A COMPARISON OF EMERGENCY DEPARTMENT

USERS AND RESIDENTS

By

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ABSTRACT

This thesis is a report of the analysis of the patient, use and illness characteristics of the visitors of two Hamilton, Ontario emergency departments. Emergency room utilization has increased greatly in recent years; much of this increase has been due to non-urgent emergency visits. Consequently, in this study characteristics of emergency use and, specifically, non-urgent use were examined.

The socio-demographic characteristics of a 1971 random sample of residents of North Hamilton were compared to the 1971 Census to establish the representative nature of this random sample. The emergency department users of the Hamilton General Hospital who reside in North Hamilton were compared to the random sample of residents. The emergency department users were characterized as being male, non-single, Protestants, native Canadians, less educated and of lower social class. The users were separated into two groups by urgency classification (emergency-urgent 52%; non-urgent 48%) and compared with the sample of residents. Non-urgent users were characterized as being younger and as having less residential tenure both in Hamilton and at their present address than residents in general. No characteristics differentiated the emergency-urgent users from residents. A younger age profile was the only socio-demographic characteristic which differentiated the two groups of urgency status. Four of the 16

illness variables separated these two groups: the emergency-
urgent users were more likely to have been involved in an
accident, suffered trauma, arrived by ambulance and preferred
care at the emergency department.

The users of the emergency department at St. Joseph's
Hospital who also resided in North Hamilton were compared
with the users from the Hamilton General. The St. Joseph's
users were more likely to be younger, single, and Catholic
than the users of the General. Although the General users
were more likely to have suffered trauma, they were less
likely to be classified as emergency-urgent than the users
at St. Joseph's Hospital.

The roles that the two emergency departments play
for the residents of North Hamilton are analyzed. Although
both serve as acute care, trauma centres, the General is
functioning relatively more as a physician surrogate for
some North Hamilton residents. Accessibility and availabi-
lity of alternate primary care services are discussed for
the non-urgent patient. Recommendations are offered to
alleviate the demand placed on the emergency department by
those most effected by its physician surrogate role.

ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

Personal health care services may be divided into three general categories:

    1.   Tertiary medical care

    2.   Secondary medical care

    3.   Primary medical care

Tertiary and secondary care are expensive, highly developed, well organized and mainly hospital based. Emergency services represent a subset of all three categories and its primary care component has been expanding because of increased community demand for readily accessible ambulatory services.

To explain the increased use of emergency services in Hamilton, two Hamilton emergency departments have been examined. Their use by North Hamilton residents is the major focus of this study. Emergency users at the Hamilton General Hospital (H.G.H.), located in North Hamilton, are compared with a random sample of North Hamilton residents to identify characteristics which predispose individuals to emergency department use, especially for non-urgent problems. The illness and health care characteristics of those H.G.H. users from North Hamilton who were classified as emergency-

urgent (EU) or non-urgent (NU) are also examined to identify predictors of non-urgent emergency department use.

North Hamilton residents who used another Hamilton hospital, St. Joseph's Hospital (S.J.H.), are compared with North End H.G.H. users to determine which characteristics differentiate these two groups and to identify the roles of each emergency department for North Hamilton residents.

The literature review is exhaustive of Canadian investigations dealing with emergency department use. A representative review of emergency department studies in the United States is presented to complement the Canadian data.

Chapter III identifies the objectives of this investigation and Chapter IV presents the data sources used in this particular study. Chapter V is concerned with the methods of data analysis to test hypotheses and assess these objectives.

Chapter VI reports the findings and Chapter VII discusses these results with emphasis on differing roles of the Hamilton General Hospital emergency department for the NU and EU North Hamilton user. The two emergency departments are also discussed with reference to their differing functions for the residents of North Hamilton.

The final chapter proposes ways of alleviating the use of emergency department services while still meeting consumer demands for continuously available services.

CHAPTER II

REVIEW OF THE LITERATURE

1. Studies Documenting Increased Use of Emergency Services
   in North America

A distinct feature of the studies of emergency department use in Canada is the dramatic increase in the volume of visits over time. Many Canadian investigations (1-14) have emphasized this trend. Some studies have also reported that the increase in emergency department use in communities has been far greater than their increases in population.

Stewart et al (12) report an increase of over 300% in the number of visits to a Halifax emergency department from 1956 to 1966; the population of the Halifax region rose just 14.6% in the same period. Baltzan's (2) investigation of hospitals in Saskatoon revealed a 63% increase in emergency department visits from 1965 to 1970. When he accounted for the relatively small increase in that city's population over the same period, the number of visits per capita increased from .52 in 1965 to .72 in 1970. Vayda et al report a 67% increase in utilization at one Hamilton hospital between 1961 and 1966, the growth in Hamilton's population during the same period was 13.6%.

In Canada, the number of hospital admissions increased 30% between 1948-1961, while emergency department visits increased 240% (9). The emergency departments of 15 general hospitals in Metropolitan Toronto experienced a 52% increase in visits between 1963 and 1967 (5). In a review of emergency department use in Hamilton, a 300% increase in the number of visits between 1961 and 1971 is reported (6).

In the United States, Shortcliffe et al (15) investigated the use of emergency departments of 90 hospitals. The number of emergency department visits in all institutions had increased by almost 400% in the fifteen-year period from 1940 to 1955. In the five year period from 1940 to 1945 the percentage increase in emergency department visits was 8.4%; in 1945 to 1950 the increase was 60%, and in 1950 to 1955 the increase was 64%. The investigators note that the relatively small increase in the period between 1940 and 1945 negates the theory that a great increase in use would be expected during World War II, when so many physicians were on active military duty. The rapid increases in emergency department use did not begin until after the war. Marinakos and Landgraf's investigation (16) of the emergency department of a Pittsburgh hospital showed an increase of 200% in the number of visits in the period from 1935 to 1962. From 1954 to 1964 emergency department visits increased by 16 million, or 175%, in the United States (17). Variations in the annual increases of emergency department visits for individual hospitals ranged from 7% to 40% (17).

2. Factors Responsible for Increased Emergency Use

In an effort to explain this upsurge in emergency
department use in the United States, Webb (17) grouped con-
tributing factors under four major headings: population,
physician, institution and external forces. He reported
that very few of the factors have been subjected to validation
relative to emergency medical care. He also noted that many
of the factors are not exclusive to the emergency facility
and could affect all aspects of medical care utilization.
In listing the factors under the major headings, their
relevance to emergency use in Canada can be considered.

(1) Population factors (sociomedical, socioeconomic and
    demographic):

    (a) Population increase

    (b) Aging of the population

    (c) Increasing prevalence of chronic diseases

    (d) Rise in accident rates

    (e) Large concentration of lower income groups in metro-
        politan areas where there are proportionally fewer
        physicians

    (f) Increased mobility so that persons relocate their
        residences frequently and do not immediately estab-
        lish a relationship with a private physician

    (g) Persons are no longer housebound and can easily visit
        a hospital for minor conditions formerly treated
        at home.

(h) Inability to afford private medical care

With the exception of the inability to afford private medical care, the above factors are also applicable to Canada. With the introduction of universal health insurance in 1968, the ability to afford medical care was no longer an issue for 98% or more of Canadians.

(2) The Physician (factors associated with availability and accessibility and the issues of primary care):

(a) Numbers of general practitioners are decreasing

(b) Private physicians are leaving core urban areas

(c) Physicians are less available at nights, weekends or holidays

(d) Physicians make fewer house calls

(e) Patients are reluctant to inconvenience their physicians outside office hours

(f) Increased specialization has a number of effects:
   - the patient may not know which specialist to call
   - arrangement of office hours are by appointment only
   - unwillingness to accept responsibility for a patient's problem outside the specialist's field of interest.

(g) Closely related to (f) is the suggestion that the independent capacity of the individual physician has decreased as medical science and knowledge has grown.

