality-wise, etc. and does it appear to make a difference. It was felt that the medical advisory committee and the medical director should be reviewing the flight records and setting minimum standards and protocols after the first 6 months and again after 1 year.

SYNOPSIS OF INTERVIEW #23

FIRST YEAR OF OPERATION

CONCERN 1: Specialty Teams and Nurse Training

There were many questions raised with regards to who and how the specialty teams would be employed. It was stated that, both from cost-effectiveness and outcome, the maternal fetal transports are better than the neonatal transports. A concern was raised over "who will be the nurses and how will they be appropriately trained" for such transfers. "I'm concerned that, particularly when they (flight nurses) are not practising their critical care every day, that to deal with a critical care case may be too much." It will be necessary to know how many neonatal and maternal transports are being done, what are the trends, "would it be easier to bring a mother from the North to the hospital by the air ambulance as opposed to having her deliver up there then finding out that you have to bring the baby down", and what will be the impacts on the high-risk centres in Winnipeg.

With regards to the specific on-going training of the nurses, "what responsibility does the education provider have in terms of ensuring competency levels are raised." It was felt that there will be difficulties in certifying that the nurses have reached the desired level and that she is maintaining it. "The Medical Director should come to speak to the nursing directors involved in the areas that the nurses wish to have further experience to give us an idea of what the program is."

CONCERN 2: Communications

"Who is responsible for contacting the team, is it the area that wants to transport the patient out or is it the area that is receiving the patient." It was stated that this issue is of particular concern to the ICUs given the shortage of bed space. The transit time for the air ambulance will be considerably shorter than the ground transfers thus making the need for coordination that much more apparent. Questions were also raised on "who makes the decision about the kind of nurse that needs to go?" How will they be dispatched and what would happen if there is a difference of opinion between the receiving and the dispatch hospital? Essentially, "who is accountable?"

CONCERN 3: Protocols for Patient Stabilization

"I really have a concern for those poor nurses who now have a real job in terms of stabilization, critical care back-up and they are suppose to take their orders from some (referring) doctor who hasn't been in a critical centre for

the last ten years." It was felt that there will be real conflicts between the nurses and the referring physicians over the types of stabilization procedures. Protocols should be established and "there has to be a lot of communications with physicians in the out-lying areas to tell them the protocols and what they can expect from the nurses while in the air." The protocols developed by Dr. Brian Kirk were suggested as good guidelines. It was also felt that the protocols would be helpful in determining the continuing education needs for the nurses and could be used as an aid in maintaining their training. They could also be useful in the continuing education of the referring centres. The medical advisory committee should be the ones to evaluate the protocols. This should be done after each transfer and checked by a survey to the sending and receiving hospitals.

CONCERN 4: Aircraft Utilization (Insured Service)

"How many people who could have been safely transported by ground are now transported by air because it is an insured service." It was stated that there will be a need to make people aware of the rules under which the air ambulance operates. What would be considered inappropriate utilization will be different depending upon the perception of the illness. There will be a need for the medical advisory committee to audit the cases and, to ensure that the abuse is curtailed, the College of Physicians and Surgeons should be involved.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Expanded Role for Aircraft

It was stated that, in the near future, heart transplants will be performed in Winnipeg. Will the aircraft be available to transport organs and will it be able to respond quickly enough to the requests? It will be necessary to know how these requests will be prioritized and what the demand will be.

CONCERN 2: Impact of Service

Some monitorship of how the air ambulance service is changing the practise of medicine in the Province will be required. "Is the program impacting on the communities such that the communities are having less confidence, less self-sufficiency." It was stated that the attitudes of the referring centres will need to be surveyed and the location of the transfers monitored.

SYNOPSIS OF INTERVIEW #24

FIRST YEAR OF OPERATION

CONCERN 1: Aircraft Space and Equipment Capability

It was stated that there is a lack of information on the capabilities of the aircraft. The questions raised included: how many patients and attendants can be carried safely, will the equipment from the sending hospital be required to go with the patient, how will it be returned, will staff be required to accompany the patient, and who will pay for their return. It was explained that it cost the hospital \$15,000 last year in extra staff costs because of the transfers. The air ambulance should be able to reduce these costs.

