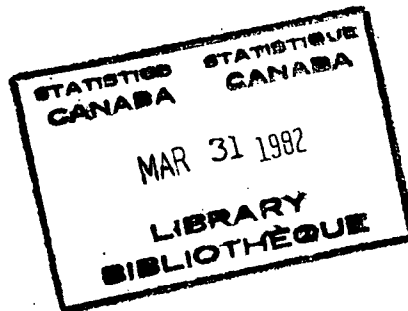


An analysis of hospital expenditures in Canada



by Douglas E. Angus, Louis A. Lefebvre, Claude Strohmenger



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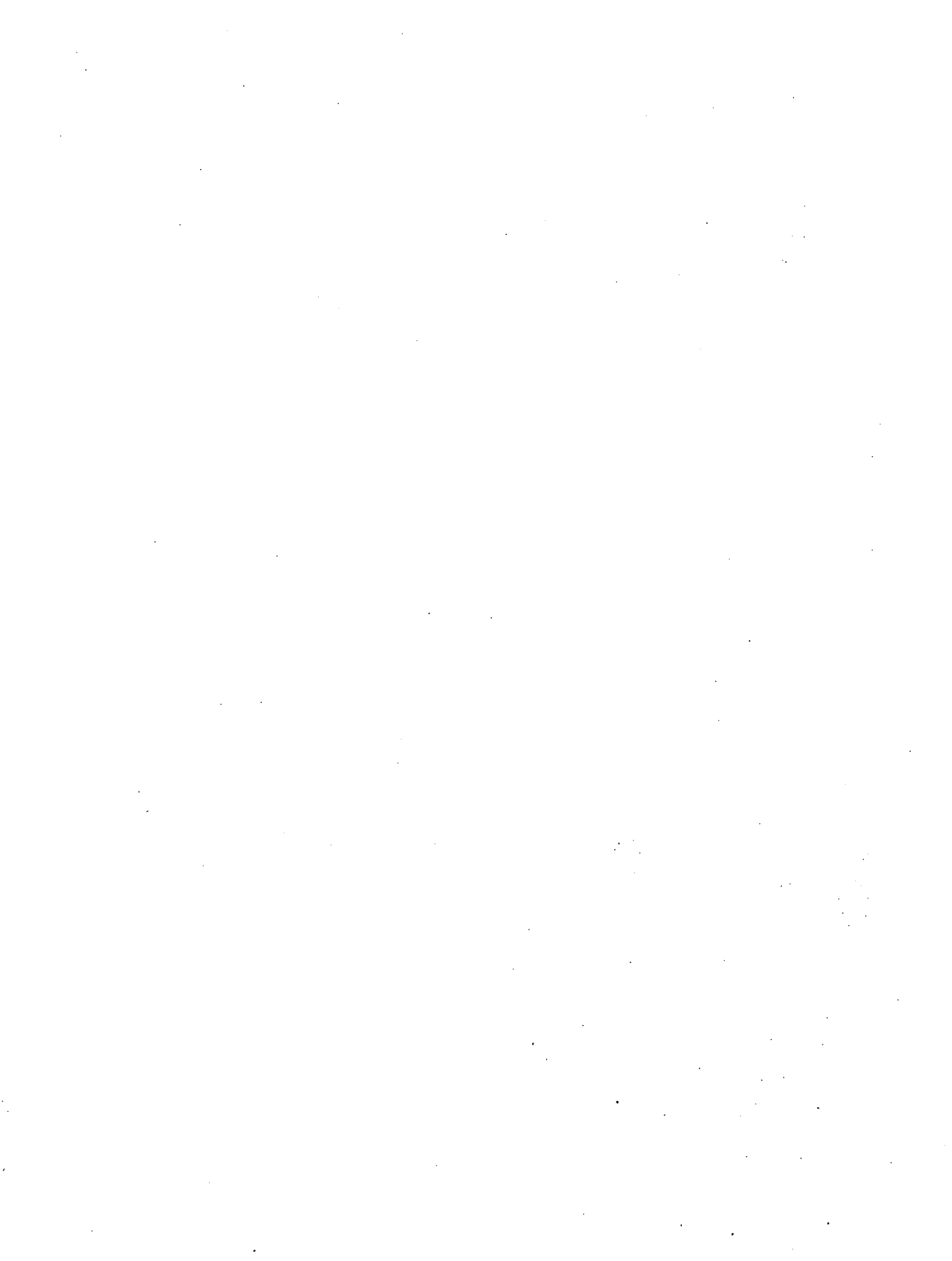
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PREFACE

The health care sector in Canada is a major industry. Between 1960 and the late 1970's aggregate health care expenditures expressed as a proportion of Gross National Product (GNP), climbed from about 5% to slightly more than 7%, indicating that expenditures for health care services have been growing much faster than other major components of the nation's GNP. The significance of the health care sector is further highlighted when it is noted that the whole agricultural sector accounts for about 4% of GNP and that the retail trade sector consumes almost the same proportion of GNP as does health.

In discussions surrounding the cost of providing health care services it is often suggested that advances in medical technology, an aging population, and rising costs of manpower and material inputs into health services production together act in such a way as to raise total health expenditures. The discussion generally concludes by noting that rising cost is nothing more than the price we pay for adhering to the ideal that every sick person is entitled to the best available treatment.

Yet, from the economist's and the policymaker's point of view this line of reasoning presents an enigma. People value long life and good health and, quite likely, health services are used because they contribute to these objectives. However, people also value other things, such as food, housing, recreation. Given that the amount of productive resources for health are limited, we must accept that if we use more of these resources for health services, there will be fewer left to produce other goods and services. Faced with this fact we must make choices. In particular, we must decide how much health services to produce rather than other goods and services.

In order to make rational decisions regarding such problems as raised above there is a requirement for relevant information. This study, **An Analysis of Hospital Expenditures in Canada**, which is part of a broader attempt to estimate the economic and social costs of illness in Canada, continues the general trend of previously-released analytic reports to provide relevant information to decision makers at varying levels in Canada. It is anticipated that these estimates will be used by planners in such studies as cost-benefit and cost-effectiveness analyses.

The authors thank all the individuals concerned with this study whether they were involved in the preparation of the report or whether they reviewed proposals and draft manuscripts. We express particular appreciation to Dorothy Rice for her pioneering work in this area and to Rod Fraser for his excellent studies in Canada, from whose efforts we have learned much. A special thanks is extended to André Charette for his valuable research assistance.

Despite the numerous helpful comments and suggestions we received from Rod Fraser, Yves Péron, Dorothy Rice and Bob Spasoff, the responsibility for the analysis, conclusions and errors or misinterpretation rests with the authors.

HIGHLIGHTS

- Hospital expenditures in 1976 for females were greater than those for males.
- In 1976, less than 9% of the population (65 and over age group) was consuming more than one third of hospital resources. The 0 to 24 age group, which represented over 45% of the total population, accounted for only 24% of total hospital expenditures.
- Diseases of the circulatory system, accounting for more than \$500 million each for males and females, are the most significant condition requiring hospitalization in Canada. Their relative importance varied from province to province, e.g., while they were 13% of the total in Newfoundland, they were 21% of the total in British Columbia.
- If pregnancy, childbirth and puerperium conditions are excluded from consideration, the four most costly diseases/illnesses (circulatory system; accidents, poisonings and violence; digestive system; and neoplasms) account for almost one half of total hospital expenditures.
- Except for those patients under one year of age, the younger age groups incurred lower expenses than people in older age groups.
- Those 65 and over in Newfoundland made up 6.6% of the province's total population and consumed 23% of the hospital expenditures. In British Columbia, meanwhile, the 65 and over age group represented nearly 10% of the population but accounted for 42% of hospital expenditures.
- In 1976, slightly more than one third of hospital expenditures were used by the 65 and over age group; it is estimated that this group will utilize 40% of hospital resources in 1986. Furthermore, it is expected that costs for those 75 and over will increase more rapidly than the total for all people 65 and over.
- It is estimated that average hospital expenditures in constant (1976) dollars consumed in Canada during an individual's lifetime, could be \$22,000 for a male vis-à-vis more than \$27,000 for a female.

TABLE OF CONTENTS

	Page
Introduction	11
Scope and Objective of the Study	11
Universe, Methodology and Limitations	12
Universe	12
Methodology and Limitations	12
Chapter	
I. Canada and the Provinces: Salient Facts	15
Expenditures by Sex and Age	15
Major Disease Categories	17
II. Situation in the Provinces: Some Comparisons	19
Major Disease Categories	19
Expenditures by Sex and Age	19
Major Disease Categories by Age	19
III. Some Projections	29
Hospital Expenditures and Population Change: 1976-1986	29
Methodology and Assumptions	29
Major Findings	30
Conclusion	35
Hospital Expenditures and the Life Cycle	35
Methodology and Assumptions	35
Results: Significance and Limitations	36
Conclusion	39
General Discussion	39
Summary and Conclusions	40
Text Table	
I. Population and Hospital Expenditures, Canada and Provinces, 1976	15
*II. Total Cost of Treating Patients in Hospitals in Canada, Selected Age Groups and Sex, 1976	16
*III. Percentage Distribution of Canadian Population, Selected Age Groups and Sex, 1976	16
*IV. Expenditures for Five Major Disease Chapters for Males and Females Treated in Hospitals, Canada, 1976	17
*V. Hospital Expenditures by Major ICD Chapters and Sex, Canada, 1976	18
VI. Hospital Expenditures by Major ICD Chapters, Canada and Provinces, 1976	20

TABLE OF CONTENTS - Continued

	Page
Text Table	
VII. Hospital Expenditures by Selected Age Groups and Sex, Canada and Provinces, 1976	22
VIII. Population by Selected Age Groups, Canada and Provinces, 1976	23
IX. Distribution of Hospital Expenditures by Selected Age Groups, Sex and Five Major ICD Chapters, Canada, 1976	24
X. Percentage Distribution of Population by Sex and Age Group, Canada, 1976 and 1986 (Assumptions 1 and 2)	32
XI. Average Annual Rates of Growth of Population, Total and Per Capita Hospital Expenditures, by Sex, Based on Two Assumptions Regarding Population Change, Canada, 1976-1986	33
XII. Proportion of Total Population and of Total Hospital Expenditures Represented by Population 65 Years of Age and Over, by Sex, Canada, 1976 and 1986 (Assumptions 1 and 2)	34
XIII. Percentage Distribution of Hospital Expenditures by Major ICD Chapters, According to Two Assumptions Regarding Population Change, Canada, 1976 and 1986	34
XIV. Average Hospital Expenditures During the Life Cycle, by Sex, Canada and Provinces	37
XV. Effect of Longevity on the Provincial Variations of the Index of Hospital Expenditures Incurred During the Life Cycle, by Sex and Province	37
XVI. Average Hospital Expenditures During the Life Cycle: Effects of Expenditures and of Longevity on Differences, by Sex, Canada and Provinces	38
 Appendix I	
Detailed Tables	
Table	
1. Summary Table Showing Selected Statistics on Data Universe	44
2. Hospital Expenditures by ICDA-8 Chapters, and Percentage Distribution by Selected Age Groups, Canada, 1976	45
3. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Canada, 1976	46
4. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Newfoundland, 1976	47
5. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Prince Edward Island, 1976	48
6. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Nova Scotia, 1976	49
7. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, New Brunswick, 1976	50
8. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Quebec, 1976	51
9. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Ontario, 1976	52
10. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Manitoba, 1976	53
11. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Saskatchewan, 1976	54
12. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Alberta, 1976	55

TABLE OF CONTENTS - Concluded

	Page
Appendix I - Concluded	
Detailed Tables - Concluded	
Table	
13. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, British Columbia, 1976	56
14. Average Hospital Expenditures by Sex and Age Group, Canada and Provinces, 1976	57
15. Population Projection by Sex and Age Group, Assumption Number 1, Canada and Provinces, 1986	57
16. Population Projection by Sex and Age Group, Assumption Number 2, Canada and Provinces, 1986	58
17. Projected Hospital Expenditures by Sex and Age Group, According to Assumption Number 1, Canada and Provinces, 1986	58
18. Projected Hospital Expenditures by Sex and Age Group, According to Assumption Number 2, Canada and Provinces, 1986	59
Appendix II	
Calculation of Hospital Expenditures During The Life Cycle	63
Table	
1. Calculation of Hospital Expenditures During the Life Cycle, Males, Canada	63
Bibliography	65

INTRODUCTION

In this introductory chapter there is a section on the scope and objective of the study, followed by a discussion of the methodology, sources, definitions and limitations of the report. Next, is a summary of the major findings of this study. Following this are Chapters I - Canada and the Provinces: Salient Facts; II - Situation in the Provinces: Some Comparisons; and III - Some Projections. Finally we present the Summary and Conclusions.

Scope and Objective of the Study

Health economists and researchers have devoted much time and effort to estimating health care sector costs in Canada. In recent years, the proportion of the Gross National Product consumed by health services (nearly 7% in 1976) has underscored and stressed interest in this sector. Present and future distribution and use of resources allocated to medical treatment and hospital care have already been the objects of several studies in Canada, all of which indicate the need for in-depth analyses of health service costs and for establishing control and planning mechanisms in order to meet the future needs of the population.

Study of the economic cost of the health sector is itself an attempt to rationalize the expenditures and advantages resulting from this type of service. Obviously, this task is highly difficult for not only must we estimate direct costs but also indirect ones such as loss of income, or certain social costs associated with the quality of life. Incidentally a major American study(1) has shown that indirect costs can be as high as, if not higher than, direct costs. If the American data are transposed to the Canadian situation, one finds that the total health sector cost could reach \$26 billion, a far larger amount than the \$13 billion reported as direct expenditures in 1976.

It is important to evaluate the aggregate cost of health, in Canada, not only because of monetary considerations but more importantly because of the questions of social priorities and human investment. Health service costs

(1) Rice, Dorothy P. and Barbara S. Cooper, "The Economic Cost of Illness Revisited", **Social Security Bulletin**, February 1976, pp. 21-36.

have often been perceived as an expenditure for the purpose of bringing a certain portion of the population to a satisfactory level of physical and mental well-being. It must, of course, be acknowledged that the performance potential and productivity of a nation are based in part, on the health of its population. With respect to medical services, Canada is one of the best-equipped nations in the world. However, to achieve this, Canadians have been spending a substantial part of their income to finance a Pan Canadian medical and hospital regime. Nearly half of these funds are absorbed by the hospital sector. In 1976, Canadian hospital operating expenditures amounted to more than \$5.5 billion, representing 3.4% of the GNP. These expenditures financed a variety of medical and paramedical services offered to the Canadian population.

In this study, we shall examine the cost of medical services in terms of the principal categories of diseases treated in hospitals and as a function of the age group of medical service users. We shall attempt to determine what types of major illness occasioned the highest expenses and in what age groups the largest number of hospital service users were to be found. This should allow us first to determine the treatment sectors in greatest "demand" and to identify the users' age groups, and, secondly, to present a complete table of the profile of use and relative significance of units of consumption.

We propose to achieve this by estimating the direct costs of hospital care for Canada and the provinces. Hospital care costs consist of hospital operating expenditures, namely labour and material costs and expenditures for medication and medical or surgical equipment. Total expenditures will then be broken down according to the International Classification of Diseases, restricting ourselves to the major chapters. For each of these, we shall determine the 1976 costs by eight selected age groups and by sex.

Additional objectives of this study were: to estimate the short-run (1976 to 1986) effects of demographic changes on total hospital expenditures; and, to attempt a calculation of the average hospital expenditures which might be generated during an individual's lifetime.

Universe, Methodology and Limitations

The purpose of this section is to outline the process by which we estimated the institutional cost of illness for public general and allied special hospitals in Canada. Following that is a description of the universe, methodology and limitations.

Universe

Since they do not report financial data, all federal and private institutions were excluded from the universe. There are also a small number of public general and allied special hospitals such as nursing homes which do not report financial data. In past years these have accounted for about 2% of the operating expenses of all public general and allied special hospitals, and nothing indicates that this proportion would have changed for 1976.

Methodology and Limitations

Since data do not exist at the national level which relate directly the costs associated with treating specific illnesses in hospitals, other means of deriving the desired expenditure breakdowns had to be found.

Using hospital admission/separation data (herein called the "hospital morbidity data base") for 1976, the total number of days accumulated during that year by patients separated from a given hospital, i.e., "days stay", were disaggregated according to sex, eight age groupings (0, 1 to 4, 5 to 14, 15 to 24, 25 to 44, 45 to 64, 65 to 74, 75+)(2) and the following 18 major chapters of the **International Classification of Diseases (ICD): 8th Revision:(3)**

- (2) The question of age groups is often retained in the health field. The eight groups were chosen to facilitate comparisons with L.A. Lefebvre, Z. Zsigmond, M.S. Devereaux, **A Prognosis for Hospitals**, Statistics Canada, Ottawa, 1979.
- (3) U.S. Department of Health, Education and Welfare, **Eighth Revision International Classification of Diseases** (Adopted for use in the United States), Public Health Publication No. 1693, Vol. 1 and 2, Washington, National Center for Health Statistics, 1968. We recognize that no single classification will fit all specialized needs. While it may be suggested that the ICD is an arbitrary system, it is used because it provides a common basis of classification for general statistical use, i.e., storage, retrieval and tabulation of data.