The above points appear to apply to the Canadian

situation. In 1968, general practitioners represented 41.7%
of the total number of active physicians in Canada. By 1972,
they represented 37.0% (18). Vayda (19) found that in 1931
in the United States there were 94 family physicians per
100,000 persons, of whom 90 were general practitioners, one
was a pediatrician and three were internists. By 1957 the
ratio of general practitioners had fallen to 48 per 100,000,
while family pediatricians had increased to three and family
internists to nine per 100,000. By 1967 there was an esti-
mated further decrease to 32 general practitioners per 100,000
and an increase in family pediatricians and family internists
to 4 and 12 per 100,000 respectively. Thus the decline in
family practice has been greater in the U.S. than Canada.
Dorsey (20) has documented a 50% decrease of general prac-
titioners in inner city Boston between 1940 and 1961. Data
is not available to determine whether a similar trend exists
in Canadian urban centres. Chaiton (21) reports that night
and weekend office hours and house calls are declining as
the usual pattern of primary care practice. A similar trend
was found in the United States where 2.3% of all physician
visits took place in the home in 1969; a decline from 3.3%
reported two years earlier (22).

(3) The institution (factors associated with the institution-
     alization of medical care):
     (a) "....The steady metamorphasis of the hospital from
         the last resort of the mortally ill to the valued
         workshop of the physician for all serious sickness,

and now to the functional community health centre"
(23)

(b) Physician acceptance of the emergency facility as a place, preferable to his office, for the treatment of the injured and the acutely ill.

(c) Increased public confidence in the hospital now viewed as an appropriate place to seek care.

(d) The more informal, non-appointment, casual care has been relinquished to the hospital.

(e) Availability for around-the-clock care.

(f) Accessibility to highly concentrated urban populations.

All the above factors are also relevant to the increased use of the emergency department in Canada. Brown (24) offers cogent reasons for the "metamorphasis" of the hospital. A generation of individuals who have observed with great admiration and respect the highly efficient and closely supervised medical care rendered in the general hospital have little desire to be sick outside the orbit of that care. Brown further indicated that the point is rapidly being reached where it will be considered a social transgression to be found dead anywhere but in a hospital.

In the United States, the emergency department is more accessible to those in urban areas than physician's offices. In 1969, 11.1% of all physician visits took place in a hospital clinic or emergency room for those living in metropolitan areas. For those not living in metropolitan areas,

only 8.6% of all physician visits were made at the hospital clinic or emergency room; 6.2% for those living on farms and 8.9% for non-farm rural residents (22).

(4)   External forces (factors influenced by the "third party"):

(a) A number of health insurance plans extend benefits for services rendered in the emergency department, but do not pay for office visits or house calls.

(b) The tendency for industries, schools and the police to refer patients to the emergency facility.

(c) Non-physician control of ambulance services such that, without effective medical screening, numerous non-urgent patients are automatically transported by ambulance to emergency facilities.

The latter two factors are a source of emergency department use in Canada. The first has not been a contributing factor since the Medical Care Act of 1966 insures office visits and housecalls.

3.   Increased Use of the Emergency Department for Non-Urgent Conditions

Paralleling the increased use of the emergency department, there are concerns about the volume of patients using this facility for non-urgent conditions. Various Canadian studies have illustrated differing proportions of non-urgent emergency department use, a variation resulting from the use of different definitions, criteria and methods of assessing

urgency classification. Increased non-urgent use is also
the result of real differences in the patient populations of
unique communities and the individualized role of the
emergency departments and other health resources for these
communities.

In a study of six emergency departments in Montreal,
Steinmetz (11) reports that the non-urgent use of the emer-
gency facility is implied by the "ordinary care" nature of
the services received. He noted that 83% of the patients
were graded as non-urgent. In addition, one-third of the
visitors studied chose the emergency department arrival time
for reasons of convenience, one-third received no treatment
during their visits and one-third were sent home without
follow-up appointments.

Robinson (7), in a review of 11,950 visits by children
and adolescents to the emergency department of a Vancouver
hospital, noted a significant increase in the number of child-
ren coming for general medical attention, rather than specifi-
cally for the treatment of acute conditions. He concluded
that the conditions treated required prompt medical attention;
the majority of visits were for non-urgent problems and the
emergency department was becoming a substitute for the office
of the family physician.

In Vayda's analysis (13) of a Hamilton emergency de-
partment, 33.7% of the visits were classified as non-urgent,
60.7% were urgent and 5.6% were emergencies. Trauma accounted

for almost 50% of the visits. The proportions of urgency classification reported for Hamilton are similar to those reported for a Toronto emergency department: 36.1% non-urgent, 58.8% urgent and 5.1% emergencies (5). An Ottawa hospital treated a similar proportion for injury (53.6%) as did the Hamilton facility and found similar percentages for the urgency categories: 42.1% non-urgent, 47.9% urgent and 6.9% emergencies (3).

Chipman (4), in the evaluation of the emergency department of a pediatric hospital in Halifax, reported that just 9.7% of the visits were classified as non-urgent. The author noted that the retrospective subjective judgement of the urgency rater resulted in assignment of the more urgent of the three categories (emergency over urgent, urgent over non-urgent) in most instances, partially explaining the smaller proportion of non-urgent visits. Chipman concluded that the findings suggest that it is the <u>unexpectedness</u> of accidents, not the <u>severity</u> of the injuries, which prompt the visits to this particular emergency department. Similarly, Baltzan's study (2) of the emergency departments in Saskatoon reported that the majority of illnesses had an acute and totally unexpected onset and, as managed, did not have a diagnostic, therapeutic or prognostic uniformity. In 18% of the 2015 visits, the illness had been present for less than one hour and in 85% of the visits it had been present for two days or less or had become exacerbated within that time period. He noted that 55% of the visits had been generated

by the patient or a lay person. Vayda (13) reported that 53% of the visitors came directly to the emergency department without contacting a physician or any other source of medical care. Those who attempted to contact their physicians were more likely to be classified emergency and urgent and less likely to be rated non-urgent. The study stated that 63% of the users had symptoms of less than one day's duration but that the non-urgency classification was associated with a longer duration of symptoms. Although the period of time the symptom was present is different in the two studies, the results indicate the recent onset of presenting complaints for emergency department users.

Stewart (12) emphasized the important role that the emergency department has come to play as a source of primary medical care. In her investigation of a Nova Scotia hospital emergency department, the vast majority (90%) of patients were non-referred and some 80% were treated in the emergency department and then discharged. Bain's investigation (1) of 3622 visits to a Toronto emergency department found that 42% of the visits were classified as non-urgent. Also reported was the fact that 70% of the patients lived within the hospital's immediate district, 80% lived at their present address for less than 6 months and over 80% of the patients said they had family doctors. Bain concluded that people use the emergency department for primary care of non-urgent, non-traumatic problems.

4. Possible Explanations of the Non-Urgent Use of the
   Emergency Department

Some investigators have explained the non-urgent use
of the emergency department by suggesting failings of the
primary care system; others by citing various socio-economic
and demographic characteristics of the patients seeking
such non-urgent care.

Webb (17) suggested reasons for the increased use
of emergency departments, generally, in the United States.
Other investigators have suggested that similar factors
encourage non-urgent use of this facility in Canada. Bain
(1) postulated the following causes: lack of family physi-
cians in the community, changing patterns of general practice,
patient preference to bring certain, usually traumatic, prob-
lems directly to the emergency department, and the increasing
urban mobility which results in fewer people having a regular
physician.

Robinson and Klonoff (7) suggested that the emergency
department is becoming the most convenient site for physi-
cians to meet and examine patients. They also cited the
public's image of the emergency department as a community
health centre which is replacing the office of the family
physician.

Lee, Solon and Sheps (25) in an early but seminal
study argued that the patient's private doctor encourages the
increasing use of the emergency department for non-urgent

care. The physician can refer his patients to a hospital
staff physician and take advantage of the diagnostic and
therapeutic facilities in the hospital which would not have
had been available in his own office or the patient's home.
The physician then does not have to leave a busy practice
schedule or interrupt his off hours.

This suggestion has met with varying support from in-
vestigations in Canada. Stewart (12) found that only 10% of
the patients were referred; Baltzan (2) reported that 45% of
the Saskatoon visits were generated by the patient's doctor
or nurse. Vayda's (13) investigation of the two Hamilton
emergency departments revealed that approximately 90% of the
patients at each hospital indicated that they had a family
physician. At the one hospital, of the 28% of the patients
who attempted to contact their physician before coming to
the emergency department, two-thirds were successful. At the
other hospital, 38% tried to reach their own physician and
60% were successful. As previously noted, those who tried
to contact their physician were more likely to be classified
as emergency or urgent than as non-urgent. Gala reported that
the proportion of patients who have a private doctor decreases
as the urgency classification goes from emergency to non-
urgent (5).