CONCERN 2: Response Time

Does the service really save time on the patient transfer? The average time from when the referring doctor confirms the transfer with the receiving doctor until the patient is at the hospital will need to be documented. If specialists are required for the flight, what are the time delays to put the team together. The number of times these teams were required and the kinds of patients needing these transfers should also be specified.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Evaluation

A report should be prepared after every time the air ambulance was used. It should outline any problems with space, equipment, timing, and how effective was the communications. The report should be distributed to the MHSC, the sending facility (Nursing Dept. and physicians), the receiving hospital, and the referring physician.

CONCERN 2: Communications

It was felt that any delays due to poor communications should be documented. In particular, problems with the hospitals in Winnipeg, re: no bed space, will have to be monitored closely.

SYNOPSIS OF INTERVIEW #25

FIRST YEAR OF OPERATION

CONCERN 1: Percentage of calls responded to.

"There should be enough statistics available to ascertain what percentage of the calls can actually be responded to." This would include the percentage of the times that the aircraft could not land at the point of transfer and the number of times the patient would need to be transported to another area before the air ambulance can make the pick-up. An acceptable standard was stated to be "the service being able to respond to at least 70% of the appropriate calls", i.e., 70% of the calls that the aircraft is anticipating getting to. It would be important for the providers of care to know if the service was falling below this standard as they may want to utilize another means to transfer the patients.

CONCERN 2: Response Time

"The amount of time that elapses between the time the call is received and the time the patient actually arrives in Winnipeg" would be a necessary statistic. "From our point of view, I guess we wouldn't be wanting to use the service that often if it was taking longer than 4 hours." This was seen as the present average time of an evacuation from most of the communities. It was felt that speed of transfer was probably more important than how well you stabilize the patient unless there was going to be a large difference in the quality of care provided. There will be trade-offs made between these criteria and some form of severity index will need to be developed to assist in these decisions. It was suggested that a comparative study be set up with Medical Services to monitor the transfers made by the air ambulance and the evacuations that did not use the air ambulance. The timings, quality of care, and outcomes could be analyzed to see if the air ambulance made a difference. Retrospective data would also be useful in determining if there was any changes with the introduction of the service.

CONCERN 3: Equipment Use

There will be a need to document specific life-saving procedures and also whether they were successfully able to perform them. Examples of these procedures were: starting an intravenous, giving an intravenous injection of a drug, stabilizing fractures, giving birth, and bandaging lacerations. It was expected that between 20-40% of the time some life-saving procedure would be attempted and it would be hoped that it would be completed successfully in 80% of those cases. "If stabilization procedures are not performed

often, I would again wonder about how often we need to use this service."

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Develop a series of tracer conditions.

It was thought that these tracers could evolve out of the first year's data. Once identified, "the impact on death rates from any of these tracer conditions for people who are residents in those areas that are served by this ambulance as opposed to the people who live in the 100 mile radius of Winnipeg" could be compared. It would also be useful to compare the outcomes (deaths, permanent disabilities, and functional state) of people who were transferred by ground ambulance versus those who were flown. It was expected that there would be no more than a 10% improvement.

CONCERN 2: Development of Teams

It was felt that the receiving doctor should fill out some kind of questionnaire about the condition of the patient on arrival. They should comment on whether the proper interventions were performed enroute, if other procedures should have been completed, and recommendations for future flights. From this data, it may be able to determine if further training of the escorts is required or a team with a physician will be needed. It is important that the form be filled out by "the person who actually sees the patient first."

CONCERN 3: Feeder Services

If the comparisons of the evacuations of the patients from communities inaccessible to the jet to those that are on or near the air routes proved the service was being successful, feeder services should be investigated. The development of this service should also consider the impact on regionalization. "I don't think you can regionalize without putting the proper resources in the region." The change in the patient flow pattern (demand side) would have to be equalled by the increased services or facilities (supply side), i.e., in order to provide good regional specialty services, you must place adequate numbers of specialists in the region. One specialist in any given specialty does not make a regional centre.