- I. Infectious and parasitic diseases.
- II. Neoplasms.
- III. Endocrine, nutritional and metabolic diseases.
- IV. Diseases of the blood and blood forming organs.
- V. Mental disorders.
- VI. Diseases of the nervous system and sense organs.
- VII. Diseases of the circulatory system.
- VIII. Diseases of the respiratory system.
- IX. Diseases of the digestive system.
- X. Diseases of the genitourinary system.
- XI. Complications of pregnancy, childbirth, puerperium.
- XII. Diseases of the skin and subcutaneous tissue.
- XIII. Diseases of the musculoskeletal system and connective tissue.
- XIV. Congenital anomalies.
- XV. Certain causes of perinatal morbidity and mortality.
- XVI. Symptoms, and ill-defined conditions.
- XVII. Accidents, poisonings and violence.
- XVIII. Supplementary classifications.

The province in which the patient resides and in which the hospital is located are assumed to be the same.

From the Annual Returns of Hospitals (Forms HS-1/HS-2) submitted by all general and allied special hospitals (herein known as the "institutional data base") for 1976, we were able to obtain total operating expenditures for each hospital, as well as the total number of patient days during the year. The latter includes patients still in hospital at year end. Total operating expenses represent the costs incurred in operating and maintaining a given hospital during a given year. It should be noted that the services which make up hospital expenditures may not be exactly comparable from one province to the next.

For each hospital, expenditures (obtained from the "institutional data base") were allocated by sex and age groups to a diagnosis in proportion to the number of days of care attributable to the diagnosis (derived from the "hospital morbidity data base").(4) Thus, we obtained an estimate of total hospital expenditures distributed by age and sex for the major ICD classifications hospitals where complete matches could be made. Data derived in this manner for each individual hospital were aggregated to provincial totals. Where information was not available from the hospital morbidity data base to match against the institutional data base, imputations using the provincial aggregates as a basis for distributing residual expenditures were made.

(4) This allocation was accomplished by "matching" the hospital morbidity and institutional data bases for each hospital via a common identifier.

For purposes of this study, hospital is defined as public general and allied special hospitals in Canada. In 1976, these represented 77% of all hospitals, or almost 90% of total hospital expenditures. Excluded are private and federal hospitals, mental and tuberculosis hospitals, and hospitals in the Yukon and Northwest Territories most of which are administered by the federal government. While mental hospitals are omitted from this study, mental disorders which are treated in public general and allied special hospitals are considered, nevertheless.

Per diem hospital costs at the provincial level assign equivalent weights to each day of care in each province. As such, they do not allow for a distinction among various diagnoses nor for varying treatment costs for a given diagnosis from one hospital to the next. Consequently, it was decided to use hospital-specific per diem costs. While this process permits the per diem rate of hospital expenditures to more realistically reflect varying institutional scenarios, e.g., active treatment hospitals have higher per diem rates than extended care institutions, thus giving some degree of improvement over the province-wide measures, it does not address the potential reasons for these cost differentials nor does it facilitate costs to be deduced from a disease-costing perspective. Since our data do not render linkage to obtain these hospital specific inpatient operating expenditures which would reflect diagnostic variability,(5) we have to rely on the method outlined above to allocate gross hospital-specific costs by major diagnostic classification, and the assumption that all days of care in a given hospital cost the same.(6)

While costs of hospital care cannot be allocated directly to specific diagnoses, we do feel, nonetheless, that our analysis of hospital expenditures can be useful to planners and policy makers in the health care sector in determining priorities for health services and health research. Regarding the proportion of total hospital expenditures accounted for by the four leading disease categories (i.e., 46%), our study does comply

with similar studies done in the United States.(7) There also are similarities between this and the United States studies with respect to the effect that aging of the population can have on expenditures. Also of interest to policy makers is the observation that hospital expenditures for a given disease category can vary significantly by province. Finally, another interesting but relatively unexplored dimension of costs of illness presented in this study is the portrayal of lifetime hospital expenditures incurred by an individual.

- (5) If possible with data at the national level, it would be ideal to have inpatient hospital-specific costs assigned to diagnoses which generated these expenditures. It is not realistic to assume that costs would be identical for two patients admitted to different hospitals for similar conditions, nor to assume that two patients selected at random from the same hospital for the same length of time would have the same costs.
- (6) While this assumption has been made in Fraser, R.D. and R.S. Spasoff, **An Estimate of the Economic Burden of Ill-Health**, Ontario Council of Health, Toronto, 1976, and other studies, it does not conform with conventional wisdom in the area of hospital costs. Specific disease costing studies, e.g., Colin Lay's thesis, **Disease Costing in an Ambulatory Clinic: Disease and Physician Profiles and the Selection of Patients for Review**, M.I.T. 1978, have indicated that the early days of care are far more expensive than the later days of a stay. As well, Evans, R.G. and H.D. Walker (1972) "Information Theory and the Analysis of Hospital Cost Structure", **Canadian Journal of Economics**, 5, pp. 398-418 have shown that the considerable variation in case-mix between hospitals is a significant determinant of interhospital differences in cost per day and cost per case, as are the age and sex patterns of discharge.
- (7) For example, Rice, D.P. and B.S. Cooper, "The Economic Cost of Illness Revisited", **Social Security Bulletin**, Vol. 39, No. 2, pp. 21-36, February 1976.

CHAPTER I

CANADA AND THE PROVINCES: SALIENT FACTS

When the provinces are considered in terms of hospital expenditures or size of population, the order of ranking remains the same. Quebec, however, with consumption of hospital expenses proportionally greater than its share of the Canadian population, does distinguish

itself from other provinces in Canada, i.e., in 1976 hospital costs in Quebec were 31.8% of the Canadian total while population in that province represented 27.2% of the total in Canada. Differences existing among the provinces can be noted from Text Table I.

TEXT TABLE I. Population and Hospital Expenditures, Canada(1) and Provinces, 1976

	Hospital expenditures		Population	
	\$'000	%	No.	%
Newfoundland	120,333	2.2	557,720	2.4
Prince Edward Island	18,435	0.3	118,210	0.5
Nova Scotia	176,437	3.2	828,580	3.6
New Brunswick	142,354	2.6	677,255	3.0
Quebec	1,778,449	31.8	6,234,455	27.2
Ontario	1,952,942	35.0	8,264,485	36.1
Manitoba	228,121	4.1	1,021,485	4.5
Saskatchewan	195,392	3.5	921,330	4.0
Alberta	429,317	7.7	1,838,015	8.0
British Columbia	545,381	9.8	2,466,610	10.8
CANADA	5,587,161	100.0	22,928,160	100.0

(1) Excludes the Yukon and Northwest Territories. Totals may not add to 100.0 due to rounding.
Source: Unpublished data, Institutions Section, Health Division (Statistics Canada) and Statistics Canada, 1976 Census of Canada, Catalogue 92-832.

The different provincial profiles will be discussed in greater detail in Chapter II. For now, we shall limit ourselves to a discussion of the overall situation in Canada.

Expenditures by Sex and Age

From Text Table II, which presents data on hospital expenditures by selected age groups, it is noted that expenses for females exceeded

those for males. This observation can be explained in part by two phenomena. The first is that female life expectancy is higher than that of males; in older age groups, such as the 75 and over group, more women than men generally use hospital services. Second, in the 15 to 44 age group women are more frequently hospitalized than men, mainly because of pregnancy, childbirth and puerperium complications. Among males, the age groups that recorded most of the expenditures were the 45 to 64 group followed by the 75 and over

group. The opposite trend was observed among females with the 75 and over group first, followed by the 45 to 64 group.(1)

Comparing the information in Text Tables II and III illustrates the relative importance of age as a determining factor in the consumption of hospital services. Among men, those aged 65 and over represented 7.7% of the population but accounted for 35.2% of hospital expendi-

tures; the corresponding figures for women were 9.8% and 35.5%. Hence, overall less than 9% of the total population was consuming more than a third of the hospital resources in Canada in 1976. At the other end of the scale the 0 to 24 age group, which represented over 45% of the population, consumed only 24% of total hospital expenditures.(2)

(2) Observations such as these may be useful in the determination of future expenditures in the institution component of the health services sector. For a more detailed treatment of this subject, see L.A. Lefebvre, Z. Zsigmond, M.S. Devereaux, *A Prognosis for Hospitals*, Statistics Canada, Ottawa, 1979.

(1) Of interest, here, is the finding that for all age groups except 15 to 24, 25 to 44 and 75 and over, total hospitals expenditures for males surpassed those for females.

TEXT TABLE II. Total Cost of Treating Patients in Hospitals in Canada,(1) Selected Age Groups and Sex, 1976

Age group	Male		Female		Both sexes	
	\$'000	%	\$'000	%	\$'000	%
Less than 1 year	229,111	9.0	194,314	6.4	423,425	7.6
1- 4 years	92,855	3.7	66,263	2.2	159,119	2.8
5-14 "	130,149	5.1	98,190	3.2	228,339	4.1
15-24 "	202,539	8.0	319,021	10.5	521,561	9.3
25-44 "	322,540	12.7	639,654	21.0	962,194	17.2
45-64 "	668,183	26.3	648,636	21.3	1,316,819	23.6
65-74 "	429,050	16.9	418,694	13.7	847,744	15.2
75 years and over	466,147	18.3	661,814	21.7	1,127,962	20.2
TOTAL	2,540,576	100.0	3,046,587	100.0	5,587,163	100.0
Sub-total:						
0-24 years	654,654	25.8	677,788	22.2	1,332,444	23.8
25-64 "	990,723	39.0	1,288,290	42.3	2,279,013	40.8
65 years and over	895,197	35.2	1,080,508	35.5	1,975,706	35.4

(1) Excludes the Yukon and Northwest Territories.

Source: Unpublished data, Institutional Statistics Section, Health Division, Statistics Canada.

TEXT TABLE III. Percentage Distribution of Canadian Population(1), Selected Age Groups and Sex, 1976

Age group	Male	Female	Both sexes
0-24 years	46.1	44.1	45.1
25-64 "	46.2	46.1	46.2
65 years and over	7.7	9.8	8.7

(1) Excludes the Yukon and the Northwest Territories.

Source: Statistics Canada, 1976 Census of Canada, Catalogue 92-832.

Major Disease Categories

Hospital expenses, broken down according to the five major disease categories and by sex, are shown in Text Table IV.

Without doubt, diseases of the circulatory system, accounting for more than \$500 million each for males and females, are the most

TEXT TABLE IV. Expenditures for Five Major Disease Chapters for Males and Females Treated in Hospitals, Canada, (1) 1976

Male		Female	
	\$'000		\$'000
Circulatory system	530,224	Circulatory system	535,699
Accidents, poisonings and violence	257,588	Pregnancy, childbirth, puerperium	356,328
Digestive system	242,579	Neoplasms	281,360
Neoplasms	239,991	Digestive system	252,653
Respiratory system	225,554	Accidents, poisonings and violence	222,521
TOTAL	1,495,936	TOTAL	1,648,561
As per cent of total expenditures	59	As per cent of total expenditures	54

(1) Excludes the Yukon and Northwest Territories.

Source: Unpublished data, Institutional Care and Institutional Statistics Sections, Health Division, Statistics Canada.

significant condition requiring hospitalization in Canada. If complications of pregnancy, childbirth and puerperium are excluded from consideration, it may be noted that three of the four most expensive disease categories are common to both males and females. This is particularly pertinent since the five major categories combined (males and females) absorbed 56% of the total Canadian hospital expenditures in 1976.

In Text Table V, total hospital expenditures are broken down by sex for the 18 major disease categories listed in the International Classification of Diseases (ICD) for Canada as

a whole. For each of these categories dollar figures and the proportion they represent of total expenditures are shown. Only diseases of the circulatory system cost more than \$1 billion, representing nearly one fifth of total expenditures. Second were neoplasms at \$520 million, followed by diseases of the digestive system with over \$495 million. These three categories combined accounted for well over one third (37%) of total hospital expenditures. If the cost of accidents, poisonings and violence are added to this group, it may be noted that the cost of treatment for these four disease categories amounted to nearly half (46%) of total hospital expenditures in Canada in 1976.

TEXT TABLE V. Hospital Expenditures by Major ICD Chapters and Sex, Canada,(1) 1976

Major ICD chapters	Male	Female	Total	Percentage
	thousands of dollars			
Infectious and parasitic diseases	60,856	54,013	114,869	2.1
Neoplasms	239,991	281,360	521,351	9.3
Endocrine, nutritional and metabolic diseases	58,691	88,598	147,289	2.6
Diseases of the blood and blood forming organs	14,771	19,662	34,433	0.6
Mental disorders	145,718	195,412	341,130	6.1
Diseases of the nervous system and sense organs	166,801	164,499	331,300	5.9
Diseases of the circulatory system	530,224	535,699	1,065,923	19.0
Diseases of the respiratory system	225,554	174,779	400,333	7.2
Diseases of the digestive system	242,579	252,653	495,231	8.9
Diseases of the genitourinary system	160,605	186,646	347,251	6.2
Complications of pregnancy, childbirth, puerperium	-	356,328	356,328	6.4
Diseases of the skin and subcutaneous tissue	35,508	37,391	72,900	1.3
Diseases of the musculoskeletal system and connective tissue	125,514	167,292	292,806	5.2
Congenital anomalies	47,397	36,856	84,253	1.5
Certain causes of perinatal morbidity and mortality	23,844	18,905	42,749	0.8
Symptoms, and ill-defined conditions	68,494	85,729	154,223	2.8
Accidents, poisonings and violence	257,588	222,521	480,108	8.6
Supplementary classifications	136,411	168,243	304,654	5.5
TOTAL	2,540,576	3,046,587	5,587,161	100.0

(1) Excludes the Yukon and Northwest Territories.

Source: Unpublished data, Institutional Care and Institutional Statistics Sections, Health Division, Statistics Canada.

CHAPTER II

SITUATION IN THE PROVINCES: SOME COMPARISONS

In the previous chapter we have examined the allocation of total hospital sector expenditures associated with each province. In this section we intend to analyse their distribution according to major disease categories in the provinces.

Major Disease Categories

The provincial distribution of hospital expenditures by major ICD Chapters appears in Text Table VI. In Newfoundland, for example, diseases of the circulatory system were the most significant category with more than \$15 million or 13% of the total. Next were accidents, poisonings and violence with \$11 million or 9% of the total. Generally, diseases of the circulatory system represented the most significant illness category in each of the provinces. Their relative importance, however, varied from province to province, e.g., while they were 13% of the total in Newfoundland, they accounted for 21% of total hospital expenses in British Columbia.

One reason for these differences may be the existence of more specialized equipment or treatment facilities from one part of the country to another. In addition, variations in age and sex distributions from one province to the next may help to explain these differences. Finally, another relevant factor is likely the general availability of certain types of health care.

Expenditures by Sex and Age

The distribution of hospital expenditures for each province by age groups is presented in Text Table VII. Except for those patients under one year of age, the younger age groups, generally incurred lower expenses than people in older age groups.

It should be noted that there was significant variation in the distribution of expenditures from province to province. For example, in Newfoundland the concentration of

expenditures was more evident in the younger age groups than in the older ones. The demographic situation in this province partially accounts for this concentration (Text Table VIII).

The effect that the elderly people have on the consumption of hospital expenditures is shown very clearly by comparing the situations between Newfoundland and British Columbia for example. In the former, people 65 years and over comprised only 6.6% of the province's total population and consumed 23% of the hospital expenditures. In British Columbia, meanwhile, where the proportion of older people was slightly higher (nearly 10% of the population), the percentage of hospital expenditures for which they accounted (42%) was significantly greater.

Major Disease Categories by Age

Text Table IX shows the distribution of hospital expenditures by the major disease categories for selected age groups and sex.⁽¹⁾ For example, among men and women 65 years and over, diseases of the circulatory system accounted for the highest level of expenditures. Of interest is the observation that in the case of accidents, poisonings and violence among both sexes, hospital expenses were higher for women 75 years of age and over than any other age group.

These results indicate that future planning in the health care sector which has as an objective the reduction of future hospital expenditures may want to consider the inclusion of preventive measures as one direction in which to proceed. This is underscored by the observation that accidents represent the leading expenditures item among males between the ages of five and 44.

(1) Detailed results by province may be found in Tables 2 to 13.