One additional reason which has been proposed for
the increased use of the emergency room for non-urgent care
is its relative efficiency. However, data do not support

this conclusion. Average times spent in emergency departments
ranges from 50 to 100 minutes at several Canadian hospitals
(1, 2, 13). In an investigation of waiting times in the
emergency department of a Victoria hospital, Allen (26) cate-
gorized the visitors as acute emergency, minor emergency and
non-urgent. In comparing the mean stay from arrival to dis-
charge, he found that the acute emergency averaged 90 minutes,
the minor emergency 60 minutes and the non-urgent cases 50
minutes. In the United States in 1969, the average waiting
time for a patient with an appointment for an office visit
was 30 minutes; for those without an appointment the average
time was 44 minutes (22). In contrast to the average time
spent in the emergency department reported by Allen (26), a
study (27) commissioned by the Ontario Medical Association
reported that 16% of the people surveyed felt that the doctors
don't keep office appointments on time. The investigation,
the Pickering Report, also noted that nearly one-third of
those interviewed felt that their doctors did not give them
enough time in the office and this was the principal comp-
laint (53%) about doctors' relations with their patients.

While financial concerns would seem to play a con-
siderable role in determining the use of the emergency depart-
ment, Stewart's (12) study indicated no discernible change
in use before and after the inauguration of Nova Scotia's
Medical Services Insurance, a government sponsored plan of
universal coverage, in April 1969. Perhaps patterns of medi-
cal care which developed when there were financial deterrants

take a long time to change. In an investigation of access
to physician services in Saskatchewan, Beck (28) reported
that approximately 5% more persons in the lower income groups
used emergency services after medicare was adopted than be-
fore its introduction. Beck noted that there was no appreciable
change in other income groups.

A good deal of effort has been focused on the role
of demographic and socio-economic characteristics of emergen-
cy department patients as explanations for increased non-
urgent use. Lavenhar, Ratner and Weinerman (29), in a study
of emergency department patients at the Yale - New Haven
Hospital in the United States, found that the individuals
using the emergency service were economically deprived and
drawn mainly from central urban minority groups. The absence
of a regular relationship with a physician was also of
crucial importance in the increased use of the emergency
department for non-urgent conditions. Age, residential sta-
bility, minority group status and proximity to a central ur-
ban hospital were other important determinants affecting the
proportion of non-urgent patients attending the emergency
department. Although social class is a major factor in the
increasing number of patients attending the emergency depart-
ment, the use of this service for non-urgent conditions was
similar in all social classes. There was, however, a direct
relationship between higher social class and the use of a
family physician as the usual source of medical care. The

techniques of factor analysis and multiple regression analysis emphasized that age, marital status, family income, and usual source of medical care were important variables in discriminating between urgent and non-urgent use of the emergency department at the New Haven hospital.

Since this investigation and others by Weinerman (23, 29, 30), there has been a great deal of interest in demographic and socio-economic characteristics of the patients as determinants of emergency department use and of non-urgent use. In an investigation of Montreal emergency departments before the introduction of universal health insurance (11), emergency patients were characterized as being either very young or very old, highly mobile, non-indigenous, unemployed and without health insurance. A Halifax study (12) revealed that utilization rates were highest in those census tracts nearest the hospital and declined with increasing distance from the hospital. After controlling for distance, the rates tended to be relatively high in census tracts of low socio-economic status. The Halifax investigators noted that the traditional patterns of seeking care, associated with socio-economic status and location of the emergency department to place of residence, are the most important determinants of utilization for the emergency service studied.

To understand the role of emergency departments in the community, Gibson in Chicago (31) and Torrens and Yedvab in New York City (32) have developed emergency

department models. Briefly, Gibson suggested that emergency department use is a function of: (1) the occurrence of precipitating medical incidents, (2) blocked access to treatment sites other than the emergency medical service, and (3) structural isolation from the private health care system. Measurable indicators of these three concepts were chosen and related to differences in emergency use. He concluded that race and education exert a substantial independent influence on emergency department use in the Chicago area.

Torrens and Yedvab (32) investigated four New York City emergency rooms. Two of the hospitals were situated in the central core area of the city, one in a suburban region, and the other hospital in an area characterized as "peripheral urban".

The investigators reported that for each of the three regions, a quite different patient population was identified.

The two "central urban" hospitals served a population with a predominantly low social class profile. The patient population was largely poor, not covered by health insurance and unaffiliated with regular sources of general care. In general, patients came to these two emergency rooms seeking care for non-urgent conditions and any follow-up care was to be provided by the hospital staff.

The second region, which was served by a suburban hospital emergency department was characterized by patients with

a predominantly high social class profile. They were largely from the middle and upper classes, well covered by health insurance and regularly receiving medical care from some source, usually a private physician, in the community. In general, these patients come to the emergency room seeking care for clinical emergencies, usually related to trauma, and their follow-up care was provided by a private physician.

The "peripheral urban" hospital served a population with a social class profile immediately between the two extremes. It resembled the two central urban hospitals in that its population was largely of low and low-middle class members with a low rate of health insurance coverage. Their emergency room problems were primarily non-traumatic and their follow-up care would be provided primarily by a hospital outpatient department. On the other hand, the peripheral hospital resembled the suburban hospital in that a small proportion of patients were receiving financial assistance and much of their medical care in the last year had been received from a private physician.

In an effort to explain the contrasting patterns of use encountered both in their investigation and also in the literature, Torrens and Yedvab identified three roles for emergency departments:

In the first role, the emergency room serves as a trauma-treatment centre for the community, providing emergency care for problems related to trauma, accidents and

other serious, unpredictable events. In this role the emer-
gency room services the cross-section of the socio-economic
spectrum.

Secondly, the emergency room functions as a substi-
tute for the private physician and for the outpatient depart-
ment during off hours when these resources are unavailable
or perceived as inappropriate for the particular patient's
problem.

Finally, the emergency departments of most central
city hospitals serve as family physicians for the socially
deprived. The service is seen as the place to go for all
health problems, whether urgent or not.

Torrens and Yedvab are careful to mention that at
any hospital emergency room, any one role may predominate
and all of which may be present in varying degrees. Vayda
(13) applied this model to two emergency rooms in Hamilton.
Both facilities appear to function primarily as trauma
centres and "off hours" physician substitutes. One hospital,
in the economically least favourable North End of Hamilton,
resembled the more suburban U.S. hospital. The author con-
cluded that these hospitals serve not only as trauma centres,
but also as "off hours" physician surrogates; thereby com-
pensating for deficiencies in the availability of primary
care services.

5. Summary

Based on these studies, two major issues emerge

which will be addressed in this investigation. First, the
lack of consistent agreement on the characteristics of
emergency department use is probably related to diverse
methodologies and the unique characteristics of the communi-
ties under study. Although the data used in this investi-
gation do not permit the documentation of increased emergency
department use, the socio-demographic characteristics of
users of two emergency departments from one area and residents
of the same area can be compared. Characteristics of overall
emergency department use can also be compared with the non-
urgent emergency department use. This investigation, by
comparing users and specifically non-urgent users with a
random sample of residents should allow the determination of
characteristics which may be predictors of use. As such,
the approach used in this investigation is different from
the majority of emergency department studies which have des-
cribed and contrasted the non-urgent users with those visits
which were classified as emergency-urgent or have compared
all users with census information and not with survey data.

If understanding and meaningful recommendations are
to result, the characteristics which predispose individuals
to seek care at the emergency department must be identified.

The interface of the emergency department with the
community and its primary care services is the second major
issue raised in the various studies which will be addressed
in this investigation. By selecting the patient population
of the hospital's immediate catchment area, the emergency

department's primary care function for the users most af-
fected by the service's ready availability and constant
accessibility can be described. The primary care role of
the Hamilton General Hospital is contrasted with both its
trauma centre function and the differing roles that another
Hamilton hospital has for the residents of this same geo-
graphical region. Thus the roles of close and more distant
hospitals for one particular neighbourhood can also be
examined.

CHAPTER III

OBJECTIVES OF THE STUDY

The impetus for this investigation of one hospital's emergency department, those who used it and their relationship with the residents of the hospital's immediate service area was generated by the lack of basic information on the predictors of emergency department use, especially non-urgent use. The residents of the defined geographical area of North Hamilton and the residents of this area who sought emergency department care at the Hamilton General Hospital will be compared in an attempt to determine whether the emergency users were representative of those living in the hospital's catchment area.