SYNOPSIS OF INTERVIEW #26

FIRST YEAR OF OPERATION

CONCERN 1: Availability and Performance

It was felt that, since the present system is available in a reasonable time, the new service will be a further improvement. Its performance should not be judged totally by time measurements. The response time will have to be assessed in view of the location of the aircraft at the time of the call and the mission it is performing. There is potential for conflicts if two calls are received at the same time. A prioritization system will need to be developed and evaluated to see how these conflicts were resolved. The data could be collected via a recording device at the dispatch and then reviewed by the audit committee.

CONCERN 2: Flight Personnel Training

The type of training that was given should be well documented. This could then be checked against the expectations of the user community to determine if a physician would be needed on a transfer. There was a question raised over where the physician would come from, the departure or receiving hospital. The data that would be required included: the record of the patient's condition on arrival at the aircraft, during flight, and at the receiving hospital. This could be collected on a transfer form and be audited by the advisory committee. A concern was raised over the workload of the nurses. The forms should be easy to fill out and not be too time consuming.

CONCERN 3: Safety

It was stated that there appeared to be a contradiction in the statements about the aircraft. On one hand it has been said that the aircraft is very safe yet the crew are all taking survival courses. It was felt that, even though the aircraft has the capability to land at unprepared strips, each one should be looked at and have more than adequate reserve.

CONCERN 4: Ground Support at Both Ends

The ground personnel have to have a willingness to cooperate with the air ambulance to make it effective. This was seen as a coordination problem. Any time delays or unavailability of ground support should be well documented. If the service was unacceptable, some other arrangements will need to be investigated, e.g., having a ground ambulance in Winnipeg for the air ambulance pick-ups only.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Maintenance of Standards

The longer term concerns related to monitoring the service and maintaining standards. It was suggested that this could be done by auditing the patients' records and by ensuring the staff have refresher courses. The courses should stress the practical aspects of medical education.

CONCERN 2: Abuse

It was felt that there will pressure brought to bear on physicians by families to have the patient evacuated by air since it is an insured service. There is a need to have someone else other than the referring physician making the decision with regards to payment. Any abuse could be ascertained by feedback on the patient's condition by the receiving physician and the flight nurses. The medical advisory committee should investigate any complaints and try to find solutions through education and awareness sessions with physicians at both ends on the transfer.

CONCERN 3: Expansion of the Service

Any expansion will depend upon the cost/benefit ratios and the monies available. If it is decided to acquire additional aircraft, different types of planes should be analyzed, i.e., interhospital helicopters.

SYNOPSIS OF INTERVIEW #27

FIRST YEAR OF OPERATION

CONCERN 1: Effective Monitoring and Reporting Mechanism

"We would want to know whether or not the program was meeting the needs for which it was designed." There will be a requirement to have a means to gather feedback from the public. A questionnaire to the people providing the service was seen as an adequate way to collect the data. Another questionnaire, done on a random basis, to the people using the service was also suggested as a possibility. "If there are substantial delays in getting the aircraft out there, or if there is a problem because the crew are not as knowledgeable as they are expected to be, you could get some negative feedback." The solution would be to alter or re-direct the program as "I would not think an alternative would be to discontinue the air ambulance program."

CONCERN 2: Costs

"We have set a certain amount of money aside for it, we would want to make sure that it's operating within those dollars." There will be a need for a financial monitoring system that would track the program to see if the costs are along the lines that were projected. It was felt that monthly report would be sufficient. These reports should be based on the fixed costs and the operating costs of the budget. If the costs were not in line, the reasons and the degree of the divergence would have to be determined before corrective measures could be taken.

CONCERN 3: Abuse

"It's going to be used the odd time when it probably shouldn't be but, if there is substantial abuse, that should be flagged or ear-marked." Again, a monitoring system would be required to collect this data. The details of the trip will need to be documented and reviewed at a later date.

ONE TO FIVE YEARS OF OPERATION

The longer term concerns were extensions of the first year's. An additional issue will be the purchase of the aircraft. Factors that will affect this decision were stated to be: the available money, changes in technology, the demand on the present aircraft, and the ability of the aircraft to meet the needs.

SYNOPSIS OF INTERVIEW #28

FIRST YEAR OF OPERATION

CONCERN 1: Quality Assurance Program

It was stated that it is important for the service to start a quality assurance program that will create an awareness of professional accountability that is inherent in the provision of quality care. The quality assurance program that is presently being used at the individual's institution was outlined. It was suggested that 2 audits per year be completed on the program. The information that such a system could generate should include the call volume and the staff requirements. Decisions that will have to be made from this data would be if the service should expand and whether 1 nurse is sufficient to handle the workload.