TEXT TABLE VI. Hospital Expenditures by Major ICD Chapters, Canada(1) and Provinces, 1976

Major ICD chapters		New- found- land	Prince Edward Island	Nova Scotia	New Brunsw- wick	Quebec	Ontario
Infectious and parasitic diseases	\$'000 %	3,057 2.5	404 2.2	2,801 1.6	3,713 2.6	37,571 2.1	34,414 1.8
Neoplasms	\$'000 %	9,610 8.0	1,257 6.8	20,940 11.9	11,611 8.2	163,989 9.2	187,839 9.6
Endocrine, nutritional and metab- olic diseases	\$'000 %	3,331 2.8	571 3.1	4,985 2.8	3,627 2.5	49,439 2.8	49,661 2.5
Diseases of the blood and blood forming organs	\$'000 %	799 0.7	127 0.7	1,090 0.6	1,047 0.7	12,154 0.7	11,865 0.6
Mental disorders	\$'000 %	7,723 6.4	428 2.3	5,590 3.2	4,721 3.3	119,061 6.7	112,125 5.7
Diseases of the nervous system and sense organs	\$'000 %	4,788 4.0	709 3.8	6,081 3.5	5,350 3.8	132,256 7.4	104,448 5.3
Diseases of the circulatory system	\$'000 %	15,474 12.9	3,107 16.9	29,858 16.9	24,747 17.4	369,611 20.8	366,504 18.8
Diseases of the respiratory system	\$'000 %	10,756 8.9	2,629 14.3	15,125 8.6	14,350 10.1	122,278 6.9	125,442 6.4
Diseases of the digestive system	\$'000 %	9,487 7.9	1,559 8.5	18,767 10.6	15,043 10.6	158,020 8.9	176,052 9.0
Diseases of the genitourinary system	\$'000 %	8,304 6.9	964 5.2	12,467 7.1	11,122 7.8	90,289 5.1	148,577 7.6
		Manitoba	Saskat- chewan	Alberta	British Columbia	Canada	
Infectious and parasitic diseases	\$'000 %	6,107 2.7	5,479 2.8	12,073 2.8	9,250 1.7	114,869 2.1	
Neoplasms	\$'000 %	22,286 9.8	16,267 8.3	36,673 8.5	50,878 9.3	521,351 9.3	
Endocrine, nutritional and metab- olic diseases	\$'000 %	5,834 2.6	5,107 2.6	10,900 2.5	13,834 2.5	147,289 2.6	
Diseases of the blood and blood forming organs	\$'000 %	1,204 0.5	1,440 0.7	2,446 0.6	2,261 0.4	34,433 0.6	
Mental disorders	\$'000 %	15,834 6.9	11,546 5.9	25,831 6.0	38,271 7.0	341,130 6.1	
Diseases of the nervous system and sense organs	\$'000 %	12,984 5.7	9,337 4.8	22,401 5.2	32,945 6.0	331,300 5.9	
Diseases of the circulatory system	\$'000 %	37,290 16.3	31,309 16.0	73,335 17.1	114,688 21.0	1,065,923 19.1	
Diseases of the respiratory system	\$'000 %	18,037 7.9	22,302 11.4	36,734 8.6	32,680 6.0	400,333 7.2	
Diseases of the digestive system	\$'000 %	19,268 8.4	17,680 9.1	34,751 8.1	44,605 8.2	495,231 8.9	
Diseases of the genitourinary system	\$'000 %	10,880 4.8	11,849 6.1	23,377 5.5	29,423 5.4	347,251 6.2	

See footnote(s) at end of table.

TEXT TABLE VI. Hospital Expenditures by Major ICD Chapters, Canada(1) and Provinces, 1976 - Concluded

Major ICD chapters		New-found-land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario
Complications of pregnancy, child-birth, puerperium	\$'000 %	11,494 9.6	1,256 6.8	9,513 5.4	9,543 6.7	106,943 6.0	131,210 6.7
Diseases of the skin and subcutaneous tissue	\$'000 %	2,407 2.0	422 2.3	4,057 2.3	2,348 1.6	20,744 1.2	25,493 1.3
Diseases of the musculoskeletal system and connective tissue	\$'000 %	5,797 4.8	848 4.6	8,615 4.9	7,086 5.0	72,060 4.1	114,501 5.9
Congenital anomalies	\$'000 %	3,618 3.0	158 0.9	3,511 2.0	1,335 0.9	27,039 1.5	30,847 1.6
Certain causes of perinatal morbidity and mortality	\$'00 %	892 0.7	44 0.2	1,280 0.7	408 0.3	10,952 0.6	14,249 0.7
Symptoms and ill-defined conditions	\$'000 %	2,790 2.3	1,158 6.3	6,058 3.4	5,794 4.1	54,028 3.0	52,123 2.7
Accidents, poisonings and violence	\$'000 %	11,222 9.3	1,805 9.8	19,119 10.8	12,751 9.0	114,932 6.5	168,724 8.6
Supplementary classifications	\$'000 %	8,783 7.3	988 5.4	6,582 3.7	7,758 5.4	117,082 6.6	98,868 5.1
TOTAL	\$'000 %	120,333 100.0	18,435 100.0	176,437 100.0	142,354 100.0	1,778,449 100.0	1,952,942 100.0
		Manitoba	Saskatchewan	Alberta	British Columbia	Canada	
Complications of pregnancy, child-birth, puerperium	\$'000 %	15,240 6.7	12,613 6.5	29,795 6.9	28,721 5.3	356,328 6.4	
Diseases of the skin and subcutaneous tissue	\$'000 %	2,978 1.3	2,939 1.5	5,596 1.3	5,916 1.1	72,900 1.3	
Diseases of the musculoskeletal system and connective tissue	\$'000 %	11,792 5.2	10,255 5.3	25,735 6.0	36,117 6.6	292,806 5.2	
Congenital anomalies	\$'000 %	2,384 1.0	2,182 1.1	5,864 1.4	7,313 1.3	84,253 1.5	
Certain causes of perinatal morbidity and mortality	\$'000 %	2,483 1.1	1,999 1.0	4,052 0.9	6,390 1.2	42,749 0.8	
Symptoms and ill-defined conditions	\$'000 %	6,308 2.8	3,108 1.6	11,823 2.8	11,033 2.0	154,223 2.8	
Accidents, poisonings and violence	\$'000 %	21,027 9.2	19,222 9.8	47,636 11.1	63,670 11.7	480,108 8.6	
Supplementary classifications	\$'000 %	16,184 7.1	10,757 5.5	20,296 4.7	17,387 3.2	304,684 5.4	
TOTAL	\$'000 %	228,121 100.0	195,392 100.0	429,317 100.0	545,381 100.0	5,587,161 100.0	

(1) Excludes the Yukon and Northwest Territories.

Note: Figures may not add to totals due to rounding.

Source: Unpublished data, Institutional Care and Institutional Statistics Sections, Health Division, Statistics Canada.

TEXT TABLE VII. Hospital Expenditures by Selected Age Groups and Sex, Canada(1) and Provinces, 1976

Age group and sex		Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec
dollars						
Less than 1 year	M.	7,079,198	894,926	7,505,682	6,663,278	74,606,553
	F.	5,802,958	789,989	5,498,594	5,790,989	62,421,500
	T.	12,882,156	1,684,915	13,004,276	12,454,267	137,028,053
Per cent of total		10.7	9.1	7.4	8.7	7.7
1-4 years	M.	3,593,551	534,726	4,085,317	3,303,475	25,271,810
	F.	2,709,489	413,525	2,851,589	2,329,557	17,855,839
	T.	6,303,040	948,251	6,936,906	5,633,032	43,127,649
Per cent of total		5.2	5.1	3.9	4.0	2.4
5-14 years	M.	5,554,949	461,855	5,599,565	3,241,689	37,574,407
	F.	4,083,352	425,841	4,629,478	2,693,358	25,597,042
	T.	9,588,301	887,696	10,229,043	5,935,047	63,171,449
Per cent of total		8.0	4.8	5.8	4.2	3.6
15-24 years	M.	4,552,147	620,326	5,494,644	4,519,867	54,814,305
	F.	11,243,396	1,063,861	10,337,913	9,734,958	86,313,073
	T.	15,795,543	1,684,187	15,832,557	14,254,825	141,127,378
Per cent of total		13.1	9.1	9.0	10.0	7.9
25-44 years	M.	7,784,017	891,973	10,123,163	7,417,421	108,608,249
	F.	14,797,551	1,906,712	18,862,013	15,192,646	213,092,752
	T.	22,789,685	2,798,685	28,985,176	22,610,067	321,701,001
Per cent of total		18.8	15.2	16.4	15.9	18.1
45-64 years	M.	13,293,139	2,099,427	22,230,615	17,114,621	225,843,259
	F.	12,677,613	1,947,915	22,052,493	15,660,024	210,962,931
	T.	25,970,752	4,047,342	44,283,108	32,774,645	436,806,190
Per cent of total		21.6	22.0	25.1	23.0	24.6
65-74 years	M.	7,129,715	1,486,265	14,338,081	10,823,248	138,697,722
	F.	6,230,159	1,353,467	12,293,253	10,344,862	143,912,276
	T.	13,359,874	2,839,732	26,631,334	21,168,110	282,609,998
Per cent of total		11.1	15.4	14.9	15.9	15.9
75 years and over	M.	7,231,637	1,490,146	12,515,199	13,279,517	145,101,123
	F.	6,619,878	2,053,771	18,019,862	14,244,672	207,776,594
	T.	13,851,515	3,543,917	30,535,061	27,524,189	352,877,717
Per cent of total		11.5	19.2	17.3	19.3	19.8
TOTAL	M.	56,168,353	8,479,644	81,892,266	66,363,116	810,517,428
	F.	64,164,396	9,955,081	94,545,195	75,991,066	967,932,007
	T.	120,332,749	18,434,725	176,437,461	142,354,182	1,778,449,435
PER CENT OF TOTAL		100.0	100.0	100.0	100.0	100.0

		Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
dollars							
Less than 1 year	M.	78,755,913	10,173,427	9,406,974	16,895,100	17,129,875	229,110,926
	F.	67,300,824	8,496,886	7,929,597	15,213,151	15,069,113	194,313,601
	T.	146,056,737	18,670,313	17,336,571	32,108,251	32,198,988	423,424,527
Per cent of total		7.5	8.2	8.9	7.5	5.9	7.6
1-4 years	M.	30,958,180	3,593,588	4,777,305	9,124,599	7,612,700	92,855,251
	F.	22,243,614	2,715,828	3,607,049	6,303,448	5,233,312	66,263,250
	T.	53,201,794	6,309,416	8,384,354	15,428,047	12,846,012	159,118,501
Per cent of total		2.7	2.8	4.3	3.6	2.4	2.8
5-14 years	M.	45,132,908	4,697,439	4,539,051	12,308,808	11,088,827	130,149,498
	F.	35,040,451	3,709,339	3,973,431	9,814,593	8,223,035	98,189,920
	T.	80,173,359	8,406,778	8,512,482	22,123,401	19,311,862	228,339,418
Per cent of total		4.1	3.7	4.4	5.2	3.5	4.1
15-24 years	M.	88,031,254	6,654,800	5,914,313	15,564,765	16,372,788	202,539,209
	F.	116,425,807	12,924,862	12,339,110	29,865,371	28,773,128	319,021,479
	T.	204,457,061	19,579,662	18,253,423	45,430,136	45,145,916	521,560,688
Per cent of total		10.5	8.6	9.3	10.6	8.3	9.3
25-44 years	M.	110,566,421	11,502,197	8,673,812	25,627,843	31,344,815	322,539,911
	F.	231,167,810	22,161,883	17,899,008	49,035,205	55,538,919	639,654,499
	T.	341,734,231	33,664,080	26,572,820	74,663,048	86,883,734	962,194,410
Per cent of total		17.5	14.8	13.6	17.4	15.9	17.2
45-64 years	M.	234,812,295	25,544,246	21,256,676	45,611,433	60,377,808	668,183,519
	F.	236,635,913	23,824,231	20,386,822	45,691,219	58,778,499	648,635,660
	T.	471,466,208	49,368,477	41,643,498	91,302,652	119,156,307	1,316,819,179
Per cent of total		24.1	21.6	21.3	21.3	21.8	23.6
65-74 years	M.	144,936,851	20,273,576	16,259,121	31,939,692	43,165,663	429,049,934
	F.	146,807,364	18,638,760	13,017,945	28,275,471	37,820,775	418,694,332
	T.	291,744,215	38,912,336	29,277,066	60,215,163	80,986,438	847,744,266
Per cent of total		14.9	17.1	15.0	14.0	14.8	15.2
75 years and over	M.	140,789,376	24,366,223	21,384,463	37,927,923	62,061,923	466,147,530
	F.	223,319,258	28,844,088	24,027,802	50,118,155	86,790,155	661,814,235
	T.	364,108,634	53,210,311	45,412,265	88,046,078	148,852,078	1,127,961,765
Per cent of total		18.6	23.3	23.2	20.5	27.3	20.2
TOTAL	M.	873,983,198	106,805,496	92,211,715	195,000,163	249,154,399	2,540,575,778
	F.	1,078,959,041	121,315,877	103,180,764	234,316,613	296,226,936	3,046,586,976
	T.	1,952,942,239	228,121,373	195,392,479	429,316,776	545,381,335	5,587,162,754
PER CENT OF TOTAL		100.0	100.0	100.0	100.0	100.0	100.0

(1) Excludes the Yukon and Northwest Territories.

Source: Unpublished data, Institutional Care and Institutional Statistics Sections, Health Division, Statistics Canada.

TEXT TABLE VIII. Population by Selected Age Groups, Canada(1) and Provinces, 1976

Age group	Canada	New- found- land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec
Less than 1 year						
Number	345,070	11,090	1,870	12,795	11,390	91,470
Per cent	1.5	2.0	1.6	1.5	1.7	1.5
1-4 years						
Number	1,379,315	46,705	7,735	52,875	46,875	351,185
Per cent	6.0	8.4	6.5	6.4	6.9	5.6
5-14 years						
Number	4,148,930	129,960	23,620	158,060	134,835	1,107,685
Per cent	18.1	23.3	20.0	19.1	20.0	17.8
15-24 years						
Number	4,465,850	114,900	22,865	162,170	137,570	1,264,735
Per cent	19.5	20.6	19.3	19.6	20.3	20.3
25-44 years						
Number	6,198,315	134,090	27,960	207,515	166,420	1,758,700
Per cent	27.0	24.0	23.7	25.0	24.6	28.2
45-64 years						
Number	4,390,060	84,435	20,920	154,425	119,090	1,179,320
Per cent	19.1	15.1	17.7	18.6	17.6	18.9
65-74 years						
Number	1,253,305	23,120	7,460	49,130	37,220	319,075
Per cent	5.5	4.2	6.3	5.9	5.5	5.1
75 years and over:						
Number	747,320	13,420	5,780	31,610	23,855	162,285
Per cent	3.3	2.4	4.9	3.8	3.5	2.6
TOTAL	22,928,165	557,720	118,210	828,580	677,255	6,234,455
PERCENT	100.0	100.0	100.0	100.0	100.0	100.0
	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	
Less than 1 year						
Number	118,895	16,430	15,205	31,525	34,395	
Per cent	1.4	1.6	1.7	1.7	1.4	
1-4 years						
Number	488,315	65,880	59,475	121,400	138,860	
Per cent	5.9	6.5	6.5	6.6	5.6	
5-14 years						
Number	1,466,580	182,780	173,335	350,200	421,870	
Per cent	17.8	17.9	18.8	19.1	17.1	
15-24 years						
Number	1,552,355	194,350	178,340	379,220	459,360	
Per cent	18.8	19.0	19.4	20.6	18.6	
25-44 years						
Number	2,266,815	254,565	206,830	499,810	675,615	
Per cent	27.4	24.9	22.5	27.2	27.4	
45-64 years						
Number	1,632,595	200,920	185,970	317,940	494,455	
Per cent	19.8	19.7	20.2	17.3	20.1	
65-74 years						
Number	458,200	64,755	60,950	85,520	147,880	
Per cent	5.5	6.3	6.6	4.7	6.0	
75 years and over						
Number	280,730	41,805	41,225	52,400	94,175	
Per cent	3.4	4.1	4.5	2.9	3.8	
TOTAL	8,264,485	1,021,485	921,330	1,838,015	2,466,610	
PERCENT	100.0	100.0	100.0	100.0	100.0	

(1) Excludes the Yukon and Northwest Territories.

Source: Statistics Canada, 1976 Census of Canada, Catalogue 92-832.

TEXT TABLE IX. Distribution of Hospital Expenditures by Selected Age Groups, Sex and Five Major ICD Chapters,(1) Canada,(2) 1976

Age group, sex and major ICD chapters	Cost
	\$'000
Less than 1 year	
Male:	
Supplementary classifications	115,079
Respiratory system	27,034
Perinatal morbidity and mortality	23,844
Congenital anomalies	20,021
Infectious and parasitic diseases	13,789
Female:	
Supplementary classifications	111,296
Perinatal morbidity and mortality	18,905
Respiratory system	17,211
Congenital anomalies	13,689
Infectious and parasitic diseases	11,179
1-4 years	
Male:	
Respiratory system	34,222
Infectious and parasitic diseases	9,194
Accidents, poisonings and violence	9,112
Congenital anomalies	8,405
Nervous system and sense organs	8,090
Female:	
Respiratory system	22,603
Infectious and parasitic diseases	7,214
Congenital anomalies	6,296
Nervous system and sense organs	6,007
Accidents, poisonings and violence	5,952

See footnote(s) at end of table.

TEXT TABLE IX. Distribution of Hospital Expenditures by Selected Age Groups, Sex and Five Major ICD Chapters,(1) Canada,(2) 1976 - Continued

Age group, sex and major ICD chapters	Cost \$'000
5-14 years	
Male:	
Accidents, poisonings and violence	27,291
Respiratory system	20,155
Nervous system and sense organs	12,530
Digestive system	10,982
Congenital anomalies	9,488
Female:	
Respiratory system	17,969
Accidents, poisonings and violence	13,535
Nervous system and sense organs	10,751
Musculoskeletal system and connective tissue	7,752
Digestive system	7,680
15-24 years	
Male:	
Accidents, poisonings and violence	59,236
Genitourinary system	36,827
Mental disorders	22,241
Digestive system	16,010
Nervous system and sense organs	13,861
Female:	
Pregnancy, childbirth, puerperium	152,891
Mental disorders	27,244
Digestive system	22,883
Accidents, poisonings and violence	21,156
Genitourinary system	19,273

See footnote(s) at end of table.