By and large, previous investigations have provided useful socio-demographic descriptions and profiles of emergency department users and recorded patient's reasons for seeking care at emergency departments. However, without the knowledge of the characteristics of emergency department users and the general population in the same service area, it is not possible to determine whether there are characteristics which predispose individuals to turn to the emergency department, rather than other providers, for care, and in particular, for care for non-urgent problems.

Thus, it is proposed in this investigation to identify
the demographic, socio-economic and health care predictors
of emergency department use for the residents of North Hamil-
ton by comparing emergency users and residents from the same
area. In addition, visits made to the emergency service of
St. Joseph's Hospital by residents of the study community
will be analyzed to compare and contrast the characteristics
of the users of two different emergency departments.

More specifically, the objectives of this study are:

1. To determine whether a 2.3% random household sample of
    North Hamilton was representative of the residents of
    the catchment area. This random sample will be used for
    the analytical comparisons with the data on emergency
    department users. When this sample was drawn in 1971 as
    part of a separate investigation concerning health care
    attitudes and utilization (33), the distribution of demo-
    graphic characteristics of the sample was compared with
    the 1966 census data for the census tracts comprising
    North Hamilton. No statistically significant differences
    in age, sex or marital status were found between the 2.3%
    sample and the total population of North Hamilton and the
    sample was considered to be representative of the com-
    munity from which it was drawn. Since there was a five
    year interval between the time the 1966 interim census
    was taken and the sample drawn, it was decided as essential
    to reaffirm the sample's representative nature by

comparing it with the more comprehensive 1971 census.

2. To delineate the demographic and socio-economic charac-
teristics of the users of the Hamilton General Hospital
who live in North Hamilton. This is a data processing
problem since the information has been gathered pre-
viously as part of a larger study (13).

3. As a subset of the second objective, to delineate the
demographic, socio-economic and health care characteris-
tics of the emergency department users that are classified
as presenting with emergency-urgent or non-urgent condi-
tions. Efforts will be made to identify the usual
patterns of medical care for both classes of users and
also to determine why the non-urgent group is using the
emergency department at this time. Differences in the
characteristics of use will be determined for the two
groups.

4. To determine whether those individuals who used this facility
have the same characteristics as those residing in North
Hamilton. The 2.3% random household sample, given that
it is representative, will be compared with the sample
of emergency department users from North Hamilton. This
comparison will indicate the groups of emergency depart-
ment users that are using this service to a greater or
lesser extent than would be expected from the composition
of North Hamilton. The assumption is made that those
groups or classes of individuals that are overrepresented

in the sample of users are in fact predisposed to greater use of this service. The same assumption is applied to underrepresentation and underuse. Those characteristics of the emergency department sample which are overrepresented will be considered as possible predictors of use.

5. To identify the patient characteristics which determine this non-urgent emergency department use. Three factors have been identified by some, but not all, investigators to be associated with increased emergency department use for non-urgent conditions (30). To corroborate these findings the variables of lower social class, greater residential mobility and lack of a regular relationship with a private physician will be examined, in addition to the socio-cultural variables, as possibly contributing to increased emergency department use for non-urgent conditions.

6. To describe the demographic, socio-economic and health care characteristics of the users of the emergency department of St. Joseph's Hospital who also reside in North Hamilton. These users will be compared with the sample of users from the Hamilton General Hospital. In addition, several characteristics of the patients' use of the emergency department such as arrival time, use of ambulance and pain and worry associated with the presenting symptom will be examined. It is assumed that the users of these two hospitals will differ from one another, particularly for those with non-urgent conditions.

CHAPTER IV

SOURCES OF DATA

This chapter describes the sources of data used in
this investigation. Briefly, data is taken from four
sources: a random sample of North Hamilton households,
the 1971 census and the investigations of two emergency
departments in Hamilton.

1. The 2.3% Random Household Sample of North Hamilton

In 1971, North Hamilton was the subject of an inves-
tigation by Vayda entitled "Health Care Attitudes and Utili-
zation in North Hamilton". The 18,206 households in the 14
census tracts of North Hamilton were identified by the
Wentworth County Assessment Office (See Map pg. 28). The
office listed the households and numbered them 1 to 18,206.
A computer program generated two sets of random numbers.
The first set consisted of 500 random numbers. The second
set of 100 random numbers was available for substitution in
the sample. Using these random numbers, the Wentworth
Assessment Office provided lists of 500 and 100 names and
addresses of households. The suite number was also provided
for apartments and other multiple tenant dwellings.

MAP 1

THE NORTH HAMILTON STUDY AREA
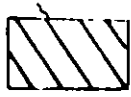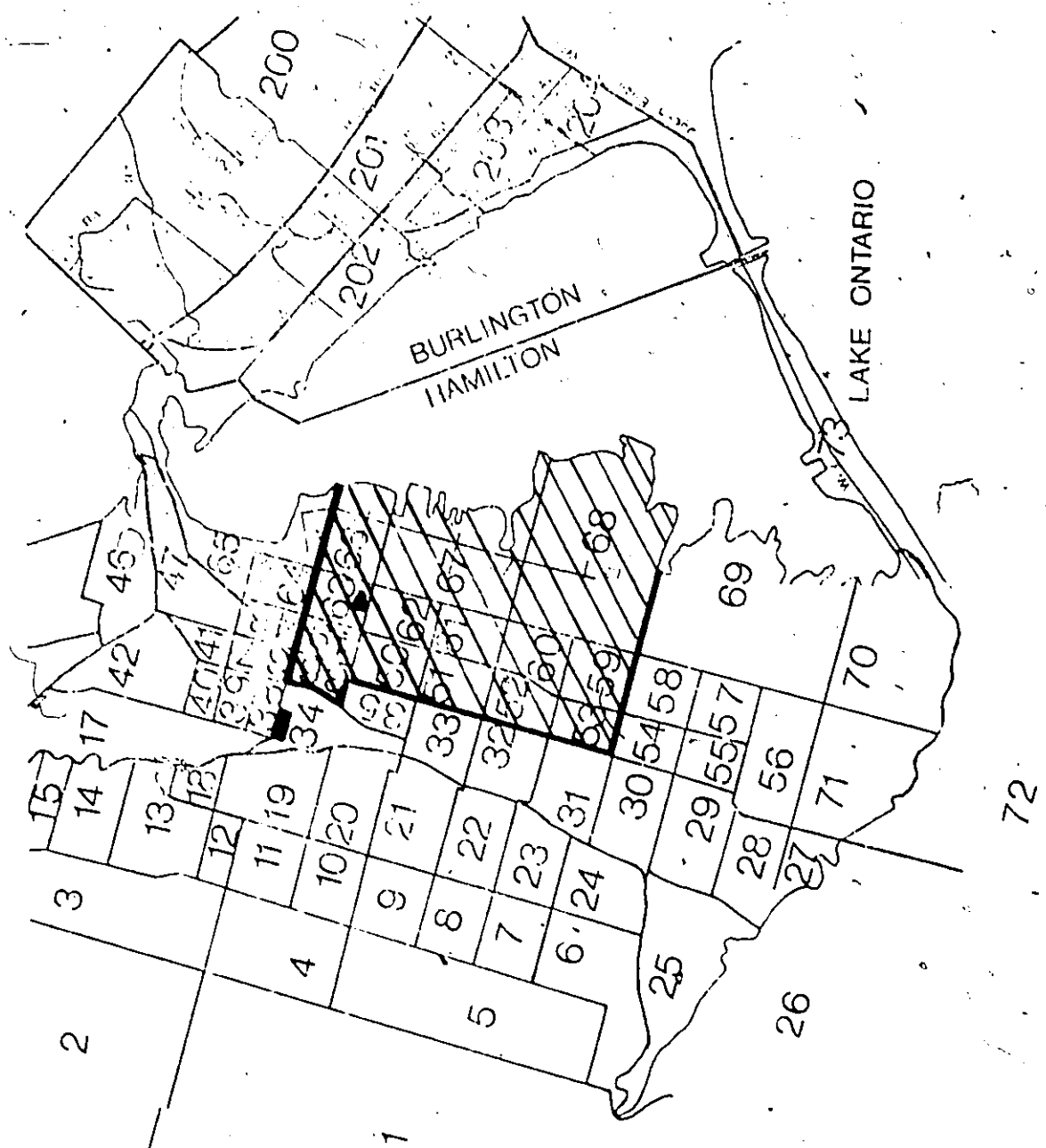
NORTH HAMILTON

▲ HAMILTON GENERAL HOSPITAL

■ ST. JOSEPH'S HOSPITAL

The assumption was made that the wife of the head of the household of the female head would make most of the decisions regarding health care utilization. Although the identified household was the sampling unit, the ranking female was interviewed if present. One interview was conducted for each household.