CONCERN 2: Identification of Problems in Patient Delivery

Response times were seen as one criteria for measuring problems in patient delivery. The dispatch should collect data on the time of the original call, the time the air ambulance departed, its arrival time, the time the patient was boarded, the arrival time at the destination, and the time of arrival at the receiving hospital. A taped dispatch system would be the best way to gather this information. It was stated that there may be a potential problem with the ground ambulance pick-ups at the Winnipeg airport. The protocols used by the Winnipeg Ambulance Service may not match the ones used by the air ambulance service. The different priorities may result in a delay.

Any problems encountered with the patient should be documented on incident forms and on the patient's chart. The treatments should be recorded and kept for evaluation by the receiving doctor at the emergency department. As a guide, it was suggested that the time to complete all the forms and documentation of a transfer should be no more than 15-20 minutes.

CONCERN 3: Re-evaluation of the Audit

The quality assurance program will need to be re-examined to ascertain if the proper information is being generated and if it is meeting the needs of the managers. Forms should be reviewed and simplified and the policies and procedures audited to see how they are meeting new problems. The review should also determine the continuing education needs of the staff. Monthly staff meetings were seen as an adequate means of allowing an on-going review to be conducted. An annual review of all the staff observations and patient charts was also suggested.

ONE TO FIVE YEARS OF OPERATION

In the longer term, data will need to be collected on the aircraft down time and the wear on the equipment. Equipment replacement and turnover should be examined as technology improves. It was suggested that replacements be planned in 3 year cycles.

SYNOPSIS OF INTERVIEW #29

CONCERN 1: Priorization of the Patients

"One of the greatest areas on conflict and controversy may be in determining, all considerations of weather and flying conditions aside, how the priority of the patient is going to be determined from a medical stand point." It was felt that the decision should be made by a person "with as much knowledge of the broad area of medicine and emergency medicine as possible." The medical director of the program or someone in a relatively neutral position were suggested. An evaluation system will be required to audit the logs of the flights, the types of patients, the diagnoses and to investigate any complaints about the prioritization. Both the referring and the receiving physicians should be surveyed to see if the categorization of the patient had changed and what were the reasons for the changes. This may be a problem at the receiving hospitals because "often the first physician who sees that patient is not a member of the emergency staff" but may be a member of the in-hospital services. It was stated that getting the cooperation of all the members may be difficult. The feedback could be obtained by a form but there would also be a need for an education process. An acceptable standard for prioritization was thought to be if 80-90% of the patients were accurately categorized.

CONCERN 2: Feedback Mechanism (Communications)

"The more important thing is that you have a group that can identify problems as they arise and can then make some long range plans to set them right." This group should have proper representation from the rural areas and from the major hospitals that are receiving the patients. It was felt that the numbers should be small and the meetings need not be often, maybe every 3 months. The lines of communication should be kept open so that, if there are any major deficiencies, they can be corrected quickly.

One area where communications need to be improved is the amount of information sent with the patients. In this regard, the flight nurse can play an important role. "They have a unique opportunity to get that information and make sure that it is taken from where we're picking that patient up to where the patient is being delivered." This alone would assist in the provision of better care. It was also stated that there is a need for a better information flow back to the referring physician after the patient has been treated and returned to their community.

SYNOPSIS OF INTERVIEW #30

CONCERN 1: Quantitative Statistics

The program should be able to provide quantitative statistics on: the number of patients transferred, the response and turnaround times of the aircraft, patient information (age and location), and the types of supports (respiratory, cardiovascular, etc.) that were required.

CONCERN 2: Qualitative Statistics

It was suggested that the following be collected: the nature of the illness or injury (trauma, medical illness, etc.), gradation of the severity of the illness, the reasons for the transfer, who made the request for the transport, and was the service appropriately or inappropriately used.

CONCERN 3: Pediatric Patients

Specifically to pediatric patients, the following data would be required: age, actual problem, nature of the illness, basic historical data (duration of the illness), decision for transfer (when, how long it took), was there advice ahead of time, who requested the air ambulance, the care provided onboard, were any other specific people picked up (teams), special drugs or blood products used, and types of drug doses.