TEXT TABLE IX. Distribution of Hospital Expenditures by Selected Age Groups, Sex and Five Major ICD Chapters,(1) Canada,(2) 1976 - Continued

Age group, sex and major ICD chapters	Cost
	\$'000
25-44 years	
Male:	
Accidents, poisonings and violence	56,363
Digestive system	49,114
Mental disorders	41,542
Musculoskeletal system and connective tissue	32,282
Circulatory system	31,352
Female:	
Pregnancy, childbirth, puerperium	202,616
Genitourinary system	73,345
Mental disorders	63,845
Digestive system	57,994
Neoplasms	45,401
45-64 years	
Male:	
Circulatory system	175,488
Digestive system	91,472
Neoplasms	81,515
Accidents, poisonings and violence	52,944
Nervous system and sense organs	45,633
Female:	
Neoplasms	110,518
Circulatory system	103,977
Digestive system	83,042
Genitourinary system	55,693
Mental disorders	54,268

See footnote(s) at end of table.

TEXT TABLE IX. Distribution of Hospital Expenditures by Selected Age Groups, Sex and Five Major ICD Chapters,(1) Canada,(2) 1976 - Concluded

Age group, sex and major ICD chapters	Cost
	\$'000
65-74 years	
Male:	
Circulatory system	133,873
Neoplasms	68,481
Digestive system	38,667
Respiratory system	36,449
Nervous system and sense organs	31,844
Female:	
Circulatory system	121,234
Neoplasms	57,064
Digestive system	38,278
Nervous system and sense organs	32,600
Accidents, poisonings and violence	32,010
75 years and over	
Male:	
Circulatory system	182,537
Neoplasms	59,020
Respiratory system	43,280
Genitourinary system	29,384
Digestive system	27,554
Female:	
Circulatory system	277,492
Accidents, poisonings and violence	80,404
Neoplasms	54,181
Digestive system	38,047
Respiratory system	37,114

(1) For each age group and sex, the five major ICD chapters (in terms of dollars) were selected.

(2) Excludes the Yukon and Northwest Territories.

Source: Unpublished data, Institutional Care and Institutional Statistics Sections, Health Division, Statistics Canada.

CHAPTER III

SOME PROJECTIONS

It is somewhat tenuous to try to make inferences which can influence long-term planning in the hospital sector based on one year of data. Yet if it can be accepted that 1976, in terms of hospital expenditures, was not too divergent from the norm, it is possible to make some estimates using certain assumptions which will be delineated below, the objective is to assist in better understanding the scope of the data presented in the previous two chapters.

The projections presented below are an attempt to answer two questions, i.e.,

what are the short-term effects of demographic changes on total hospital expenditures?, and

what are the average hospital expenditures which may be incurred by an individual during his/her lifetime or life cycle?

These two ways of considering future expenditures in the hospital sector, i.e., as they relate to the population as a whole in the former and to the life of an individual in the latter, actually correspond to the period and cohort approaches traditionally used in demographic analysis.

Hospital Expenditures and Population Change: 1976-1986

The type of projection relating to our first question already has been used in recent Canadian studies.(1) The following discussion will be restricted to a brief presentation of results based on 1976 hospital expenditures and updated demographic projections.

(1) In particular, see Boulet, J.A. & Grenier, G., **Health Expenditures in Canada and the Impact of Demographic Changes on Future Government Health Insurance Program Expenditures** (Discussion Paper #123), Economic Council of Canada, Ottawa, October 1979, 98 pages; and Lefebvre, L.A., Zsigmond, Z. and Devereaux, M.S., **A Prognosis for Hospitals**, Statistics Canada, Catalogue 83-520E, Ottawa, November 1979, 92 pages.

Methodology and Assumptions

The projected hospital expenditures are based on a straight-forward calculation i.e., for each age group the projected population for each year in the period 1976 to 1986 was multiplied by the average expenses calculated in 1976 for the corresponding age group.

Average hospital expenditures (Table 14)(2) by sex and age group were derived by dividing total expenses observed in 1976 by the June 1, 1976 population as given by the census (Text Table VIII). Still, before projecting these expenditures we distributed equally among all children under one year of age the expenditures relating to pregnancy, childbirth and puerperium. These expenses are normally attributed to women of child-bearing years but it seemed that from the projections perspective, their total amount depends more on the number of births than on the number of women in the child-bearing age group.(3)

Based on the brevity of the projection period of 1976 to 1986 certain assumptions can be taken. The first is that no significant modifications will arise with respect to causes of hospitalization and corresponding treatment. (The per capita expenditures will be expressed in constant (1976) dollars.) Next it can be assumed that the price of hospital care relative to the price of other goods and services will not change significantly. Demand for this type of care is considered uniquely dependent on physiological conditions, i.e., essentially on the age and sex of the population. Therefore, average hospital care consumption for a particular age and sex group is constant and we make the assumption that

(2) It should be noted that (per capita) expenses relate closely to the sex and age of the population. Therefore changes in the age structure of the population can be expected to affect significantly the evolution of hospital expenditures.

(3) This idea comes from Boulet, J.-A. & Grenier, G., *op. cit.*, pp. 48-49.

supply will adapt to that demand schedule.(4) Finally we suppose that **technological** change will not be a major factor in the period under consideration.(5)

As for the demographic projections, they have been obtained by the component method using the model developed by Statistics Canada.(6) The population base is the most recent population estimate by sex and age, i.e., June 1, 1979. Two sets of assumptions have been considered.(7)

The first set of assumptions are:

the fertility rate for Canada is estimated to continue falling from 1.9 to 1.7 children per female between 1976 and 1986;

a declining mortality until 1981, when life expectancy for males and females in 1981 is expected to be 70.5 and 79.0 years, respec-

(4) In the hospital sector, "demand" in some discussions has come to be known as Say's Law of hospital beds, i.e., it is the available supply of beds which partially determines the demand for them. However, the whole question of supply-demand interactions is much more complex than this statement would imply. In fact, a thorough demand analysis would stress the multiple nature of demands for medical care (for example, see Berki, Sylvester E., **Hospital Economics**, Lexington Books, O.C. Heath and Company, Massachusetts, 1972).

(5) The inspiration for these assumptions came from Boulet, J.-A. & Grenier, G., *op. cit.*; see pages 42-44, in particular. It should be remembered that we are not so much **predicting** hospital expenditures but rather are attempting to **simulate** the effect of demographic changes alone on the rate of growth of hospital costs. From this perspective, the likelihood of the assumptions vis-à-vis expenditures becomes secondary.

(6) The projections were provided by the Projections' Section, Demography Division, Statistics Canada.

(7) Essentially, these correspond to assumptions four and seven developed by Statistics Canada, which were modified here to account for the availability of new information (most recent population base, fertility trends, life tables for 1975-1977, etc.). For more details see Statistics Canada, **Population Projections for Canada and the Provinces, 1976-2001**, Catalogue 91-520, Ottawa, February 1979, 472 pages.

tively, compared to 70.2 and 77.5 years, respectively in 1976;(8)

recent trends in interprovincial migration, which closely approximate Statistics Canada Assumption A which assumes constant rates of out-migration and constant in-migration proportions (i.e., the 1975-1976 to 1977-1978 averages) during the projection period, are employed; and

net international migration (immigration - emigration) is estimated to be constant at 50,000 per year.

The second set of assumptions differ from the first only in terms of migration. To show the effect of this phenomenon, we considered the situation in which there would be neither international nor interprovincial migration. In other words, no one left their province of birth (or residence) after the June 1, 1979 starting point for the demographic projections.

The resulting population projections are detailed in Tables 15 and 16.

Major Findings

The effects of demographic changes on hospital expenditures for the period 1976 to 1986 in Canada are presented from two perspectives: net migration and no migration. The latter case allows us to examine the effects of changes in mortality and fertility, while the first position enables an observation of the additional outcomes occasioned by migration.

According to the first assumption, the Canadian population would grow at an average annual rate of about 1% during the projection period. An implicit part of this growth is the changing age structure of that population; the low level of fertility helps to continue the phenomenon of the "aging" of the Canadian population (Text Table X). Under the second assumption (with no migration) population growth is less rapid (less than 0.9% per annum) and, while it is hardly noticeable here

(8) While we have assumed that life expectancy will continue to diverge in the short run, it has been suggested that the gap between male and female life expectancy could begin to converge in the longer term, possibly due to changing lifestyles among females e.g., higher frequency of smoking.

given the small numbers involved;(9) the "aging" of the Canadian people is more significant than is portrayed in Assumption 1. Of interest here is the observation that not only is the proportion of the elderly female population greater than the male counterpart, but that the annual rate of growth of the former is estimated to be greater than the latter (Text Tables X and XI).

If there were no changes in the population's age structure, per capita hospital expenditures would remain constant during the projection period, and the rate of growth of total expenses would be identical to that of the total population. However, the estimates in Text Table XI suggest that this is far from the situation. Consequently, hospital expenditures must be studied carefully in order to separate changes due to the increase in the **number** of individuals in the population from changes resulting from modifications in **age structure** alone.(10)

Comparison of the growth rates of the population (1.0%) and total expenditures (1.8%) over the period 1976 to 1986, allows us to appreciate the significance of changes in age structure as they affect hospital expenditures (Text Table XI). It is observed that while the latter increase less rapidly when there is no migration, the changing age structure effects play a greater role in this case. It is apparent that under either assumption, the growth in expenditures is clearly more significant for females than for males, the difference being related primarily to the effect of age structure.

As a result of the significance the elderly population play in the estimates of future hospital expenditures, the aged population deserve particular attention in this analysis(11) (Text Table XII). Whatever assumption is considered, the proportion of the 65 and over age group is estimated to grow from 8.8% in 1976 to 10.4% in 1986, with the more significant increase being reflected by females. A striking observation here is the growing importance of the 75 and over, which is the result of an aging process within the elderly population.

With respect to hospital expenditures, slightly more than one third were consumed by the 65 and over age group in 1976. Of significance is the fact that one fifth of the total went for those people 75 and over. Whichever demographic scenario is considered, it is estimated that the elderly will utilize 40% of hospital resources in Canada in 1986: about 36% for men and 43% for women. Furthermore, expenditures for the 75 and over age group are expected to increase more rapidly than for

people 65 and over as a whole. Although immigration has the effect of diminishing somewhat the impact of the 65 and over age group in the population figures, this is not reflected vis-à-vis their effect on total hospital expenditures.

What would happen to the distribution of hospital expenditures by major disease or illness classification as a result of this population change? This question is important since it has a bearing on the future demand for hospital care.

Text Table XIII indicates that, except for two major ICD chapters (diseases of the circulatory system and complications of pregnancy, childbirth and puerperium), the proportional distribution of these expenditures is not affected by our assumptions regarding demographic changes.

The proportion of total hospital expenditures being consumed by diseases of the circulatory system is estimated to increase between 1976 and 1986. For that part of the population less than 25 years of age, expenditures for this illness category are negligible; after age 25 costs here increase rapidly. It will be recalled from Text Table X that in 1986, those in the age group 25 to 44 will represent a significantly greater proportion of the total than in 1976, reflecting in large part the "baby boom" bulge which is growing older. As well, people 65 and over will represent a greater proportion of the population. For the latter age group, a notable part of hospital expenditures are attributed to diseases of the circulatory system. The decrease in the portion of expenses related to complications of pregnancy, childbirth and puerperium reflects the expected continuing decline in the birth rate.

- (9) Because of their age structure, immigrants add to the younger proportion of the population, but the effect on the structure of the population is negligible since in the short term and with the assumptions used they make up only a small proportion of the age groups that they have just increased.
- (10) While we are trying to examine these effects separately, in reality increases in the numbers of people and changes in age structure work together simultaneously to influence hospital expenditures.
- (11) Underscoring this significance is the fact that per capita hospital expenses for Canadians 65 and over are almost 17 times greater than those in the five to 14 age group, with this differential being 26 times greater for those 75 and over.

**TEXT TABLE X. Percentage Distribution of Population by Sex and Age Group, Canada,(1) 1976 and 1986
(Assumptions 1 and 2)**

Sex and age group	1976	1986	
		Assumption 1	Assumption 2
	per cent		
Both sexes:			
Total	100.0	100.0	100.0
Less than 1 year	1.5	1.5	1.5
1- 4 years	6.0	6.1	6.0
5-14 "	18.1	14.3	14.1
15-24 "	19.5	16.7	16.6
25-44 "	27.0	32.2	32.2
45-64 "	19.1	18.8	19.1
65 years and over	8.8	10.4	10.4
65-74 years	5.5	6.3	6.3
75 years and over	3.3	4.1	4.1
Male:			
Total	100.0	100.0	100.0
Less than 1 year	1.5	1.6	1.6
1- 4 years	6.2	6.3	6.3
5-14 "	18.6	14.8	14.6
15-24 "	19.8	17.2	17.1
25-44 "	27.4	32.8	32.7
45-64 "	18.8	18.6	18.9
65 years and over	7.7	8.8	8.8
65-74 years	5.1	5.7	5.7
75 years and over	2.6	3.1	3.1
Female:			
Total	100.0	100.0	100.0
Less than 1 year	1.5	1.5	1.5
1- 4 years	5.8	5.9	5.8
5-14 "	17.6	13.8	13.6
15-24 "	19.2	16.2	16.1
25-44 "	26.7	31.7	31.7
45-64 "	19.5	19.1	19.2
65 years and over	9.8	12.0	12.1
65-74 years	5.9	6.9	7.0
75 years and over	3.9	5.1	5.1

(1) Excludes the Yukon and Northwest Territories.

Note: In Assumption 2, there is no migration after June 1, 1979.

Source: Statistics Canada, 1976 Census of Canada, Catalogue 92-832, and Tables 15 to 16, before rounding.

TEXT TABLE XI. Average Annual Rates of Growth of Population, Total and Per Capita Hospital Expenditures, by Sex, Based on Two Assumptions Regarding Population Change, Canada,(1) 1976-1986

Sex	Assumption 1			Assumption 2		
	1976-1981	1981-1986	1976-1986	1976-1981	1981-1986	1976-1986
	per cent					
Both sexes:						
Population	1.00	1.01	1.01	0.92	0.80	0.86
Per capita expenditures	0.91	0.65	0.78	0.94	0.74	0.84
Total expenditures	1.92	1.67	1.80	1.87	1.55	1.71
Male:						
Population	0.94	0.97	0.95	0.84	0.74	0.79
Per capita expenditures	0.69	0.39	0.54	0.74	0.49	0.61
Total expenditures	1.64	1.36	1.50	1.59	1.23	1.41
Female:						
Population	1.07	1.06	1.07	0.99	0.86	0.93
Per capita expenditures	1.10	0.89	1.00	1.13	0.97	1.05
Total expenditures	2.19	1.96	2.07	2.14	1.84	1.99

(1) Excludes the Yukon and Northwest Territories.

Note: In Assumption 2, there is no migration after June 1, 1979.

Source: Statistics Canada, 1976 Census of Canada, Catalogue 92-832, unpublished projections (1981) and Tables 15 to 18, before rounding.

TEXT TABLE XII. Proportion of Total Population and of Total Hospital Expenditures Represented by Population 65 Years of Age and Over, by Sex, Canada,(1) 1976 and 1986 (Assumptions 1 and 2)

Sex and age group	1976		1986			
			Assumption 1		Assumption 2	
	Popu- lation	Expen- ditures	Popu- lation	Expen- ditures	Popu- lation	Expen- ditures
	per cent					
Both Sexes:						
All age groups	100.0	100.0	100.0	100.0	100.0	100.0
65 years and over	8.8	35.4	10.4	39.7	10.4	39.8
65-74 years	5.5	15.2	6.3	16.1	6.3	16.1
75 years and over	3.3	20.2	4.1	23.6	4.1	23.7
Male:						
All age groups	100.0	100.0	100.0	100.0	100.0	100.0
65 years and over	7.7	32.9	8.8	36.2	8.8	36.3
65-74 years	5.1	15.8	5.7	16.7	5.7	16.7
75 years and over	2.6	17.1	3.1	19.5	3.1	19.6
Female:						
All age groups	100.0	100.0	100.0	100.0	100.0	100.0
65 years and over	9.8	37.7	12.0	43.0	12.1	43.1
65-74 years	5.9	14.6	6.9	15.6	7.0	15.6
75 years and over	3.9	23.1	5.1	27.4	5.1	27.5

(1) Excludes the Yukon and Northwest Territories.

Note: In Assumption 2, there is no migration after June 1, 1979.

Source: Statistics Canada, Catalogue 92-832, op. cit. and Tables 15 to 18, before rounding.