A questionnaire was developed which employed original questions and others which had been field tested previously. The questionnaire, which had been pretested, recorded information on several demographic and socio-economic characteristics of the head of the household which are relevant to the present investigation.

An introductory letter was sent to each household selected in the random sample and a second letter was sent to those who refused initially to be interviewed. Of the original sample list, 32 of the households were not suitable (29 vacant lot) and substitutions from the alternative list of 100 households were made. If a 100% response rate had been realized, the projected sample of 500 households would have represented 2.8% of the total population (18,206 households) of North Hamilton. However, the response rate was 86.6% (433 households) representing 2.3% of the population. The investigators considered this rate as satisfactory for generalization although the characteristics of the non-respondents were not determined.

2. Census of Canada

In the same year, 1971, the official census of Canada was conducted. From this census data, two Census Tract Reports for Metropolitan Hamilton were produced. Similar reports are prepared for every major Canadian city.

Series A (34) reports basic population, household and family data by census tracts. The population characteristics included: age, sex, marital status and mother tongue. Households are classified by number of persons and by number of families. Families are classified by age of head and by number and ages of children. These and other characteristics in Series A were collected on a 100% basis for all Hamilton residents and reported by census tracts.

Series B (35) reports for each census tract basic population and housing data that were collected on a 33.3% sample. The population characteristics include ethnic group, religion, schooling, language and migration. The population is also classified by economic characteristics such as occupation and income. Housing classifications include rent, length of occupancy and the value of the house.

The characteristics that are common to both the 2.3% random sample and the census are: Series A's age, sex, marital status and household size; and Series B's religion, birthplace, language, income, years of schooling and length of occupancy.

3. Hamilton General Hospital (H.G.H.) Emergency Department
   Visit Sample

Data concerning the users of the H.G.H. emergency
department who are residents of the North Hamilton area
studied in the 2.3% random sample are taken from the investi-
gation "Study of Emergency Room Services at the Hamilton
General Hospital". This study by Vayda et al (13) was designed
to investigate the reasons for emergency department use in
Hamilton.

The emergency department was studied during the period
November 10 - November 24, 1973. In this interval 1360 visits
were reviewed and 459 interviews recorded. The interviews
represent 34% of all visits. The interviewed visits were
randomly selected after stratification for time of day and
day of the week. The response rate was 99%. Almost all of
the interviews (96%) were done at the time of the visit.
Approximately two-thirds (64.7%) were completed by the patient
himself, one-third (34.7%) by the patient and a proxy or a
proxy alone, and just 3 interviews (0.7%) were broken.

The questionnaire (Appendix A) used had been pretested
in an earlier study (14) and at the H.G.H. emergency depart-
ment prior to the study period. With minor modifications,
it was the same questionnaire which had been used in a simi-
lar study of the emergency department at Hamilton's St.
Joseph's Hospital. Interviews were done by trained staff of
the Field Survey Unit at McMaster University. The

questionnaire consists of 46 questions dealing with the
patient's attitudes and patterns of medical care and the
demographic and socio-economic characteristics of the patient
and/or the head of his/her household.

In addition, a short abstract form was used to re-
cord 20 items from the clinical chart for all 1360 patients.
Information recorded included several demographic and health
care characteristics of the patient and urgency and trauma
classifications for the visit. One item on the abstract
form converted the patient's present address into the cor-
responding census tract of his/her residence.

With the data stored on the Hewlett-Packard 3000
computer at McMaster's Health Sciences Centre's Computation
Services Unit, access was made to restrict the data base to
just those visitors whose place of residence was one of the
14 census tracts of North Hamilton and a sub-sample of North
Hamilton visitors was identified. This subsample represented
472 abstracted visits and of these, 150 had been interviewed.
It is this subsample that is of central interest to this
thesis.

As noted, all visits in Vayda's investigation were
assigned an urgency rating of emergency, urgent or non-urgent.
The urgency rating scale was stamped on each clinical chart
during the study period so that the rating could be made
directly by the attending physician. The classification of
urgency was based on criteria developed by Weinerman (30)
and used by others. The criteria for the three classifications

were:

(1) Emergency: Condition requires immediate medical atten-
tion; time delay is harmful to the patient; disorder is
acute and potentially threatening to life or function.

(2) Urgent: Condition requires medical attention within a
period of a few hours; there is possible danger to
patient or to ultimate outcome if not promptly medically
attended; disorder is of acute onset but not necessarily,
severe or life threatening. Will usually not, but may,
require hospitalization.

(3) Non-urgent: Condition does not require the resources
of an emergency service; symtoms of long duration with-
out sudden change in severity; referral for routine
medical care is all that is needed; disorder is minor
and not acute.

A list of examples of each rating is displayed in
Appendix B.

Copies of the rating scale criteria were available
in the emergency department and were also mailed to the mem-
bers of the attending and resident staff along with a letter
describing the investigation and requesting their cooperation.
In addition, the investigator held two meetings with the
casualty officers.

Of the total sample of 1360 visits, 69.0% were clas-
sified by the attending physician at the time of the visit,
18.8% were classified at a latter time by the physician who

signed the chart; 10.0% were classified by the investigator
because the attending physician was not available to make
the determination; 1.7% were classified in the Outpatient
Department and 0.5% were never classified. In the subsample
of 472 North Hamilton visitors the proportions classified
were: 71.2% by the attending physician at the time of the
visit; 18.6% at a latter time by the physician who signed
the chart; 8.1% by the investigator; 1.7% in the Outpatient
Department and 0.4% were never classified.

Of the subsample of 472 visits made by residents of
North Hamilton, 2.6% were classified as emergency, 49.4% as
urgent and 48.0% as non-urgent. And of the 150 of these
visits which were interviewed, 3.3% were emergency, 48.0%
urgent and 48.6% non-urgent.

4.   The St. Joseph's Hospital Emergency Department Sample

Data used to describe the North Hamilton residents
who used the St. Joseph's Hospital emergency department is
taken from Vayda's investigation: "Emergency Room Services
at St. Joseph's Hospital". Three weeks from October 24 to
November 13, 1971 made up the study period. In this interval,
2608 individual emergency records were abstracted. The ab-
stract form recorded basic demographic and health care data.
Here, as at the General Hospital, the emergency chart was
stamped so that the patient's urgency classification and
the presence or absence of trauma could be indicated by the
attending physician. The criteria for emergency, urgent and

non-urgent visits are the same as those described in Section 3.

Demographic, socio-economic and health care information was obtained from a random sample, stratified by day of the week and time of the day, of the patients making visits in the three week period. Interviews were conducted on two full 8 hour periods for each day of the week. During the interview period, 2 of each three consecutive visitors were selected for interview according to a predetermined random sampling plan. This random procedure resulted in an interview sample of 1177 visits. The 1147 visits that were interviewed represents a response rate of 97.5% of these 94.3% were conducted at the time of the visit. The questionnaire used had been pretested and was also administered by a trained interview team.

The data from the 1147 questionnaires and from the 2608 abstract forms was stored on the Hewlett-Packard computer. Access was made to create a subsample of visitors whose residence was North Hamilton by restricting the variable of place of residence to the 14 census tracts of North Hamilton. This subsample represented 435 (17%) abstract visits, of which 194 (44.6%) were interviewed.

CHAPTER V

METHODS

This chapter is presented in six sections. The first section discusses general considerations relating to the analysis of the data derived from the four sources. The representative nature of the 2.3% random sample is examined in Section 2. Given that the 2.3% random sample proves representative, the identification of factors associated with emergency department use follows (Section 3). To determine whether the statistically significant characteristics of overall emergency department use differentiate visits that are classified as non-urgent and emergency-urgent, the random sample is compared with the NU and EU user subsets in Section 4. The fifth section is the comparison of the NU and EU subsets with each other. In the last section, visits made to the emergency departments at the Hamilton General Hospital and St. Joseph's Hospital by residents of North Hamilton are compared to determine whether there are patient and health related characteristics which differentiate emergency users at the two hospitals.