CONCERN 4: Poison Cases

In poison cases, it will be important to ascertain the estimated time that the patient took the overdose of medication and if any "esoteric" antidotes were used. It was felt that the flight nurses will be in an ideal situation to gather most of this information. For assessment purposes, it would be useful to know how often did the flight nurses ask for or attempt to get that information and, if so, how often was it actually of value to the hospital.

Reports on pediatric cases should be fed back to the pediatric department heads on a regular basis but not every 6 months or annually. "I would not want much more than a month or two (between the time of the incident and the review) if we are looking at the quality assurance angle." A schedule could be designed with Medical Director on an ad hoc basis.

SYNOPSIS OF INTERVIEW #31

CONCERN 1: Use of Physicians on Evacuations

A concern was raised over the detrimental effect to the sending community if the local physician needs to accompany the patient to the receiving hospital. The lack of back-up medical personnel and the time it takes for the physician to return to the community should be considered.

CONCERN 2: Dissemination of Information

It will be important to "make everyone in the Province aware that it exists." A full page notice in the College of Physicians and Surgeons Newsletter was suggested. The notice should state clearly who to call if a patient needs such a service.

CONCERN 3: Audit by the Pediatric Mortality Committee

It was suggested that synopses of the pediatric cases be sent to the Pediatric Mortality Committee for review. The synopses should include: when the patient was presented to the sending facility, what was their condition, what was done, who was called, what advice were they given, the time the call for the air ambulance was made, how was the patient disposed of at the transferring end, what happened enroute, was a physician in attendance, and what were the problems or difficulties. This committee could expand their mandate to review the cases from the point of view of mortality and morbidity if the project was small and well-defined. If the MHSC wished to have such an audit, they should make a request to the Pediatric Mortality Committee through Dr. K. Brown at the College of Physicians and Surgeons. It was felt that this may require some funding to cover the salary of a person to compile the data for the Committee. Every 3 months was suggested as a good time frame for sending the synopses to the Committee.

SYNOPSIS OF INTERVIEW #32

FIRST YEAR OF OPERATION

CONCERN 1: Response Time

For neonatal transports, "ideally our response time should be 1 hour from the call. Two hours would be the more realistic aim." It was stated that this would not necessarily mean that the total trip length will be short as much will depend upon the stability of the baby. The stabilization process may take a minimum of 1-2 hours and thus tie the aircraft up for even longer periods of time.

CONCERN 2: Communication and Education

Communication and education of the physicians and nurses in the rural areas was seen as a key to the program. "They have to be encouraged to pick up the phone and discuss cases readily with people and, obviously, there is got to be people readily available with the expertise to discuss these cases with the family physicians."

An education program is needed to "sell the idea and to promote the use of the plane" yet "people will have to be told to don't expect miracles right away." It is also linked to communication in that it is important to get the message out to the physicians to phone and ask for advice. For neonatal transfers, it is anticipated that "probably 1 out of 3 babies transported in should perhaps be unnecessary." If there are less than this, it was felt that not enough babies were being sent in and more education is required. An audit committee should monitor the outcomes of the babies who were transported. They should also attempt to define what conditions would constitute an air evacuation. The committee should be independent but very highly critical.

CONCERN 3: Staff Training

It was felt that the nurses will not be able to cope with all the possible situations. An awareness of their limitations will be required so that decisions on teams can be made. "From my point of view, I can see most of the neonatal transports requiring the special transport team." Due to the time periods that this team will be away during an air evacuation, a back-up team will have to be considered. In both cases, a respiratory technologist should be added to the team. "I think that the provision of the team will be one of the biggest hurdles, fiscal constraints being as they are and manpower problems."

One area that was suggested for further training was obstetrics. "It is important for staff on the planes to be familiar with obstetrical practise and be able to do deliveries."

CONCERN 4: Feedback

"How does the flight team get feedback from the tertiary centres?" It was suggested that the documentation of the pre-flight condition, the in-flight care, post-flight condition, a report 48 hours after admission, and discharge reports be collected and reviewed by the audit.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Regionalization

"There has to be a certain degree of regionalization. For that to be successful, the regional centres have got to be set up well and properly to be able to take on the situations they are expected to take on."