TEXT TABLE XIII. Percentage Distribution of Hospital Expenditures by Major ICD Chapters According to Two Assumptions Regarding Population Change, Canada,(1) 1976 and 1986

Major ICD chapters	1976		1986	
			Assumption 1	Assumption 2
	per cent			
TOTAL	100.0	100.0	100.0	100.0
Infectious and parasitic diseases	2.1	2.0	2.0	2.0
Neoplasms	9.3	9.5	9.5	9.5
Endocrine, nutritional and metabolic diseases	2.6	2.7	2.7	2.7
Diseases of the blood and blood forming organs	0.6	0.6	0.6	0.6
Mental disorders	6.1	6.0	6.0	6.0
Diseases of the nervous system and sense organs	5.9	5.9	5.9	5.9
Diseases of the circulatory system	19.1	20.4	20.4	20.5
Diseases of the respiratory system	7.2	7.0	7.0	7.0
Diseases of the digestive system	8.9	8.8	8.8	8.8
Diseases of the genitourinary system	6.2	6.1	6.1	6.1
Complications of pregnancy, childbirth, puerperium	6.4	5.9	5.9	5.9
Diseases of the skin and subcutaneous tissue	1.3	1.3	1.3	1.3
Diseases of the musculoskeletal system and connective tissue	5.2	5.3	5.3	5.3
Congenital anomalies	1.5	1.3	1.3	1.3
Certain causes of perinatal morbidity and mortality	0.8	0.7	0.7	0.7
Symptoms, and ill-defined conditions	2.8	2.7	2.7	2.7
Accidents, poisonings and violence	8.6	8.5	8.5	8.5
Supplementary classifications	5.5	5.2	5.2	5.2

(1) Excludes the Yukon and Northwest Territories.

Note: In Assumption 2, there is no migration after June 1, 1979.

Source: Table 2 (for 1976) and unpublished tables (for 1986).

Conclusion

Demographic changes by themselves will influence appreciably the growth of hospital expenditures. Under both assumed circumstances population will grow at an average annual rate of about 1%. Yet, depending on whether we consider males or females the rate of growth in expenditures *ceteris paribus* would be 1.5 to two times greater than the population growth rate, as a result of changes in the age structure.

Under the two assumed scenarios, hospital expenses would increase at about the same rate. The distinguishing factor among them is the greater importance of the age structure effect, in the absence of international migration.

Finally, by virtue of the level of their per capita expenses and the increasing part of the population that they represent, 65 and over age group likely will consume a significantly increasing portion of hospital expenditures: 40% for 10% of the total population in 1986 vis-à-vis 35% for less than 9% 10 years earlier.

Hospital Expenditures and the Life Cycle(12)

Those concerned with health economics may be interested in estimates of the average cost of hospital care which an individual might possibly incur during his life cycle or lifetime.

Interest in this type of research already has been demonstrated in studies of the economic value of human life which treat, among other things, the costs of education, of lost production or the costs necessary to save or prolong life.(13) The latter represent the direct health costs, of which hospital expenditures represent an important component, i.e., 42% in 1976.(14)

(12) The interpretation of this concept depends on the goal being pursued. In this case, "life cycle" represents simply that period of time between birth and death.

(13) In this regard it is worth mentioning the important contribution of Alfred Sauvy in his **Théorie générale de la population** (vol. 1: Économie et population), 2nd edition, Paris, P.U.F., 1956, pp. 312-352.

(14) Based on data from Health Economics and Data Analysis Division, Health and Welfare Canada.

The question of individual life-cycle hospital expenditures is complex, but nevertheless, use of some simplifying assumptions, make it possible to arrive at an estimate of the magnitude of these expenses.

Methodology and Assumptions

Let us assume a cohort of 100,000 people of each sex born in Canada in 1976. Assume further that migration would not affect their number and that during different stages of their lives, they will be subject to the same risks of death as were observed at the corresponding ages during the period 1975 to 1977.

What we have then is the framework of a model based on the longitudinal life table concept which illustrates the life expectancy of a cohort subject to only one phenomenon: mortality, the level of which is that observed during the 1975 to 1977 period.(15)

From this model we can obtain the total number of years the members of the cohort group would live (100,000 times life expectancy at birth) and, since everyone will not die at the same time, the distribution of these years lived $L_x, x+a$ according to the age intervals $x, x+a$.

The average hospital costs for these people broken down by sex and age, will be based on those which were used for the projection period 1976 to 1986 (see Table 14) and will be based on the same assumptions. These average per capita expenditures, $C_x, x+a$ will be expressed in constant (1976) dollars and will be kept constant throughout the life of the cohort.

Since these average costs represent, in fact, mean life year expenditures for the age groups considered, total hospital expenditures will be calculated when all members of the cohort have completed their life cycles:(16)

$$\sum_{x=0}^{\omega} (C_x, x+a) (L_x, x+a)$$

where the average cost (\bar{C}) is:

$$\bar{C} = \frac{1}{100,000} \sum_{x=0}^{\omega} (C_x, x+a) (L_x, x+a).$$

(15) See Statistics Canada, **Life Tables, Canada and Provinces, 1975-1977**, Catalogue 84-532, Ottawa, October 1979.

(16) See Appendix II for an example of a detailed calculation.

Results: Significance and Limitations

The results of the calculations are summarized in Text Table XIV. It illustrates the magnitude of hospital expenditure for which an individual might account on average, if the conditions observed in 1976, i.e., per capita hospital expenditures and risks of death, were maintained long enough such that an entire cohort would experience them during its life cycle.

The estimates suggest that average hospital expenditures in Canada would amount to \$22,000 during the life cycle of a man compared with over \$27,000 during that of a woman.(17) There are considerable differences among the provinces, but the magnitude of these variations is approximately the same for both sexes (Text Table XIV). Quebec and Prince Edward Island represent extreme cases: whether females or males are considered, the expenditures of the former would be more than twice those of the latter. Furthermore, only Quebec and Alberta would have higher costs than the Canadian average.

In every situation, hospital expenditures

$$\text{average expenditures} = \frac{\text{total expenditures}}{\text{population}}$$

or,

$$\text{average expenditures} = \frac{\text{average expenditures per treated case}}{\text{proportion of treated cases in the population}}$$

incurred during a female's life cycle would be greater than those for a man. At the national level, this difference would be nearly 25%.(18)

What do these variations by province and sex conceal? These divergences result from differences in the level of hospital expenditures by year lived on the one hand, and longevity on the other hand.

Let us control, for males and females, the cost effect by applying to each of the 10 provinces the average expenditures by age calculated for Canada as a whole. The results thus obtained (Text Table XV) illustrate the significance of the cost effect. As a result, the great differences which had been observed from one province to the next in Text Table XIV have practically disappeared.

Thus, the individual cost of hospital care varies greatly from one province to another, particularly because of differences in average costs. Still, to appreciate better the significance of these variations, it is necessary to disaggregate to a greater degree these average costs. For each age group we have:

$$\text{average expenditures per treated case} = \frac{\text{average expenditures} \times \text{number of treated cases}}{\text{population}}$$

(17) Average expenditures such as these tend to conceal significant observations. For instance, in Zook, C.J. and Moore, F.D., "The High Cost Users of Medical Care", **New England Journal of Medicine**, Vol. 302, 1980, pp. 996-1002, it was shown that a small proportion of hospital patients (about 13%) used over half of hospital resources in a given year. In another study, Zook, C.J., Savickis, S.F. and Moore, F.D., "Repeated Hospitalization for the same Disease: A Multiplier of National Health Costs", **Health and Society**, Millbank Memorial Fund, Vol. 58, No. 3, 1980, pp. 454-471, found that in five typical hospitals and a specialized treatment centre, more than half of all patients, and 60% of all costs, were attributable to repeated admissions for the same disease. Unfortunately, as discussed earlier in the Methodology and Limitations section of this paper, our data do not allow us to obtain costs directly associated with specific diseases, in order that observations such as these can be uncovered.

Thus it appears that two factors, which the data used here do not allow us to distinguish, influence the level of per capita expenditures, i.e., the amount spent per treated case in hospital and the proportion of treated cases in the population. The first factor depends essentially on the means utilized (type of personnel, state of technology, etc.) and on productivity. With respect to the proportion of treated cases, the health status of the population plays a primary role. Nevertheless, other factors such as the degree of availability of health care (existence of a health insurance system, for example) and the accessibility to such care (proximity to hospitals, adequacy of services and personnel, etc.) can contribute significantly to this variation. Understandably then, one cannot compare provinces simply on the basis of average expenditures alone, particularly since

(18) The decision to allocate, contrary to conventional practice, expenditures related to complications of pregnancy, childbirth, puerperium to all children less than one year of age had the effect of reducing these differences.

TEXT TABLE XIV. Average Hospital Expenditures During the Life Cycle, by Sex, Canada(1) and Provinces

Type of measure and sex	Canada(1)	New- foundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec
Expenses \$'000:						
Male	22.2	20.6	12.4	17.7	19.5	27.3
Female	27.6	22.9	15.7	22.3	22.5	34.0
Index (Canada = 100):						
Male	100.0	92.8	56.0	79.6	87.7	123.0
Female	100.0	83.0	57.0	80.7	81.7	123.1
Index of female expenses: (Male = 100)	124.3	111.2	126.4	126.0	115.8	124.3
	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	
Expenses \$'000:						
Male	20.9	20.1	18.0	22.8	20.5	
Female	25.7	23.3	22.4	30.3	26.7	
Index (Canada = 100):						
Male	94.1	90.4	81.1	102.8	92.3	
Female	93.2	84.6	81.2	110.0	96.9	
Index of female expenses: (Male = 100)	123.0	116.3	124.4	133.0	130.4	

(1) Does not include the Yukon and Northwest Territories.

Note: See the text for the methodology and assumptions used.

Source: Table 14, before rounding, and Statistics Canada, Catalogue 84-532, op. cit.

TEXT TABLE XV. Effect of Longevity on the Provincial Variations of the Index of Hospital Expenditures Incurred During the Life Cycle, by Sex and Province

(Canada = 100)

Sex	Canada(1)	New- foundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec
Male	100.0	100.5	99.5	96.6	100.9	95.2
Female	100.0	98.6	105.5	102.0	101.6	95.8
	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	
Male	99.8	103.7	106.7	105.1	102.7	
Female	100.0	102.7	98.8	102.0	105.1	

(1) Excludes the Yukon and Northwest Territories.

Note: For each sex the longevity effect has been isolated by applying average expenditures by age for Canada to all provinces.

Source: Table 14, before rounding, and Statistics Canada, Catalogue 84-532, op. cit.

the same level of per capita expenditures can be derived by very different combinations of the two factors discussed above.

Longevity also can explain certain differences, particularly by sex. This is illustrated by a comparison of the hospital expenditures which could be consumed during the life cycle of a male and female in Canada.

It may be recalled from the first comparison that the cost of care for a female would be, on average, 24.3% higher than that for a male (Text Table XIV). If average expenditures by age for women were identical to those for men, (19) the divergence then would be 33% which represents the difference

solely due to the effect of longevity. On the other hand, if the risks of death for females were equal to those for males, average lifetime hospital expenditures for females would be 6% less than those for males. Text Table XVI summarizes all these comparisons for each province.

(19) This standardization is to be used with caution. To allocate a level of average hospital expenditures for males to a female cohort assumes that for a given age group, there is no relationship between the level of hospital expenditures and mortality. Of course, this is probably not the situation. However, for our results we have assumed that these consequences would be negligible.

TEXT TABLE XVI. Average Hospital Expenditures During the Life Cycle: Effects of Expenditures and of Longevity on Differences by Sex, Canada(1) and Provinces

	Situations		
	1	2	3
Characteristics of the male cohort attributed to the female cohort	None	Average expenditures by age	Longevity
Isolated effect	None	Longevity	Average expenditures by age
Index of female expenditures (Male costs = 100):			
Canada(1)	124.3	133.0	94.0
Newfoundland	111.2	127.3	91.0
Prince Edward Island	126.4	132.2	96.0
Nova Scotia	126.0	133.4	95.2
New Brunswick	115.8	133.8	89.5
Quebec	124.3	137.0	91.3
Ontario	123.0	131.1	94.6
Manitoba	116.3	132.3	89.0
Saskatchewan	124.4	131.4	95.3
Alberta	133.0	130.4	101.5
British Columbia	130.4	136.3	95.6

(1) Excludes the Yukon and Northwest Territories.

Note: For situation 1, the indices correspond to those of the last line of Text Table XIV.

Source: Table 14, before rounding, and Statistics Canada, Catalogue 84-532, op. cit.

Conclusion

In this section we have considered hospital expenditures from a new perspective, i.e., that of the individual's life cycle by applying conditions observed in 1976 to a cohort.

It was estimated that the average hospital expenditures which might be consumed in Canada during a lifetime would be \$22,000 for a male and more than \$27,000 for a female.

Variations by province were found to be considerable and essentially were due to differences in the level of average expenditures. In all provinces, costs for females would be greater than those for males. For Canada as a whole differences in longevity, everything else being equal, result in higher life expenditures for females. However, with the same risks of death, given the level and structure of average expenses by age, hospital care for females would be less expensive than for males.

General Discussion

The effects of demographic factors on hospital expenditures have been examined from two different perspectives, i.e., that for the whole population during a short period of its history and that for an individual over his/her lifetime.

As has been indicated earlier, similar studies have been done previously with respect to the first type of estimate. The intention here was not to forecast expenditures with a high degree of precision, but was to indicate the magnitude of the effect of demographic changes on the rate of growth of hospital expenses, given their level and structure by age. No assumptions were made regarding changes in per capita costs. However, the second type of estimate, i.e., portrayal of average lifetime hospital expenditures for an individual, represents a relatively unexplored dimension in costs-of-illness studies.

It should be stressed that, in all projections such as this, the results are only as reliable as the assumptions upon which they are based. It is likely that per capita hospital expenditures as well as the risks of death for a given age group will change over time. Again, while not attempting to predict the exact amount of hospital resources which an individual would consume during a lifetime, we were trying to indicate, in a general sense, the magnitude of such expenses if conditions observed in 1976 regarding causes of death, as well as hospital expenditures were to remain constant during the whole life of a cohort of individuals born in 1976.

It is from this point of view that average lifetime hospital expenditures may be useful to health planners in the health care sector. In fact it provides an order of magnitude for this type of expenditures and in addition facilitates comparisons, by highlighting the factors which play a role. Thus, the planner is alerted as to what could occur if the situation observed in 1976 were to continue sufficiently into the future. For example, it is noted that at the national level, these expenses are equivalent to about three times per capita GNP in 1976.⁽²⁰⁾ Finally, it will be observed that hospital expenditures per capita for 1976 (\$239 for males and \$249 for females at the Canada level) are not directly comparable to those which were obtained by the same calculation within the fictitious cohort (\$316 and \$356, respectively). Hence, we cannot compare the average per capita costs calculated for 1976 to the average costs per year of life for members of a generation subject to the death rates observed in 1976 and recipients of services for which the cost is the same as those granted that year.

(20) For per capita GNP see: Statistics Canada, **System of National Accounts, National Income and Expenditure Accounts, 1964-1978**, Catalogue 13-201, Ottawa, November 1979, Table V, p. 96.

SUMMARY AND CONCLUSIONS

In this study we set out to examine the cost of medical services in terms of the major categories of diseases treated in hospitals as a function of the age group and sex of medical service users. A further objective was to estimate the effects of demographic changes on total hospital expenditures to 1986. Finally, an attempt was made to calculate the average hospital expenditures which might be generated during an individual's lifetime:

We have found that:

- In 1976 hospital costs in Quebec were 31.8% of the Canadian total while population in that province represented 27.2% of the total in Canada.
 - Expenditures for females were higher than those for males. This may be due, in part, to the fact that female life expectancy is higher than that for males; in older age groups, such as the 75 and over group, more women than men use hospital services. Furthermore, because of pregnancy, childbirth and puerperium conditions, women between 15 and 44 years of age are hospitalized more frequently than men.
 - In 1976, less than 9% of the population (65 and over age group) was consuming more than one third of hospital resources. The 0 to 24 age group, which represented over 45% of the total population, accounted for only 24% of total hospital expenditures.
 - Diseases of the circulatory system, accounting for more than \$500 million each for males and females, are the most significant condition requiring hospitalization in Canada.
 - If pregnancy, childbirth and puerperium conditions are excluded, the four most costly diseases/illnesses, which incidentally are common to both males and females, (circulatory system, accidents, poisonings and violence, digestive system, and neoplasms) account for almost one half of total hospital expenditures.
 - Diseases of the circulatory system represented the most significant category in terms of costs in each of the provinces. Yet, their relative importance varied from province to province, e.g., while they were 13% of the total in Newfoundland they accounted for 21% of the total in British Columbia.
 - Except for those patients under one year of age, the younger age groups incurred lower expenses than people in older age groups.
 - Those 65 and over in Newfoundland made up 6.6% of the province's total population and consumed 23% of the hospital expenditures. In British Columbia, meanwhile, the 65 and over age group represented nearly 10% of the population but accounted for 42% of hospital expenditures.
 - For men and women 65 and over, diseases of the circulatory system accounted for the highest level of expenditures. Among all age groups for both sexes, it was women 75 years of age and over who had the highest hospital expenses for accidents, poisonings and violence.
 - In 1976, slightly more than one third of hospital expenditures were consumed by the 65 and over age group; it is estimated that this group will utilize 40% of hospital resources in 1986. Furthermore, it is expected that costs for those 75 and over will increase more rapidly than the total for all people 65 years and over.
 - While population is expected to grow at an average annual rate of about 1%, the rate of increase in expenditures (for females or males), *ceteris paribus*, would be 1.5 to 2 times greater than population growth. This phenomenon is due primarily to changes in the age structure of the population.
 - It is estimated that average hospital expenditures consumed in Canada during the life cycle could be \$22,000 for a male vis-à-vis more than \$27,000 for a female, expressed in constant (1976) dollars.
- As indicated earlier this study is part of a broader attempt to estimate the economic and social costs of illness in Canada. Other aspects which should and will be considered as we continue our efforts to build these thorough measures are:
- (a) complete the calculations of the direct costs i.e., estimate costs for such things as physician, dentist and other professional services, drugs, nursing home care, etc.;
 - (b) indirect costs resulting from losses in economic output stemming from disability and premature death;
 - (c) other related direct and indirect costs such as transportation costs to health providers, and time spent visiting physicians;

- (d) social costs and quality of life, e.g., as a consequence of a certain disease or illness, the victim may suffer loss of a body part or speech, disfigurement, disability, etc., resulting in costs which not only the individual must bear but also society as a whole, and
- (e) overall increases in costs throughout the economy, i.e., the question of opportunity costs of public expenditures.