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1. Analysis of the Data - General Considerations

The chi-square goodness of fit test will be used for each of the demographic and socio-economic characteristics examined in the comparison of the 2.3% random sample and the census data. The data from the 1971 census will represent the expected proportions for the characteristic in question and the 2.3% random sample the observed value. Computation of the tests will be done on the Wang 720 calculator.

In the remaining comparisons the chi-square test of independence will be used. The expected frequencies and chi-square values will be calculated by the chi-square Analyzer Programme on the Hewlett-Packard 3000 computer. This test will examine whether the distribution of the characteristic in question is the same in the two groups of interest, for example the NU and EU subsets. If the null hypothesis is rejected at an $\alpha = .05$ the distribution of the characteristic is not the same for the two groups. The statistically significant 2 x n tables will be partitioned on single degrees of freedom to investigate any sources of statistical significance. For example, if, in the 2 x 4 contingency table displayed below the null hypothesis was rejected, three additional chi-square tests would be conducted to identify the one or more categories of the characteristic that resulted in the statistically significant value for the comparison of the two groups.

	Group A	Group B	
Category 1			Total
2			Total
3			Total
4			Total
	Total	Total	Total

Characteristic X

As the first 2 x 2 contingency table test, categories 1
and 2 and 3 and 4 could be combined for each group and eva-
luated by the chi-square statistic. Categories 1 vs. 2
and 3 vs. 4 would each be examined in their own 2 x 2 table.
In this manner, both the statistically significantly dif-
ferent characteristic and the one or more categories res-
ponsible will be identified for all comparisons.

The successive univariate testing of a number of
variables increases the overall chance of type I error above
the individual test level. A multivariate approach was thought
to be unwarranted in this analysis. In addition, stepwise
multiple regression, using the Statistical Package for the
Social Sciences, will be performed on the socio-demographic
and some illness characteristics in the comparison of the EU
and NU users. Possible pairwise correlation between the
socio-demographic characteristics recorded for the H.G.H.
users will be examined using the Spearman rank and chi-square
test of independence tests.

2.   Comparison of the 2.3% Random Sample of North Hamilton
     and the Census Data

The first step is to determine whether the 2.3%
random household sample of North Hamilton was representative
of the population of North Hamilton. The same demographic
and socio-economic characteristics will be compared for
those randomly sampled from 14 census tracts with data for
the same census tracts as determined by the 1971 Census of
Canada.

Sources of Data

The two data sets compared in this section were des-
cribed in Chapter IV. They are:

(1) The 2.3% Random Household Sample of North Hamilton.

(2) Statistics Canada data on the 14 census tracts of North
    Hamilton.

Hypotheses

The ten characteristics determined for the random
sample and included in the 1971 census will be compared.
These characteristics are:

      demographic - age

                  - sex

                  - marital status

                  - household size

                  - length of residence at present

                    address

socio-economic - religion

               - birthplace

               - language

               - years of schooling

               - family income

The primary question in this section deals with whether the 2.3% random sample can be considered as representative of the population as determined by the census. For each of the ten characteristics there are ten null hypotheses of the form:

There is no difference between the 2.3% sample and Statistics Canada Census data in the age (sex; marital status; · · · ; and income) distribution of North Hamilton.

3. Comparison of North Hamilton Residents and Emergency Department Users at the Hamilton General Hospital Who Are Residents of North Hamilton

If the 2.3% sample proves representative of the total North Hamilton population, the second stage of this investigation will be to determine whether the residents of North Hamilton who used the emergency department of the H.G.H. have the same demographic, socio-economic and health care characteristics as the residents of North Hamilton.

Sources of Data

The two data sources to be compared in this section

are:

(1) The 2.3% Random Household Sample of North Hamilton.

(2) The Hamilton General Hospital (H.G.H.)

    Emergency Department Subsample of North Hamilton Users.

Considerations and Hypotheses

    The comparison of the 2.3% sample of residents and the sample of H.G.H. emergency users who are also residents of North Hamilton will identify demographic, socio-economic and health care predictors of emergency department use. In other words, the analysis will determine whether the residents of the hospital's immediate service area have a similar "profile" as the users from the same service area.

    Some of the specific questions which will be examined are:

(a) Are any particular demographic or socio-economic groups overrepresented or underrepresented among emergency department users?

(b) Is length of residence negatively correlated with emergency department use?

(c) Are the proportions of users and residents with family doctors the same?

(d) Does having a family physician effect the utilization of the emergency service?

(e) Are Roman Catholic residents likely to be underrepresented among the H.G.H. users (because they prefer St. Joseph's Hospital)?

To examine the above and other issues the research question examined in this section is:

.Are there differences between the residents of North Hamilton and the residents of North Hamilton who used the emergency department at the H.G.H. during the two week study period. The 13 characteristics in common to the two samples will be examined individually. These variables are:

demographic -, age

- sex

- marital status

- length of residence in Hamilton

- length of residence at present address

socio-economic - family income

- country of birth

- religion

- employment status

- job description

- education

- social class

health care - family physician

To assess this question, each of the 13 characteristics will be examined individually in the form of the null hypothesis:

There is no difference in the age (sex; marital status; · · · ; and family physician) distribution for the residents of North Hamilton and the

North Hamilton residents who used the emergency
department at the H.G.H.

The characteristic of social class is of special
analytical interest and deserves mention. Because of ease
of administration and proven efficacy, the Hollingshead Two
Factor Index of Social Position (.36) was used in both studies
by Vayda. It is based on the occupation and educational
level of the head of the household weighted by a ratio of
7:4 with the resulting score placed on a scale of I (highest)
to V (lowest) social class.

4. Comparisons of North Hamilton Residents With the Two
   Subsets of Users (EU and NU)

The comparisons of the residents with each of the
non-urgent and emergency-urgent subsets may identify charac-
teristics which predispose individuals to the non-urgent
use of the emergency department. The characteristics of NU
users which differentiate them from residents, all users
and emergency-urgent users thus will be isolated.

Sources of Data

(1) The 2.3% Random Household Sample of North Hamilton.

(2) The Hamilton General Hospital Emergency Department
    Subsample of North Hamilton Residents.

The data base of interest here is the non-urgent and
emergency-urgent subsets of the identified subsample of North

Hamilton residents who used the H.G.H. emergency department.
Access was made to the computer to print 3 x n tables with
the three scale urgency classification as the column·variable
and the socio-demographic variable of interest as the row
variable. In the analysis the emergency and urgent classes
of urgency will be combined because of the small number of
emergencies (3.1%).

Considerations and Hypotheses

Those characteristics which are overrepresented in
the sample of non-urgent users only may be assumed to be
factors which predispose individuals to the non-urgent use
of the emergency department. Some of the questions that
will be examined are:

(a) Does having a family doctor effect the use of the
    emergency department for non-urgent care?

(b) Are individuals with a lower social class rating over-
    represented when non-urgent users are compared to residents?

(c) Are younger people more frequent visitors to the emer-
    gency department?

(d) Are individuals with lower incomes more likely to use
    this facility for non-urgent care than those with high
    incomes?

In this analysis it is also assumed that the socio-
medical factors which determine the acute and serious nature
of emergency-urgent visits are not the same factors which
influence visits classified as non-urgent. If similar

statistically significant differences are identified for the same characteristic in the comparisons between the residents and both subsets of urgency, then that characteristic is associated with both EU and NU use, but does not differentiate the two urgency subsets.

The primary research questions address themselves to the differences between the residents and both subsets of users. To examine these questions the 13 socio-demographic characteristics that are in common to the 2.3% sample and the EU and NU subsets will be examined individually. The 13 null hypotheses, for the two comparisons are of the form:

> There is no difference in the age(sex; marital status; · · ·; and family physician) distribution for the residents of North Hamilton and the residents of North Hamilton who used the H.G.H. emergency department for non-urgent (emergency-urgent) care.

5. Comparison of the Non-Urgent and Emergency-Urgent Users

This section deals with the comparison of the non-urgent and emergency-urgent subsets of visits at the H.G.H. The previous section will identify those characteristics which differentiate the two classes of urgency from the community in which the users live. Whatever proportional and statistical differences that do exist between the two subsets and the residents are now examined to determine if

these differences also exist between the two urgency subsets.
This comparison will also permit the analysis of the more
detailed health care and illness information recorded for
each patient in the emergency department study (separated
into EU and NU groups).