CONCERN 2: On-going Education Process

The education process is required not only for the flight crew but for the nurses and physicians throughout the Province. It was suggested that it may be more economical to send specialists out on trips to see patients and to give in-services than to bring everyone into Winnipeg.

CONCERN 3: Expanded Service

The questions raised included: is one plane enough, is it worth the expense, should out-of-province transfers be done, and what priority system will be used to determine who is evacuated and who is not? Again, there is a need for an audit committee to handle these questions. "I think that you have to set out a committee that is as non-threatening as possible and probably the MMA would be the body that would be perceived by most physicians as the least threatening rather than the College and the tertiary centres."

SYNOPSIS OF INTERVIEW #33

FIRST YEAR OF OPERATION

CONCERN 1: Priority for Use

A concern was raised over who will be carried on the aircraft, what types of patients, and how will the priority of the patients be set. As a standard, it was suggested that the aircraft should pick-up 80% of all the medivacs from the hospitals in the province that are urgent and emergent. If the standard was not met, the program should be re-evaluated.

CONCERN 2: Level of Patient Care

The flight staff's background and education should be made known to the users of the service and should be augmented by on-going education. The MARN standards of nursing care were suggested as a suitable standard of care.

CONCERN 3: Availability of the Aircraft

Concerns were raised over how available the aircraft will be and the amount of down time it will require due to maintenance.

CONCERN 4: Use of Equipment

An evaluation of what was used and what was not used should be done. It will be important to document any problems with the functioning of the equipment and investigate new makes and models. The maintenance of the equipment should also be considered.

ONE TO FIVE YEARS OF OPERATION

The longer term concerns were seen as extensions of the first year's. There will be a need for a continual upgrading and training of the staff. It was felt that, over the first year, there will not be much of a turnover of staff, but over 3-4 years, the staff morale may decline unless they can be stimulated and challenged.

SYNOPSIS OF INTERVIEW #34

FIRST YEAR OF OPERATION

CONCERN 1: Funding of Ground Ambulances

It was stated that the present system has many inequities and disparities. "We have to look at a fairer system for the funding of ground ambulances and we should do that almost in conjunction with this service because of the problems that it's going to highlight." In terms of data, it would be important to monitor "what percentage of the ambulance work is going to the air ambulance." This would be needed to get an idea of how significant a drop there is going to be in the ground ambulance service and to see how they can adjust to cope with that and continue to operate. "I would like to see all of it insured at some point but realizing our fiscal restraints and limitations, there is no justification for paying the ground ambulance to and from the airport anymore than there is for paying the ground ambulance to and from the city of Winnipeg."

CONCERN 2: Possible Abuse

It was felt that, since the air ambulance was an insured service, there will be pressure put on doctors to send the patients by air when it is not warranted. An audit committee should be formed to closely monitor the patients to ensure that they meet the criteria. It was suggested that the committee be made up of members of the medical and nursing professions and also the general public. "Some representation from the public may be firmer, have a slightly different point of view, less willing to accept the decisions that were made, and tougher in analyzing if there was abuse or not." It was stated that a fairer system of payment for the ground ambulance would cut down on the abuse and alleviate the pressure on the physicians.

CONCERN 3: Community Needs

The program will need to show how well it can meet the needs of the whole province and how many times there are cases where it cannot meet the demand. The planned outreach program to inform the communities of the service was seen as a good opportunity to allow people to become familiar with it. If some problems do occur, it was felt that they would become known to the MLAs and specific concerns could be clarified by a questionnaire.

ONE TO FIVE YEARS OF OPERATION

CONCERN 1: Additional Communities to be Served

"There is going to be pressure from the smaller communities to have airports equipped with the proper facilities to support the air ambulance." The costs of such an expansion will need to be ascertained as well as the usage by the people in that community.

CONCERN 2: Impact on Ground Ambulances

"I still think that rationalization of it (ground ambulance) in terms of equalizing to a better degree the service, the provincial grants for ground ambulance, is going to be a growing problem and highlighted more as this service goes along." The air ambulance program will generate "more pressure to fully insure ambulance services or to provide to these providers of the service an equitable system in the absence of a fully insured system."