It is not an understatement to say that it will not be easy to accomplish the whole task. The process of estimating reliably becomes more difficult as one goes through the major categories of costs from (a) to (e). In fact, calculating the direct costs of hospital care has not been achieved to a sufficient degree of satisfaction.

In this study we used hospital-specific per diem costs. This process is an improvement over the provincial level per diem hospital costs in that it allowed the per diem rate of hospital expenditures to reflect more realistically varying institutional scenarios. It would be much better to have inpatient hospital-specific costs assigned to diagnoses which generated these expenditures. A serious endeavour should be undertaken to obtain this information, even if only for a few provinces, in order to make better inferences for the national level.

In most economic and social impact of disease research, costs are calculated based on the **prevalence** of the illness during a given year, the approach taken in this study. Another promising path in which research efforts could be directed, and which has been the subject of recent investigation,(21) is the **incidence** approach. Very briefly, this alternative method of considering costs involves calculating and assigning present values of both health care expenditures and lost productivity to the year of incidence.

In spite of some of the limitations of this study, it is hoped that our observations, estimates and projections will be useful to planners and decision makers in the determination of future expenditures in the health care sector, and of priorities for health services and health research.

(21) Hartunian, N.S., Smart, C.N. and Thompson, M.S., "The Incidence and Economic Costs of Cancer, Motor Vehicle Injuries, Coronary Heart Disease, and Stroke: A Comparative Analysis", **American Journal of Public Health**, Vol. 70, No.12, 1980, pp. 1249-1260. In the **prevalence approach** "direct and morbidity costs are assigned to the years in which they occur and mortality costs are assigned to the year of death", while the **incidence approach** "assigns all direct, morbidity, and morbidity costs to the year in which the condition first appears" (p. 1250).

APPENDIX I

Detailed Tables

TABLE 1. Summary Table Showing Selected Statistics on Data Universe

Province	All hospitals	All public	Public general and allied special	Public mental and TB	Hospitals in survey
	A	B	C	D	E
No.					
Newfoundland	48	48	47	1	46(1)
Prince Edward Island	13	12	9	3	9(2)
Nova Scotia	58	53	46	7	46
New Brunswick	39	38	35	3	35
Quebec	262	210	191	19	189(3)
Ontario	352	287	234	53	234
Manitoba	113	90	80	10	80
Saskatchewan	147	143	139	4	134(3)
Alberta	167	157	146	11	145(3)
British Columbia	137	130	116	14	110(3)
CANADA(4)	1,336	1,168	1,043	125	1,028
E of C					
Hospitals with imputed data					
Total for E					
Imputed					
I of H					
F	G	H	I	J	
%	No.	\$'000	\$'000	%	
Newfoundland	97.8	-	120,333	-	-
Prince Edward Island	100.0	1	16,917	1,518	9.0
Nova Scotia	100.0	1	174,734	1,703	1.0
New Brunswick	100.0	-	142,354	-	-
Quebec	98.9	7	1,630,713	147,736	9.1(5)
Ontario	100.0	-	1,952,942	-	-
Manitoba	100.0	-	228,121	-	-
Saskatchewan	96.4	2	187,713	7,679	4.1
Alberta	98.6	2	427,721	1,596	0.4
British Columbia	94.8	1	544,645	736	0.1
CANADA(4)	98.6	14	5,426,193	160,968	3.0

(1) One hospital did not report any days stay.
(2) Provincial, Sanitoria included.
(3) Small institutions which did not report on HS 1 reporting form.
(4) Excludes the Yukon and Northwest Territories.
(5) Includes chronic hospitals.

TABLE 2. Hospital Expenditures by ICDA-8 Chapters, and Percentage Distribution by Selected Age Groups, Canada, 1976

Age group		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
Less than 1 year	\$'000	24,969	1,603	9,747	1,703	357	8,891	1,093	44,245	7,011	3,540
	%	21.7	0.3	6.6	4.9	0.1	2.7	0.1	11.1	1.4	1.0
1-4 years	\$'000	16,408	3,842	3,826	2,233	3,224	14,097	647	56,825	6,496	6,678
	%	14.3	0.7	2.6	6.5	0.9	4.3	0.1	14.2	1.3	1.9
5-14 "	\$'000	8,776	8,249	7,419	3,947	13,402	23,281	2,657	38,124	18,663	12,348
15-24 "	\$'000	9,350	14,583	7,824	2,115	49,485	22,592	8,750	21,859	38,893	56,100
	%	8.1	2.8	5.3	6.1	14.5	6.8	0.8	5.5	7.9	16.2
25-44 "	\$'000	14,845	62,295	17,047	2,813	105,387	49,745	58,175	32,025	107,108	89,054
	%	12.9	11.9	11.6	8.2	30.9	15.0	5.5	8.0	21.6	25.6
45-64 "	\$'000	18,515	192,033	40,165	6,411	94,098	91,891	279,465	67,737	174,514	92,319
	%	16.1	36.8	27.3	18.6	27.6	27.7	26.2	16.9	35.2	26.6
65-74 "	\$'000	10,617	125,545	30,821	5,297	34,494	64,444	255,107	59,124	76,945	45,808
	%	9.2	24.1	20.9	15.4	10.1	19.5	23.9	14.8	15.5	13.2
75 years and over	\$'000	11,388	113,201	30,440	9,916	40,685	56,360	460,029	80,394	65,602	41,403
	%	9.9	21.7	20.7	28.8	11.9	17.0	43.2	20.1	13.2	11.9
TOTAL	\$'000	114,869	521,351	147,289	34,433	341,130	331,300	1,065,923	400,333	495,231	347,251
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	Total	
Less than 1 year	\$'000	-	5,240	573	33,711	42,749	7,849	3,767	226,375	423,425	
	%	-	7.2	0.2	40.0	100.0	5.1	0.8	74.3	7.6	
1-4 years	\$'000	-	3,951	2,718	14,702	-	7,781	15,064	627	159,119	
	%	-	5.4	0.9	17.4	-	5.0	3.1	0.2	2.8	
5-14 "	\$'000	441	5,142	15,319	15,922	-	11,979	40,825	1,845	228,339	
	%	0.1	7.1	5.2	18.9	-	7.8	8.5	0.6	4.1	
15-24 "	\$'000	152,891	10,300	22,618	7,015	-	11,690	80,393	5,103	521,561	
	%	42.9	14.1	7.7	8.3	-	7.6	16.7	1.7	9.3	
25-44 "	\$'000	202,616	14,244	60,486	6,618	-	26,229	84,963	28,546	962,194	
	%	56.9	19.5	20.7	7.9	-	17.0	17.7	9.4	17.2	
45-64 "	\$'000	380	16,672	96,735	4,590	-	37,314	92,251	11,729	1,316,819	
	%	0.1	22.9	33.0	5.4	-	24.2	19.2	3.8	23.6	
65-74 "	\$'000	-	8,237	44,789	1,144	-	19,273	55,528	10,570	847,744	
	%	-	11.3	15.3	1.4	-	12.5	11.6	3.5	15.2	
75 years and over	\$'000	-	9,113	49,567	551	-	32,107	107,317	19,800	1,127,962	
	%	-	12.5	16.9	0.7	-	20.8	22.4	6.5	20.2	
TOTAL	\$'000	356,328	72,900	292,806	84,253	42,749	154,223	480,108	304,684	5,587,163	
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

For Notes and Sources, see Table 13.

TABLE 3. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Canada, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
thousands of dollars											
Less than 1 year	M.	13,789	695	5,113	894	203	5,061	758	27,034	4,566	2,223
	F.	11,179	909	4,634	808	154	3,830	335	17,211	2,445	1,317
1-4 years	M.	9,194	2,124	2,150	1,348	1,993	8,090	423	34,222	4,214	3,305
	F.	7,214	1,718	1,676	885	1,231	6,007	223	22,603	2,282	3,374
5-14 "	M.	4,604	4,741	3,811	2,265	8,826	12,530	1,448	20,155	10,982	6,097
	F.	4,172	3,508	3,608	1,682	4,575	10,751	1,209	17,969	7,680	6,251
15-24 "	M.	4,179	6,521	2,941	1,070	22,241	13,861	4,345	10,009	16,010	36,827
	F.	5,171	8,062	4,882	1,045	27,244	8,731	4,405	11,850	22,883	19,273
25-44 "	M.	7,773	16,894	6,226	976	41,542	26,350	31,352	15,404	49,114	15,708
	F.	7,073	45,401	10,820	1,837	63,845	23,395	26,823	16,621	57,994	73,345
45-64 "	M.	10,042	81,515	16,945	2,649	39,830	45,633	175,488	39,000	91,472	36,625
	F.	8,473	110,518	23,220	3,761	54,268	46,258	103,977	28,737	83,042	55,693
65-74 "	M.	5,699	68,481	11,214	2,221	14,296	31,844	133,873	36,449	38,667	30,435
	F.	4,919	57,064	19,607	3,075	20,198	32,600	121,234	22,675	38,278	15,373
75 years and over	M.	5,576	59,020	10,290	3,347	16,788	23,431	182,537	43,280	27,554	29,384
	F.	5,812	54,181	20,150	6,569	23,897	32,928	277,492	37,114	38,047	12,019
TOTAL	M.	60,856	239,991	58,691	14,771	145,718	166,801	530,224	225,554	242,579	160,605
	F.	54,013	281,360	88,598	19,662	195,412	164,499	535,699	174,779	252,653	186,646
	T.	114,869	521,351	147,289	34,433	341,130	331,300	1,065,923	400,333	495,231	347,251
thousands of dollars											
Less than 1 year	M.	-	2,873	331	20,021	23,844	4,416	2,209	115,079	229,111	
	F.	-	2,367	242	13,689	18,905	3,432	1,558	111,296	194,314	
1-4 years	M.	-	2,152	1,491	8,405	-	4,344	9,112	289	92,855	
	F.	-	1,799	1,227	6,296	-	3,437	5,952	338	66,263	
5-14 "	M.	-	2,783	7,567	9,488	-	6,415	27,291	1,145	130,149	
	F.	441	2,359	7,752	6,434	-	5,564	13,535	699	98,190	
15-24 "	M.	-	5,134	10,988	3,437	-	3,873	59,236	1,865	202,539	
	F.	152,891	5,165	11,630	3,578	-	7,817	21,156	3,238	319,021	
25-44 "	M.	-	7,527	32,282	3,107	-	9,324	56,363	2,597	322,540	
	F.	202,616	6,717	28,204	3,511	-	16,904	28,600	25,948	639,654	
45-64 "	M.	-	8,389	42,621	2,219	-	17,262	52,944	5,548	668,183	
	F.	380	8,282	54,114	2,371	-	20,052	39,306	6,181	648,636	
65-74 "	M.	-	3,733	14,988	471	-	9,108	23,519	4,052	429,050	
	F.	-	4,504	29,801	673	-	10,165	32,010	6,518	418,694	
75 years and over	M.	-	2,916	15,247	249	-	13,750	26,914	5,865	466,147	
	F.	-	6,197	34,321	302	-	18,357	80,404	14,024	661,814	
TOTAL	M.	-	35,508	125,514	47,397	23,844	68,494	257,588	136,441	2,540,576	
	F.	356,328	37,391	167,292	36,856	18,905	85,729	222,521	168,243	3,046,587	
	T.	356,328	72,900	292,806	84,253	42,749	154,223	480,108	304,684	5,587,163	

For Notes and Sources, see Table 13.

TABLE 4. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Newfoundland, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
		thousands of dollars									
Less than 1 year	M.	398	30	215	22	-	177	3	1,234	107	59
	F.	339	51	131	11	9	143	5	823	45	40
1-4 years	M.	282	82	83	25	24	324	9	1,172	153	154
	F.	235	90	105	40	160	270	4	776	110	140
5-14 "	M.	177	139	129	62	392	479	90	717	380	223
	F.	137	104	119	89	219	379	59	765	258	351
15-24 "	M.	83	112	107	24	362	338	103	234	431	252
	F.	118	181	161	23	787	236	142	344	568	680
25-44 "	M.	219	407	135	28	951	316	704	326	1,117	475
	F.	162	883	262	40	1,226	348	611	401	1,174	2,002
45-64 "	M.	227	1,776	322	38	1,085	440	3,206	958	1,428	902
	F.	177	1,886	559	89	1,349	433	2,298	649	1,389	1,287
65-74 "	M.	79	1,145	206	42	253	216	2,097	728	606	617
	F.	78	757	381	67	427	246	1,736	428	645	334
75 years and over	M.	232	1,322	144	130	298	215	2,590	605	431	554
	F.	109	646	271	69	181	229	1,815	593	643	235
TOTAL	M.	1,700	5,013	1,341	372	3,365	2,504	8,803	5,975	4,654	3,235
	F.	1,357	4,597	1,990	427	4,357	2,284	6,671	4,782	4,833	5,068
	T.	3,057	9,610	3,331	799	7,723	4,788	15,474	10,756	9,487	8,304
		XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	Total	
		thousands of dollars									
Less than 1 year	M.	-	177	7	860	501	112	78	3,098	7,079	
	F.	-	148	13	506	392	82	46	3,018	5,803	
1-4 years	M.	-	131	62	521	-	122	421	27	3,593	
	F.	-	94	65	278	-	95	227	20	2,709	
5-14 "	M.	-	146	432	572	-	280	1,106	182	5,505	
	F.	34	121	253	344	-	291	479	80	4,083	
15-24 "	M.	-	237	277	119	-	103	1,607	162	4,552	
	F.	6,413	167	253	135	-	252	563	220	11,243	
25-44 "	M.	-	201	913	89	-	176	1,532	196	7,784	
	F.	5,028	214	645	76	-	318	669	739	14,797	
45-64 "	M.	-	179	941	50	-	198	1,301	239	13,293	
	F.	19	161	1,072	49	-	246	793	219	12,678	
65-74 "	M.	-	245	194	8	-	130	456	107	7,130	
	F.	-	69	372	9	-	83	409	188	6,230	
75 years and over	M.	-	51	102	-	-	139	328	88	7,232	
	F.	-	64	193	4	-	163	1,204	199	6,620	
TOTAL	M.	-	1,368	2,928	2,219	501	1,260	6,831	4,099	56,168	
	F.	11,494	1,038	2,869	1,400	392	1,530	4,391	4,684	64,164	
	T.	11,494	2,407	5,797	3,618	892	2,790	11,222	8,783	120,333	

For Notes and Sources, see Table 13.

TABLE 5. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Prince Edward Island, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
thousands of dollars											
Less than 1 year	M.	45	0.5	6	3	-	41	2	227	9	3
	F.	39	1	3	0.5	-	43	2	149	6	2
1-4 years	M.	41	0.5	0.1	5	0.5	57	0.3	330	15	6
	F.	47	-	3	2	0.1	62	2	189	12	14
5-14 "	M.	14	4	10	6	3	42	3	155	41	16
	F.	17	3	6	6	3	29	4	177	27	22
15-24 "	M.	8	10	14	3	7	20	13	65	68	13
	F.	13	15	8	3	29	18	5	75	69	68
25-44 "	M.	10	14	23	5	66	49	83	79	145	37
	F.	26	104	38	5	58	55	112	103	165	225
45-64 "	M.	17	214	121	6	97	64	596	202	232	100
	F.	26	259	83	20	67	49	324	188	206	171
65-74 "	M.	12	164	37	12	32	26	486	178	164	97
	F.	34	152	107	7	22	54	355	105	124	48
75 years and over	M.	19	147	40	14	14	28	463	226	133	94
	F.	35	167	71	30	28	73	656	179	141	48
TOTAL	M.	166	555	250	53	219	326	1,647	1,461	807	366
	F.	238	702	320	74	208	383	1,460	1,168	751	598
	T.	404	1,257	571	127	428	709	3,107	2,629	1,559	964
thousands of dollars											
		XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	Total	
Less than 1 year	M.	-	17	1	13	26	23	10	469	895	
	F.	-	17	1	22	18	13	10	463	790	
1-4 years	M.	-	9	6	17	-	23	25	-	535	
	F.	-	8	2	14	-	30	26	-	413	
5-14 "	M.	-	19	11	17	-	39	82	-	462	
	F.	0.3	17	17	8	-	39	49	0.5	426	
15-24 "	M.	-	32	24	2	-	27	314	-	620	
	F.	572	25	16	5	-	63	76	1	1,064	
25-44 "	M.	-	40	88	4	-	63	184	-	892	
	F.	678	17	63	8	-	119	74	54	1,907	
45-64 "	M.	-	27	104	17	-	117	186	-	2,099	
	F.	5	34	199	6	-	193	118	0.2	1,948	
65-74 "	M.	-	26	49	4	-	92	106	-	1,486	
	F.	-	33	97	13	-	93	107	-	1,353	
75 years and over	M.	-	23	43	6	-	112	129	-	1,490	
	F.	-	77	126	3	-	110	308	-	2,054	
TOTAL	M.	-	193	326	79	26	498	1,037	469	8,480	
	F.	1,256	229	522	79	18	660	769	519	9,955	
	T.	1,256	422	848	158	44	1,158	1,805	988	18,435	

For Notes and Sources, see Table 13.