Sources of Data

The data base used are the two subsets of non-urgent
and emergency-urgent visits from the Hamilton General Hospi-
tal Emergency Department Subsample of North Hamilton Residents.

Consideration and Hypotheses

The primary research question examines whether there
are differences between the non-urgent and emergency-urgent
subsets who used the emergency department at the H.G.H.

The 13 null hypotheses concerning the socio-demo-
graphic characteristics are of the form:

There is no difference in the age (sex; marital
status; · · · ; and family physician) distribution
between the two subsets.

In addition the following characteristics which
relate to patterns of medical care and emergency department
use, are common to both subsets:

- trauma

- arrival time

- time since contacting family physician

- time since onset of presenting symptoms

- pain associated with presenting symptoms

- worry associated with presenting symptoms

- involved in an accident

- use of ambulance

- use of an emergency department before

- number of times emergency department used

- place where medical care is usually sought

- satisfaction with past medical care

- kind of medical care sought before this visit to the emergency department

- preferred place of medical care for this symptom

- of those preferring medical care at the H.G.H., why

- health insurance

These 16 variables will be examined to determine which characteristics are associated with EU and NU care. Individuals treated for EU conditions are probably making use of the emergency department for medical care which, generally, would most appropriately be handled at the emergency department, while those classified non-urgent could (by definition) be managed in a doctor's office. The comparison of the 16 characteristics will identify differences in the quality and duration of symptoms and health care patterns associated with the visit.

For each characteristic there will be a null hypothesis in the form:

There is no difference in the trauma (arrival

time; time since contacting physician; · · · ;

and presence or absence of health insurance)

of the two urgency subsets of H.G.H. users

who reside in North Hamilton.

6. Comparison of the Hamilton General Hospital and St.
Joseph's Hospital Users Who are Residents of North
Hamilton

In this final section, the sample of North Hamilton
residents who used the emergency department at the Hamilton
General Hospital will be compared with a sample of North Hamil-
ton residents who used the emergency department at Hamilton's
St. Joseph's Hospital during a three week study period in
1971. This comparison is of interest because the latter
hospital, unlike the Hamilton General, is located outside
the 14 North Hamilton census tracts studied.

Vayda (13), in an investigation of these two emer-
gency services, describes some of the differences found in
the two patient populations. "Although both hospitals are
in downtown Hamilton, the Hamilton General is in the econo-
mically less favourable north end of the city and mainly
serves those who live in its residential catchment area and
the workers from the nearby industrial plants. This 'urban
industrial hospital', characterized by patients with a lower
socio-economic profile, had a higher proportion of total

visits which were non-urgent than did St. Joseph's Hospital. The latter hospital served mainly suburban residents. When socio-economic characteristics of the two samples of 459 and 1,147 interviewed patients were compared, three times as many St. Joseph's users were in social classes I-III. There were 25% more high school graduates and twice as many college graduates among S.J.H. users than in the Hamilton General sample."

In this section, the examination of the users of both emergency departments who reside in the 14 North Hamilton census tracts will indicate whether the two hospitals serve patient populations from the same residential location who have different characteristics. Vayda's investigation showed that, overall, different socio-economic groups visit the two hospitals, whether this is true when place of residence is held constant will be determined in this analysis.

In addition to the 13 demographic and socio-economic variables in common to both sets of users, there are several health care use variables that will be examined to determine whether there are different characteristics of emergency department use for the North Hamilton community at the two hospitals.

Sources of Data

(1) The Hamilton General Hospital Emergency Department Subsample of North Hamilton Residents.

(2) The St. Joseph's Hospital Emergency Department Sub-

sample of North Hamilton Residents.

Considerations and Hypotheses

To examine the primary research question concerning the differences between these two user groups, the 13 demographic and socio-economic characteristics will be assessed individually. The null hypotheses are of the form:

There is no difference in the age (sex; marital status; · · · ; and presence or absence of family physician) distribution of the North Hamilton residents using emergency services at the Hamilton General Hospital or at St. Joseph's Hospital.

In addition the following characteristics which relate to patterns of medical care and emergency department use are common to both samples:

- accident
- trauma
- urgency classification
- when most recently contacted family physician
- use of emergency room before
- first source of care sought
- number of visits to emergency room
- time since onset of presenting symptoms
- pain associated with presenting symptom
- worry associated with presenting symptom
- use of transportation to hospital

- time to get to hospital

- kind of medical care sought before this visit

- use of X-Ray facilities

- use of laboratory facilities

- admission to hospital

These variables will be examined to determine whether residents using one of the two hospitals have different characteristics from residents using the other, testing the following null hypotheses:

There is no difference in the accident (trauma; · · · ; admission to hospital) distribution of the North Hamilton residents using the Hamilton General Hospital or St. Joseph's Hospital.

CHAPTER VI

FINDINGS

This chapter presents the results of the investigation in eight sections. The first section reports the results of the comparison of the 2.3% random sample and the census data. The 2.3% sample is compared with all H.G.H. emergency department users, non-urgent users and emergency-urgent users in the second section. The results of the comparison of the socio-demographic characteristics common to the NU and EU are present in the next section. Section 4 deals with tests for linear trend and Section 5 with correlation and regression analyses. The illness and health care characteristics analyzed for the NU and EU subsets are reported in Section 6. The results of the comparison of users at S.J.H. and H.G.H. are reported in Section 7 and Section 8 concludes the chapter with an analysis of the degree of agreement in the validation of urgency classifications at the H.G.H.

1. Comparison of the 2.3% Random Sample and the 1971
    Census Data

    The comparison of the 10 characteristics common to
the two data sets was:

Statistically Significant Difference	Non-Significant Difference
Demographic	
Length of Occupancy (P < .025)	Sex
	Age
	Marital Status
	Household Size
Socio-economic	
Schooling (P < .05)	Religion
Language (P < .001)	Country of Birth
Family Income (P < .001)	

The sex, age and marital status of all the 1510 persons living in the 433 interviewed households which made up the 2.3% random sample are summarized in Table 1 and comparisons made with the same 14 census tracts from the 1971 census data. No statistically significant differences were found between these groups. The distribution of household size was also similar in both groups (modal size 4-5 persons). Length of occupancy at present address was the only demographic variable that was statistically significantly different in the two groups. In general, the randomly sampled respondents had less residential tenure than those enumerated in the census.

The five socio-economic characteristics which could be compared for the two groups are displayed in Table 2.

Table 1

DEMOGRAPHIC CHARACTERISTICS

Sex	2.3% Random Sample (Percent)	North Hamilton Census Tracts (1971 Census) (Percent)
	(n = 1510)	(n = 60,110)
Male	50.6	50.4
Female	49.4	49.6
Total	100.0	100.0

$x^2 = 0.014$ (1df) Not Significant

Age	(n = 1507)	(n = 60,065)
0-4	8.2	8.6
5-9	11.3	9.3
10-14	10.4	9.0
15-19	9.0	8.8
20-24	8.9	9.3
25-34	11.7	12.6
35-44	12.7	11.8
45-54	9.4	10.9
55-64	8.7	9.1
65-69	3.2	3.7
≥ 70	6.4	6.8
Total	99.9*	99.9*

$x^2 = 17.43$ (10df) Not Significant

Table 1 (Continued)

	2.3% Random Sample (Percent)	North Hamilton Census Tracts (1971 Census) (Percent)
Marital Status	(n = 1510)	(n = 59,135)
Single/Divorced	49.4	47.3
Married/Separated	45.4	46.2
Widowed	5.2	6.5
Total	100.0	100.0

$x^2 = 5.551$ (2df)   Not Significant

Household Size	(n = 433)	(n = 18,185)
1 Person	12.7	18.0
2 Persons	26.1	24.7
3 Persons	19.4	17.8
4-5 Persons	27.0	26.3
$\geq$ 6 Persons	14.8	13.2
Total	100.0	100.0

$x^2 = 8.511$ (4df)   Not Significant

Length of Occupancy	(n = 430)	(n = 18,455)
$\leq$ 1 Year	19.5	17.8
1-2 Years	20.0	15.8
$\geq$ 3 Years	60.5	66.4
Total	100.0	100.0

$x^2 = 7.753$ (2df) (P < 0.025)