SYNOPSIS OF INTERVIEW #35

CONCERN 1: Audit

The audit should have an emphasis on the appropriateness of the referrals. "There is going to be even more pressure than there is now on physicians to evacuate their patients to the tertiary centres and I think that there is going to be a problem initially with the lack of understanding that some people have about what, in fact, the air ambulance can provide for them." It is important to make clear "that it is not an alternative to good initial care and stabilization but rather is a method of transport and not a method of delivering definitive care." Data will need to be collected on: age, sex, location, vital signs, type of trauma (severity score, coma score), initial diagnosis, interventions performed at the departure end, enroute, on arrival, and at the receiving hospital, and the discharge diagnosis. From this, a subjective decision could be made on the appropriateness or inappropriateness of the transfer. The medical director was seen as the person to be responsible for the audit and the decisions should be sent to the referring and receiving physicians. Patterns of use should also be identified and any problems dealt with by educating the providers.

CONCERN 2: Impact of Workload at Tertiary Centres

The service could have a negative effect on the tertiary centres by increasing the number of admissions and the acuity of the patients. "It would be nice if there could be some sort of a program which outlines what is anticipated and the impact on various centres as the result of the transport of these patients to these centres." The impact statement should list the potential resources that may be required, i.e., supplies, personnel, funds, and space, and indicate the commitment to funding if the increases do come about. "I don't think that the people who are administering this program should come into it with the expectation that everyone is going to do whatever they can to make it a success. I think everyone is willing to do that up to a point." If there was a significant impact without the commitment to further funding, there will be "reluctance on the part of many people to be involved." It was also stated that the program may have a positive effect and actually reduce the acuity by getting people early on in their illness.

CONCERN 3: Insurance

"I personally would not step onto the airplane unless I was satisfied that there was adequate life insurance, disability insurance, and also without first having some instruction on air safety, what to do in the event of some

sort of mishap, survival instruction, and familiarity with the plane."

CONCERN 4: Dispatch

A concern was raised over who makes the decision to assemble and dispatch the crew. The idea of having the receiving physician make the decision was reasonable but it will need to be monitored closely. It was felt that the flight nurses would be able to do the triage functions but, if a patient was to be refused the service, "clearly that has to be a physician's decision and would seem to me to have to be the medical director's decision."

SYNOPSIS OF INTERVIEW #36

CONCERN 1: Staffing and Equipment

The interview began with a brief explanation of the pediatric transportation problems. It was stated that "independently we have looked at the transportation of pediatric patients and it was 900 and some odd transfers last year and 200 were nursery patients." An estimated 60-80 of these would be considered urgent or emergent. To handle this number of patients, provision must be made for physicians, nurses, and equipment as these cases cannot be adequately cared for by the flight nurses. It was felt that arrangements could be made to find well trained nurses from the ICUs or ERs to go on the flights as necessary but finding doctors will be difficult. The ICU nurses would also assist in the continuation of care at the hospital. At present, there is a shortage of space and nurses in the ICU so consideration should be given to funding additional staff to cover the extra duties. Interim arrangements could be worked out but only if there will be a re-evaluation after 1 year.

A concern was also raised over the size of the aircraft with respect to its ability to carry additional staff for the transfers. The special equipment to be carried on pediatric transfers would also cause a problem in this aircraft.

CONCERN 2: Communications

"When we look at the program as we see it, we don't see that the pediatric population is being dealt with at all. We see no role in providing doctors, we see no role in providing nurses, and we see no role in providing the range of equipment. No one has come this way and said, how do you want to participate, do you want to participate, do we need to give you this to bring you up to this level." Essentially, they need to know what the program expects of them and what they should expect from the program.

There is a requirement for some cooperation with the MHSC and an improvement in the lines of communications. Concerns were expressed over the lack of basic information on the program and what it can do. Specifically, questions were raised about how the aircraft will be used, where will it fly to (out-of-province transfers), and how will the on-going flight nurse training be handled. "I think that MHSC has got to do some public relations. The troops are not happy. We may not be happy because we don't know what is going on." It was suggested that everyone stop "posturing" and that a specific individual be delegated at the MHSC to communicate and coordinate the program with the medical com-

munity. "Our attitude right now is that we would like to improve the service. Let's stop, call time out, and figure out how we can improve the service."