TABLE 6. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Nova Scotia, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
thousands of dollars											
Less than 1 year	M.	455	63	203	44	-	189	8	1,301	219	87
	F.	247	73	106	23	2	98	9	774	86	39
1-4 years	M.	230	50	88	77	64	306	13	1,698	201	143
	F.	219	73	61	35	33	226	5	1,057	104	150
5-14 "	M.	135	197	174	89	351	445	51	1,153	554	276
	F.	139	201	236	66	207	370	116	1,032	342	307
15-24 "	M.	74	294	93	26	204	190	123	450	556	262
	F.	141	244	166	33	475	262	150	458	934	768
25-44 "	M.	165	491	174	16	514	414	1,119	476	1,747	602
	F.	176	1,673	363	53	1,257	456	1,047	647	2,110	3,071
45-64 "	M.	144	3,803	612	66	526	618	6,257	1,317	3,089	1,310
	F.	233	4,555	1,001	106	994	721	3,726	1,003	2,998	2,043
65-74 "	M.	106	2,988	288	78	184	480	4,441	1,201	1,414	1,169
	F.	122	2,210	685	113	469	488	2,980	560	1,496	536
75 years and over	M.	74	2,114	244	75	105	313	4,725	1,079	887	1,306
	F.	141	1,911	488	187	203	505	5,087	921	2,030	397
TOTAL	M.	1,383	10,000	1,878	472	1,948	2,956	16,738	8,673	8,667	5,155
	F.	1,418	10,940	3,107	618	3,641	3,126	13,120	6,451	10,100	7,312
	T.	2,801	20,940	4,985	1,090	5,590	6,081	29,858	15,125	18,767	12,467
thousands of dollars											
		XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	Total	
Less than 1 year	M.	-	146	10	820	718	258	99	2,885	7,506	
	F.	-	109	27	417	562	173	39	2,715	5,499	
1-4 years	M.	-	101	37	501	-	275	296	4	4,085	
	F.	-	99	72	290	-	199	212	16	2,852	
5-14 "	M.	-	137	299	415	-	352	960	13	5,600	
	F.	31	119	340	303	-	311	501	9	4,629	
15-24 "	M.	-	201	325	147	-	163	2,347	39	5,495	
	F.	4,896	216	331	106	-	411	677	69	10,338	
25-44 "	M.	-	273	1,068	107	-	386	2,537	32	10,123	
	F.	4,572	244	913	143	-	622	1,099	415	18,862	
45-64 "	M.	-	301	1,164	91	-	701	2,161	71	22,231	
	F.	13	283	1,738	98	-	837	1,625	79	22,052	
65-74 "	M.	-	155	525	34	-	317	894	63	14,338	
	F.	-	258	931	29	-	328	1,054	31	12,293	
75 years and over	M.	-	120	229	5	-	342	870	26	12,515	
	F.	-	1,295	606	5	-	381	3,747	115	18,020	
TOTAL	M.	-	1,434	3,657	2,120	718	2,795	10,164	3,133	81,892	
	F.	9,513	2,622	4,957	1,391	562	3,263	8,955	3,449	94,545	
	T.	9,513	4,057	8,615	3,511	1,280	6,058	19,119	6,582	176,437	

For Notes and Sources, see Table 13.

TABLE 7. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, New Brunswick, 1976

Age group and sex		Chapter										Total
		I	II	III	IV	V	VI	VII	VIII	IX	X	
thousands of dollars												
Less than 1 year	M.	410	12	106	28	31	199	34	1,273	130	342	
	F.	376	10	89	13	1	171	10	835	36	31	
1-4 years	M.	285	66	50	49	16	297	9	1,398	166	101	
	F.	214	27	54	32	5	247	11	997	96	154	
5-14 "	M.	130	51	48	76	31	237	33	684	387	139	
	F.	116	69	55	64	42	190	49	643	273	325	
15-24 "	M.	139	85	93	21	230	240	64	329	613	179	
	F.	231	168	61	36	277	273	177	398	781	757	
25-44 "	M.	158	236	149	32	626	347	822	424	1,401	409	
	F.	391	1,017	208	36	823	469	838	478	1,695	2,420	
45-64 "	M.	290	1,918	385	49	960	516	4,194	1,392	2,559	1,067	
	F.	326	2,303	659	102	594	533	2,849	978	2,323	1,797	
65-74 "	M.	126	1,458	276	81	246	340	3,343	1,288	1,288	1,019	
	F.	172	1,409	581	109	317	475	2,698	660	1,173	574	
75 years and over	M.	134	1,666	204	121	249	346	4,978	1,457	951	1,295	
	F.	214	1,115	609	197	271	468	4,638	1,115	1,171	511	
TOTAL	M.	1,672	5,493	1,311	457	2,391	2,523	13,477	8,245	7,495	4,552	
	F.	2,040	6,118	2,316	589	2,330	2,827	11,270	6,104	7,549	6,570	
	T.	3,713	11,611	3,627	1,047	4,721	5,350	24,747	14,350	15,043	11,122	
thousands of dollars												
Less than 1 year	M.	-	133	2	267	219	191	67	3,218	6,663		
	F.	-	134	0.9	233	189	177	61	3,423	5,791		
1-4 years	M.	-	65	17	137	-	360	281	4	3,303		
	F.	-	61	35	61	-	151	184	1	2,330		
5-14 "	M.	-	115	131	186	-	226	762	5	3,242		
	F.	15	79	118	49	-	190	411	4	2,693		
15-24 "	M.	-	212	277	78	-	131	1,811	17	4,520		
	F.	5,163	167	200	49	-	351	562	84	9,735		
25-44 "	M.	-	206	659	87	-	375	1,443	4.2	7,417		
	F.	4,335	139	599	67	-	655	467	553	15,193		
45-64 "	M.	-	273	1,308	57	-	642	1,442	62	17,115		
	F.	30	235	1,156	32	-	669	958	114	15,660		
65-74 "	M.	-	90	356	-	-	391	457	63	10,823		
	F.	-	155	739	2	-	350	897	33	10,345		
75 years and over	M.	-	96	526	18	-	439	727	72	13,279		
	F.	-	186	961	11	-	496	2,221	62	14,245		
TOTAL	M.	-	1,191	3,277	831	219	2,755	6,990	3,484	66,363		
	F.	9,543	1,157	3,809	504	189	3,039	5,761	4,274	75,991		
	T.	9,543	2,348	7,086	1,335	408	5,794	12,751	7,758	142,354		

For Notes and Sources, see Table 13.

TABLE 8. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Quebec, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
thousands of dollars											
Less than 1 year	M.	3,483	181	1,777	306	77	1,768	339	7,668	1,594	931
	F.	3,115	377	1,521	244	67	1,348	79	4,526	700	589
1-4 years	M.	2,592	762	673	388	458	2,029	123	7,968	1,168	1,040
	F.	1,802	552	508	274	419	1,725	64	5,255	752	932
5-14 "	M.	1,649	1,357	1,301	622	2,547	3,621	338	5,028	3,447	1,569
	F.	1,100	829	949	400	994	3,037	230	4,244	2,426	1,368
15-24 "	M.	1,378	1,615	985	347	8,992	4,955	1,826	3,053	4,854	1,769
	F.	1,584	2,147	1,680	322	8,780	2,040	1,379	3,638	6,991	4,690
25-44 "	M.	2,736	5,719	2,225	415	17,125	11,023	11,103	5,158	16,923	4,145
	F.	2,548	15,546	3,890	698	24,098	7,971	8,962	5,301	19,715	22,736
45-64 "	M.	4,480	26,279	5,730	1,121	14,567	20,075	61,841	12,678	31,393	10,424
	F.	2,740	36,616	7,997	1,522	18,714	19,255	35,285	8,603	27,529	17,208
65-74 "	M.	2,820	21,135	3,891	840	4,693	13,797	44,454	11,414	11,637	8,338
	F.	1,824	18,307	7,442	1,263	6,889	14,796	44,738	8,390	11,854	4,664
75 years and over	M.	2,101	16,353	2,819	1,184	4,496	10,522	61,271	13,899	6,950	6,669
	F.	1,619	16,215	6,050	2,209	6,144	14,294	97,578	15,456	10,085	3,217
TOTAL	M.	21,239	73,400	19,401	5,223	52,957	67,789	181,295	66,867	77,967	34,885
	F.	16,333	90,589	30,038	6,931	66,104	64,466	188,316	55,411	80,053	55,404
	T.	37,571	163,989	49,439	12,154	119,061	132,256	369,611	122,278	158,020	90,289
thousands of dollars											
Less than 1 year	M.	-	958	185	7,631	6,146	1,688	509	39,366	74,607	
	F.	-	830	108	4,534	4,806	1,358	343	37,875	62,421	
1-4 years	M.	-	593	512	3,100	-	1,280	2,433	150	25,272	
	F.	-	458	456	1,705	-	1,125	1,693	138	17,856	
5-14 "	M.	-	716	2,110	2,619	-	1,988	8,317	344	37,574	
	F.	44	603	1,914	1,831	-	1,590	3,823	214	25,597	
15-24 "	M.	-	1,531	3,382	931	-	987	17,375	833	54,814	
	F.	39,271	1,671	3,267	1,176	-	1,761	4,904	1,013	86,313	
25-44 "	M.	-	2,286	9,827	987	-	2,485	15,204	1,246	108,608	
	F.	67,510	2,425	6,959	967	-	5,281	6,787	11,699	213,093	
45-64 "	M.	-	2,380	11,767	535	-	6,456	12,926	3,191	225,843	
	F.	118	2,795	13,484	600	-	6,424	8,783	3,288	210,963	
65-74 "	M.	-	852	3,223	118	-	3,941	5,308	2,238	138,698	
	F.	-	1,279	6,728	217	-	4,230	6,877	4,412	143,912	
75 years and over	M.	-	461	2,768	22	-	6,346	6,202	3,037	145,101	
	F.	-	906	5,371	65	-	7,084	13,445	8,039	207,777	
TOTAL	M.	-	9,777	33,773	15,944	6,146	25,173	68,275	50,405	810,517	
	F.	106,943	10,968	38,286	11,095	4,806	28,855	46,657	66,677	967,932	
	T.	106,943	20,744	72,060	27,039	10,952	54,028	114,932	117,082	1,778,449	

For Notes and Sources, see Table 13.

TABLE 9. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Ontario, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
thousands of dollars											
Less than 1 year	M.	4,512	233	1,622	252	45	1,647	266	7,009	1,664	449
	F.	3,469	250	1,468	244	33	1,245	164	4,230	1,041	415
1- 4 years	M.	2,837	706	785	524	396	2,618	198	11,639	1,540	1,261
	F.	2,282	706	582	318	416	1,745	116	7,132	720	1,161
5-14 "	M.	1,188	1,974	1,365	900	2,306	4,702	581	6,857	3,886	2,631
	F.	1,171	1,567	1,427	688	1,358	4,282	429	5,986	2,702	2,387
15-24 "	M.	1,309	2,777	1,075	453	7,144	4,681	1,550	3,381	5,723	33,004
	F.	1,655	3,043	1,683	399	11,147	3,451	1,714	3,881	7,948	7,259
25-44 "	M.	1,968	5,813	2,133	268	13,069	9,347	11,552	5,131	16,961	6,462
	F.	2,046	16,767	3,712	677	22,675	8,640	9,489	5,548	20,217	26,742
45-64 "	M.	2,883	28,418	5,806	892	12,901	15,454	64,232	12,504	32,316	14,303
	F.	2,799	39,665	8,126	1,294	19,698	14,368	38,271	9,846	30,515	21,061
65-74 "	M.	1,184	24,211	3,647	667	4,235	7,944	47,688	11,811	13,434	11,068
	F.	1,466	20,873	6,164	1,052	6,885	9,146	42,939	7,342	14,424	5,844
75 years and over	M.	1,646	20,162	3,134	1,011	4,033	5,632	54,933	12,482	9,220	10,089
	F.	1,998	20,672	6,931	2,226	5,784	9,546	92,381	10,664	13,741	4,440
TOTAL	M.	17,528	84,293	19,569	4,968	44,129	52,025	181,000	70,814	84,744	79,267
	F.	16,887	103,545	30,092	6,897	67,996	52,423	185,504	54,628	91,308	69,310
	T.	34,414	187,839	49,661	11,865	112,125	104,448	366,504	125,442	176,052	148,577
thousands of dollars											
Less than 1 year	M.	-	575	70	6,855	7,909	1,390	966	43,291	78,756	
	F.	-	470	54	4,641	6,340	1,086	617	41,534	67,301	
1- 4 years	M.	-	583	509	2,721	-	1,549	3,070	22	30,958	
	F.	-	526	439	2,817	-	1,233	1,990	61	22,244	
5-14 "	M.	-	961	2,858	3,649	-	2,431	8,738	105	45,133	
	F.	177	752	3,308	2,481	-	2,054	4,190	82	35,040	
15-24 "	M.	-	1,892	4,211	1,350	-	1,646	17,508	326	88,031	
	F.	55,920	1,850	4,521	1,267	-	3,114	6,652	921	116,426	
25-44 "	M.	-	2,764	12,700	1,198	-	4,033	16,634	533	110,566	
	F.	74,966	2,393	12,252	1,252	-	6,655	9,525	7,611	231,168	
45-64 "	M.	-	3,150	16,883	1,026	-	6,363	16,947	733	234,812	
	F.	148	3,199	23,305	901	-	7,938	14,445	1,073	236,654	
65-74 "	M.	-	1,346	6,127	221	-	2,521	8,407	425	144,937	
	F.	-	1,677	11,442	256	-	3,003	13,643	651	146,807	
75 years and over	M.	-	1,150	4,536	123	-	2,992	9,251	396	140,789	
	F.	-	2,206	11,284	88	-	4,116	36,141	1,101	223,319	
TOTAL	M.	-	12,420	47,894	17,144	7,909	22,924	81,522	45,832	873,983	
	F.	131,210	13,073	66,606	13,703	6,340	29,198	87,202	53,035	1,078,959	
	T.	131,210	25,493	114,501	30,847	14,249	52,123	168,724	98,868	1,952,942	

For Notes and Sources, see Table 13.

TABLE 10. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Manitoba, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
		thousands of dollars									
Less than 1 year	M.	949	26	228	45	3	139	42	1,560	83	113
	F.	694	11	261	30	1	120	8	1,030	48	56
1-4 years	M.	455	72	60	34	13	195	27	1,438	135	104
	F.	407	17	14	28	2	149	13	1,143	71	114
5-14 "	M.	178	220	54	60	399	278	70	759	345	169
	F.	177	99	76	45	273	195	39	759	212	218
15-24 "	M.	214	226	73	44	1,056	238	121	398	583	193
	F.	182	359	152	25	810	310	150	466	866	700
25-44 "	M.	465	459	219	46	1,955	411	873	609	1,708	469
	F.	326	1,638	318	22	2,119	614	786	515	2,027	1,826
45-64 "	M.	488	3,082	801	94	1,738	1,654	5,756	1,614	3,433	1,087
	F.	447	4,057	827	117	2,362	1,279	3,535	1,118	2,874	1,529
65-74 "	M.	237	2,940	492	112	992	2,325	5,258	1,586	1,812	1,400
	F.	240	2,831	827	110	1,342	1,337	4,296	1,042	1,553	595
75 years and over	M.	294	3,256	682	133	1,112	1,396	7,830	2,670	1,704	1,719
	F.	350	2,541	748	260	1,657	2,343	8,485	1,327	1,811	586
TOTAL	M.	3,282	10,282	2,611	567	7,268	6,636	19,977	10,635	9,804	5,255
	F.	2,825	12,004	3,224	638	8,566	6,348	17,313	7,401	9,463	5,625
	T.	6,107	22,286	5,834	1,204	15,834	12,984	37,290	18,037	19,268	10,880
		XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	Total	
		thousands of dollars									
Less than 1 year	M.	-	133	20	582	1,434	205	66	4,545	10,173	
	F.	-	95	7	482	1,048	136	84	4,383	8,497	
1-4 years	M.	-	129	81	178	-	173	470	29	3,594	
	F.	-	113	40	125	-	156	294	30	2,716	
5-14 "	M.	-	155	348	272	-	224	963	203	4,697	
	F.	37	129	243	253	-	246	585	121	3,709	
15-24 "	M.	-	182	435	98	-	144	2,574	74	6,655	
	F.	6,872	160	406	91	-	357	911	109	12,925	
25-44 "	M.	-	339	1,049	52	-	352	2,384	110	11,502	
	F.	8,324	171	753	80	-	667	1,060	913	22,162	
45-64 "	M.	-	251	1,591	34	-	582	2,796	542	25,544	
	F.	7	259	1,903	83	-	871	1,717	387	23,824	
65-74 "	M.	-	171	658	8	-	364	1,381	537	20,274	
	F.	-	155	1,796	44	-	509	1,321	639	18,639	
75 years and over	M.	-	159	689	2	-	563	1,166	991	24,366	
	F.	-	375	1,774	-	-	757	3,256	2,570	28,844	
TOTAL	M.	-	1,521	4,870	1,226	1,434	2,608	11,799	7,031	106,805	
	F.	15,240	1,457	6,922	1,158	1,048	3,700	9,229	9,153	121,316	
	T.	15,240	2,978	11,792	2,384	2,483	6,308	21,027	16,184	228,121	

For Notes and Sources, see Table 13.

TABLE II. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Saskatchewan, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
thousands of dollars											
Less than 1 year	M.	1,155	5	140	32	4	191	8	1,949	155	75
	F.	869	18	156	28	1	152	15	1,361	133	35
1- 4 years	M.	704	53	72	32	20	380	15	2,184	183	131
	F.	522	10	70	36	13	303	4	1,659	106	133
5-14 "	M.	208	117	105	94	277	350	110	1,036	367	188
	F.	213	88	73	75	223	420	68	1,018	310	296
15-24 "	M.	157	146	79	40	778	197	86	446	545	168
	F.	163	228	170	51	707	221	104	479	857	675
25-44 "	M.	137	366	207	34	1,403	629	684	488	1,306	337
	F.	179	974	298	83	1,604	692	898	691	1,697	1,971
45-64 "	M.	163	2,459	538	88	1,579	1,190	4,452	1,908	3,052	1,393
	F.	238	3,227	706	155	1,729	951	2,591	1,731	2,682	2,015
65-74 "	M.	125	2,444	447	128	709	1,106	4,346	1,802	1,568	1,557
	F.	171	1,747	699	88	652	703	3,043	999	1,352	620
75 years and over	M.	174	2,671	586	192	516	894	6,578	2,668	1,671	1,685
	F.	302	1,714	762	285	1,330	958	8,305	1,884	1,696	570
TOTAL	M.	2,823	8,262	2,174	640	5,286	4,938	16,280	12,481	8,847	5,533
	F.	2,656	8,006	2,933	801	6,260	4,399	15,029	9,822	8,833	6,316
	T.	5,479	16,267	5,107	1,440	11,546	9,337	31,309	22,302	17,680	11,849
thousands of dollars											
Less than 1 year	M.	-	206	6	498	1,133	65	57	3,728	9,407	
	F.	-	176	3	319	865	66	75	3,637	7,930	
1- 4 years	M.	-	187	48	213	-	82	450	23	4,777	
	F.	-	132	35	221	-	68	265	29	3,607	
5-14 "	M.	-	138	159	175	-	149	1,036	30	4,539	
	F.	17	124	132	139	-	167	589	22	3,973	
15-24 "	M.	-	178	363	94	-	114	2,452	71	5,914	
	F.	6,695	146	361	101	-	225	1,062	94	12,339	
25-44 "	M.	-	208	766	82	-	192	1,679	156	8,674	
	F.	5,886	131	659	120	-	322	1,083	611	17,899	
45-64 "	M.	-	379	1,572	58	-	305	1,883	236	21,257	
	F.	15	241	1,797	85	-	395	1,571	258	20,387	
65-74 "	M.	-	117	738	26	-	176	837	134	16,259	
	F.	-	177	1,192	6	-	167	1,157	245	13,018	
75 years and over	M.	-	174	965	32	-	322	1,683	572	21,384	
	F.	-	225	1,459	12	-	291	3,342	891	24,028	
TOTAL	M.	-	1,588	4,618	1,178	1,133	1,405	10,077	4,949	92,212	
	F.	12,613	1,351	5,637	1,004	865	1,703	9,145	5,807	103,181	
	T.	12,613	2,939	10,255	2,183	1,999	3,108	19,222	10,757	195,392	

For Notes and Sources, see Table 13.

TABLE 12. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, Alberta, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
		thousands of dollars									
Less than 1 year	M.	1,521	88	353	81	3	384	23	2,857	304	74
	F.	1,354	106	449	100	1	254	25	2,108	226	49
1-4 years	M.	1,135	152	138	134	611	608	12	3,740	343	186
	F.	967	89	139	47	48	423	4	2,701	170	271
5-14 "	M.	561	321	284	212	1,396	1,098	110	2,127	752	408
	F.	740	333	394	135	844	668	87	1,887	595	477
15-24 "	M.	442	612	240	61	1,668	1,242	251	847	1,250	407
	F.	615	633	415	78	2,121	810	362	1,142	1,949	1,764
25-44 "	M.	988	1,467	435	66	2,592	1,252	2,076	1,299	3,638	1,072
	F.	645	3,013	774	131	4,464	1,847	1,832	1,462	4,159	5,713
45-64 "	M.	580	6,086	1,177	127	2,682	2,519	10,417	3,107	5,792	2,291
	F.	640	7,251	1,460	147	3,793	3,706	6,496	2,210	5,227	3,962
65-74 "	M.	444	4,863	894	112	1,243	1,763	8,754	3,436	2,913	2,317
	F.	411	3,782	1,137	159	1,240	2,275	8,040	1,542	2,232	852
75 years and over	M.	492	4,261	865	243	1,211	1,702	14,087	3,889	2,441	2,579
	F.	536	3,615	1,743	612	1,912	1,849	20,757	2,379	2,759	952
TOTAL	M.	6,164	17,850	4,388	1,037	11,407	10,568	35,732	21,302	17,433	9,336
	F.	5,909	18,823	6,512	1,409	14,424	11,832	37,603	15,432	17,317	14,041
	T.	12,073	36,673	10,900	2,446	25,831	22,401	73,335	36,734	34,751	23,377
		XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	Total	
thousands of dollars											
Less than 1 year	M.	-	217	12	1,136	2,209	301	217	7,111	16,895	
	F.	-	209	19	999	1,843	205	151	7,115	15,213	
1-4 years	M.	-	201	128	509	-	309	889	28	9,125	
	F.	-	158	57	357	-	268	561	42	6,303	
5-14 "	M.	-	227	773	739	-	351	2,701	247	12,309	
	F.	46	231	859	474	-	390	1,510	143	9,815	
15-24 "	M.	-	301	1,075	353	-	355	6,134	327	15,565	
	F.	14,307	376	1,164	241	-	715	2,657	515	29,865	
25-44 "	M.	-	585	2,959	206	-	666	6,091	234	25,628	
	F.	15,430	503	2,384	321	-	1,310	3,130	1,916	49,035	
45-64 "	M.	-	557	3,413	129	-	1,094	5,362	280	45,611	
	F.	11	562	4,037	218	-	1,435	3,793	562	45,691	
65-74 "	M.	-	360	1,372	16	-	706	2,409	337	31,940	
	F.	-	391	2,501	57	-	889	2,544	222	28,275	
75 years and over	M.	-	284	1,510	15	-	1,122	2,714	511	37,928	
	F.	-	430	3,473	94	-	1,708	6,591	706	50,118	
TOTAL	M.	-	2,734	11,242	3,102	2,209	4,903	26,517	9,076	195,000	
	F.	29,795	2,862	14,493	2,762	1,843	6,919	21,119	11,220	234,317	
	T.	29,795	5,596	25,735	5,864	4,052	11,823	47,636	20,296	429,317	

For Notes and Sources, see Table 13.

TABLE 13. Hospital Expenditures by ICDA-8 Chapters, Selected Age Groups and Sex, British Columbia, 1976

Age group and sex		Chapter									
		I	II	III	IV	V	VI	VII	VIII	IX	X
		thousands of dollars									
Less than 1 year	M.	861	56	461	81	40	325	32	1,956	300	89
	F.	677	10	450	115	38	255	18	1,375	124	60
1- 4 years	M.	632	180	201	80	389	1,275	14	2,653	311	179
	F.	519	155	141	73	135	856	0.1	1,694	141	305
5-14 "	M.	363	359	340	144	1,124	1,278	61	1,641	822	477
	F.	362	214	273	112	411	1,181	129	1,458	535	499
15-24 "	M.	373	644	182	51	1,799	1,761	205	806	1,385	579
	F.	468	1,044	386	76	2,111	1,110	221	967	1,919	1,912
25-44 "	M.	926	1,922	525	64	3,241	2,562	2,335	1,413	4,168	1,701
	F.	573	3,785	957	91	5,520	2,303	2,247	1,474	5,033	6,639
45-64 "	M.	770	7,479	1,452	167	3,694	3,104	14,537	3,319	8,178	3,748
	F.	847	10,248	1,800	208	4,968	4,962	8,601	2,410	7,298	4,619
65-74 "	M.	564	7,133	1,037	150	1,708	3,846	13,006	3,006	3,831	2,853
	F.	399	4,996	1,581	107	1,955	3,080	10,408	1,605	3,424	1,305
75 years and over	M.	409	7,068	1,571	243	4,752	2,384	25,083	4,305	3,165	3,395
	F.	505	5,583	2,477	495	6,386	2,662	37,790	2,596	3,970	1,063
TOTAL	M.	4,899	24,842	5,768	982	16,747	16,535	55,274	19,100	22,160	13,021
	F.	4,351	26,036	8,065	1,279	21,524	16,410	59,414	13,579	22,445	16,402
	T.	9,250	50,878	13,834	2,261	38,271	32,945	114,688	32,680	44,605	29,423
		XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	Total	
		thousands of dollars									
Less than 1 year	M.	-	310	16	1,360	3,550	183	141	7,368	17,130	
	F.	-	178	10	1,537	2,840	135	132	7,114	15,069	
1- 4 years	M.	-	153	90	507	-	169	778	-	7,613	
	F.	-	150	24	429	-	111	499	-	5,233	
5-14 "	M.	-	170	446	844	-	376	2,626	16	11,089	
	F.	39	184	568	552	-	286	1,396	23	8,223	
15-24 "	M.	-	368	620	265	-	203	7,114	17	16,373	
	F.	12,782	388	1,110	408	-	568	3,092	211	28,773	
25-44 "	M.	-	624	2,252	295	-	594	8,675	47	31,345	
	F.	15,886	479	2,976	477	-	955	4,706	1,437	55,539	
45-64 "	M.	-	891	3,879	220	-	805	7,939	195	60,378	
	F.	14	514	5,424	298	-	1,043	5,322	201	58,778	
65-74 "	M.	-	371	1,747	35	-	470	3,262	148	43,166	
	F.	-	308	4,002	40	-	513	3,999	97	37,821	
75 years and over	M.	-	396	3,878	27	-	1,372	3,842	172	62,062	
	F.	-	432	9,074	17	-	3,251	10,147	340	86,790	
TOTAL	M.	-	3,282	12,928	3,554	3,550	4,171	34,376	7,962	249,154	
	F.	28,721	2,633	23,189	3,759	2,840	6,862	29,294	9,424	296,227	
	T.	28,721	5,916	36,117	7,313	6,390	11,033	63,670	17,387	545,381	

Note: Nomenclature for ICD Chapters may be found in Introduction, Methodology and Limitations. Totals may not add due to rounding.
 Source: Unpublished data, Institutional Care and Institutional Statistics Sections, Health Division, Statistics Canada.

TABLE 18. Projected Hospital Expenditures by Sex and Age Group, According to Assumption Number 2, Canada and Provinces, 1986

Sex and age group	Canada	Newfound-land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
thousands of dollars											
Male:											
Less than 1 year:	450,728	13,457	1,699	13,450	12,477	141,298	159,796	18,419	17,947	36,497	35,687
1-4 years	101,519	3,437	532	4,273	3,415	28,593	32,853	3,635	5,351	10,874	8,554
5-14 "	110,724	4,707	384	4,570	2,732	30,815	37,755	4,175	4,077	11,930	9,578
15-24 "	190,209	5,111	666	5,325	4,459	47,645	84,740	6,172	5,794	14,924	15,372
25-44 "	415,323	10,898	1,226	13,699	10,509	137,281	137,720	14,971	12,455	37,194	39,370
45-64 "	728,051	14,368	2,163	22,346	17,670	248,317	257,443	25,060	20,628	54,632	65,423
65-74 "	523,034	9,638	1,603	16,709	12,823	169,427	178,816	23,507	18,727	39,782	52,002
75 years and over	612,697	9,826	1,648	15,285	16,853	200,388	183,912	29,394	25,801	48,388	81,204
Total	3,132,285	71,443	9,922	95,656	80,938	1,003,764	1,073,037	125,331	110,782	254,222	307,190
Female:											
Less than 1 year	402,193	11,864	1,535	11,244	11,216	125,597	142,748	16,407	15,508	33,572	32,501
1-4 years	72,447	2,611	436	2,974	2,383	20,201	23,684	2,787	3,998	7,500	5,872
5-14 "	83,037	3,447	346	3,758	2,295	20,861	29,130	3,211	3,551	9,409	7,028
15-24 "	152,425	5,314	506	5,289	4,444	39,759	56,397	5,532	5,542	14,955	14,688
25-44 "	568,669	14,004	1,710	19,355	15,398	183,464	198,037	18,265	17,058	49,298	52,082
45-64 "	705,675	13,993	1,986	22,221	16,331	231,612	260,792	23,414	19,875	54,108	61,342
65-74 "	545,418	8,889	1,693	16,110	13,410	184,245	187,503	23,383	17,277	40,190	52,718
75 years and over	957,381	9,269	2,369	23,944	19,311	316,637	314,123	40,333	33,195	75,475	122,725
Total	3,487,245	69,390	10,582	104,895	84,789	1,122,376	1,212,414	133,333	116,005	284,506	348,956
Both sexes:											
Less than 1 year	852,921	25,321	3,234	24,694	23,694	266,895	302,544	34,826	33,455	70,069	68,188
1-4 years	173,966	6,048	968	7,247	5,799	48,795	56,538	6,422	9,350	18,375	14,426
5-14 "	193,761	8,154	731	8,328	5,027	51,676	66,885	7,386	7,628	21,338	16,607
15-24 "	342,634	10,425	1,172	10,613	8,903	87,404	141,137	11,704	11,336	29,879	30,060
25-44 "	983,992	24,902	2,937	33,053	25,907	320,745	335,757	33,236	29,513	86,492	91,452
45-64 "	1,433,726	28,361	4,149	44,567	34,001	479,929	518,236	48,474	40,504	108,740	126,766
65-74 "	1,068,452	18,527	3,296	32,819	26,233	353,672	366,319	46,889	36,005	79,972	104,720
75 years and over	1,570,078	19,095	4,017	39,229	36,164	517,024	498,035	69,727	58,996	123,864	203,929
TOTAL	6,619,530	140,833	20,504	200,551	165,727	2,126,140	2,285,451	258,664	226,786	538,729	656,147

Source: Tables 14 and 16

APPENDIX II

**Calculation of Hospital Expenditures During
the Life Cycle**

APPENDIX II

Calculation of Hospital Expenditures During the Life Cycle

The principle on which the calculations presented in Text Table XIV are based was discussed in detail in Chapter III ("Hospital Expenditures and the Life Cycle: Methodology and Assumptions"). It is worthwhile here, with the help of data for males, to provide a numerical application.

The two data series necessary to carry out this calculation are shown in Appendix II, Table 1. The first (Column 1 of Appendix II, Table 1), which is taken from Column LL of official Statistics Canada mortality tables, indicates the total number of years lived by the members of the fictitious cohort under consideration, the initial size of which is 100,000 individuals. As well, this series shows how these years are distributed according to the age intervals $x, x + a$. The

second set (Column 2), which is derived from Appendix I, Table 14, gives average hospital expenditures by age. One could consider these average expenditures as hospital expenditures by year of life, as well.

Column 3, which is the product of Columns 1 and 2, represents for each age interval considered, total hospital expenditures incurred by survivors at the beginning of each respective age interval. The total of Column 3 thus gives aggregate hospital expenditures for the whole fictitious cohort from its birth to its death. By dividing this aggregate amount by the initial size of the cohort, i.e., 100,000 individuals, we obtain hospital expenditures for a male during his life cycle: about \$22,000.

TABLE 1. Calculation of Hospital Expenditures During the Life Cycle, Males, Canada

Age interval	Years lived	Average hospital expenditures	Total hospital expenditures
$x, x + a$	$L_{x, x + a}$	$C_{x, x + a}$	
	(1)	(2)	(3) = (1) x (2)
		dollars	
0- 1 year	98,693	2,328	229,757,304
1- 5 years	393,348	131	51,528,588
5-15 "	980,329	61	59,800,069
15-25 "	970,773	90	87,369,570
25-45 "	1,891,390	103	194,813,170
45-65 "	1,687,934	311	524,947,474
65-75 "	598,109	741	443,198,769
75 years and over	397,975	1,579	628,402,525
TOTAL	7,018,551		2,219,817,469

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