*Due to rounding

Table 2

SOCIO-ECONOMIC CHARACTERISTICS

	2.3% Random Sample	North Hamilton Census Tracts (1971 Census)
	Percent	Percent
Religion	(n = 290)	(n = 57,665)
Protestant	33.4	38.9
Roman Catholic	53.8	50.6
Other	12.8	10.5
Total	100.0	100.0

$\chi^2 = 4.174$ (2df) Not Significant

Birthplace	(n = 377)	(n = 60,010)
Canada	58.1	61.8
Other	41.9	38.2
Total	100.0	100.0

$\chi^2 = 2.158$ (1df) Not Significant

Years of Schooling	(n = 416)	(n = 54,900)
9 Years	52.6	58.3
9-10 Years	20.9	19.7
11 Years	5.8	5.9
12-13 Years	14.7	12.2
Post-Secondary	6.0	3.8
Total	100.0	99.9*

$\chi^2 = 9.959$ (4df) Significant (P < .05)

Table 2 (Continued)

Language	Sample (n = 430)	Census (n = 52,005)
English	78.6	74.0
French	0.7	1.7
German	1.2	0.9
Italian	7.4	17.3
Other	12.1	6.1
Total	100.0	100.0

χ^2 = 54.169 (4df) Significant (P < .001)

Income	(n = 388)	(n = 14,635)
$3,000.	27.8	13.1
$3,000. - $4,999.	20.6	14.8
$5,000. - $6,999.	21.1	17.1
$\geq$ $7,000.	30.4	55.1
Total	99.9*	100.1*

χ^2 = 120.709 (3df) Significant (P < .001)

*due to rounding

Religion and country of birth did not differ statistically
and the proportional differences were small: approximately
6% fewer Roman Catholics and 4% fewer native born Canadians
in the 2.3% sample than in the 1971 Census.

Language, years of schooling and family income were
statistically significantly different. Although approxi-
mately three-quarters of both the 2.3% sample and those
enumerated in the 14 census tracts in the 1971 Census named
"English" as their language; less than one half (7.7% vs
17.3%) as many respondents in the 2.3% sample named "Italian".
A possible explanation for this difference is that the census
recorded "the language spoken most frequently" and the ran-
domly chosen individuals were asked "what language do you
prefer to speak?".

.An explanation for the difference in years of
schooling is that all individuals 5 years of age and over
were included in the census, but the question was asked of
the head of the household in the 2.3% sample. This would
probably explain the larger proportion (58.3% vs 52.6%) of
the census respondents with less than a grade 9 education.

Over twice (27.8% vs 13.1%) as many respondents in
the 2.3% sample reported family incomes of less than $3,000.
and considerably fewer (30.4% vs 55.1%) reported incomes of
≤ $7,000. Since the 1971 census reported income for the
year 1970, the data for the 1971 2.3% sample was adjusted
downward. A possible explanation for this difference is the
less accurate reporting of a sensitive item in an "unofficial"

survey.

The 2.3% random sample is considered representative
of the population of North Hamilton since six of the ten
characteristics were accepted on the individually assessed
null hypotheses and explanations could be offered for three
of the four statistically significant differences.

2. Analysis of the 2.3% Random Sample With the Subsample of
    All Hamilton General Hospital Patients, and With the Sub-
    sets of the Non-urgent and Emergency-Urgent Patients
    From the 14 Census Tracts of North Hamilton

The comparison of the 2.3% random sample of North
Hamilton residents and the subsample of North Hamilton re-
sidents who used the emergency department at the H.G.H. will
seek to identify characteristics of emergency department
use for North Hamilton. Likewise, the comparison of the 2.3%
random sample and the subsets of non-urgent (NU) and emer-
gency-urgent (EU) patients will seek to differentiate pre-
dictors of NU use of the emergency department.

Table 3 summarizes the statistical significance of
each of the 13 socio-demographic characteristics in each of
the three comparisons. The results can be summarized in
three groupings:

Group 1. The following six characteristics predict emergency
department use but do not differentiate whether the use is
for NU or EU care:

Table 3

SIGNIFICANCE OF COMPARISONS BETWEEN RESIDENTS AND

ALL USERS, NON-URGENT USERS AND EMERGENCY-URGENT USERS

	Residents vs All Users	Residents vs Non-Urgent Users	Residents vs Emergency-Urgent Users
Characteristics Associated With Emergency Department Use			
Sex	Sign****	Sign****	Sign****
Marital Status	Sign****	Sign*	Sign****
Religion	Sign****	Sign**	Sign****
Country of Birth	Sign****	Sign****	Sign****
Education	Sign*	N.S.	N.S.
Social Class	Sign*	N.S.	N.S.
Characteristics Associated With Non-Urgent Use of the Emergency Department			
Age	N.S.	Sign****	N.S.
Residence at Address	Sign****	Sign***	N.S.
Residence in Hamilton	N.S.	Sign*	N.S.
Characteristics Not Associated With the Use of the Emergency Department			
Employment Status	N.S.	N.S.	N.S.
Job Description	N.S.	N.S.	N.S.
Income	N.S.	N.S.	N.S.
Family Physician	N.S.	N.S.	N.S.

N.S.	Not Significant
*	$P < .05$
**	$P < .025$
***	$P < .01$
****	$P < .001$

sex

marital status

religion

country of birth

education

social class

Sex, age, marital status and country of birth were statistically significant in each of the three comparisons with the 2.3% random sample. Education and social class were statistically significant in only the comparison of the random sample and all H.G.H. users.

There were more males in each of the patient groups than would be expected from North Hamilton as determined by the 2.3% sample. When the other five 2 x n tables were partitioned on single degrees of freedom, the statistical significance was due to:

Marital Status: an underrepresentation of single individuals and an overrepresentation of separated/divorced/ and widowed individuals among users.

Religion: an overrepresentation of Protestants and an underrepresentation of Roman Catholics for all users.

Country of Birth: an overrepresentation of Canadian born users among the emergency department user groups when compared to residents.

Education: an overrepresentation of grades 10-11 and an underrepresentation in the less than grade 7 category for the total user group. This statistically significant

difference is considered valid even though education differed statistically in the comparison of the census and the 2.3% random sample. In that comparison the lowest educational category was overstated by the census and in the present comparison there are proportionately more, not fewer, residents than users in the less than grade 7 category.

Social Class: an underutilization of the emergency department by persons in social classes I-III (combined).

The distribution of these six characteristics in each of the three comparisons is presented in Table 4.

Group 2. Age, length of residence in Hamilton and length of residence at present address were the three characteristics which were statistically significantly different in the comparisons of the 2.3% random sample and NU users but not with EU users. Only length of residence at present address was also statistically significantly different in the comparison with all emergency department users. The distribution of the three variables for the three comparisons are presented in Table 5. These three characteristics are associated with the non-urgent use of the emergency department and are considered as predictors of NU use.

Partitioning of the 2 x 8 contingency table for age, NU users, when compared to residents, were overrepresented in the 10-19 (29.2% vs 19.4%) and 40-49 year age groups (16.4% vs 12.0%) and underrepresented in the 0-9 (15.5% vs 19.6%) and the 50-59 (5.3% vs 8.4%) age categories.

Table 4

GROUP 1: VARIABLES STATISTICALLY ASSOCIATED WITH THE
OVERALL USE OF THE EMERGENCY DEPARTMENT

	2.3% Sample (Percent)	All Users (Percent)	Non-Urgent Users (Percent)	Emergency-Urgent Users (Percent)
Sex	(n = 1510)	(n = 472)	(n = 226)	(n = 244)
Female	49.4	35.8	37.6	33.6
Male	50.6	64.2	62.4	66.4
Total	100.0	100:0	100.0	100.0

2.3% Sample vs All Users; $x_1^2 = 26.757$ P < .001

2.3% Sample vs NU Users; $x_1^2 = 10.956$ P < .001

2.3% Sample vs EU Users; $x_1^2 = 21.034$ P < .001

Marital Status	(n = 1510)	(n = 110)	(n = 48)	(n = 64)
Single	47.9	35.5	37.5	32.8
Married	43.3	41.8	43.8	39.1
Other	8.8	22.7	18.8	23.1
Total	100.0	100.0	100.1*	100.1

2.3% Sample vs All Users; $x_2^2 = 23.787$ P < .001

2.3% Sample vs EU Users; $x_2^2 = 6.101$ P < .05

2.3% Sample vs NU Users; $x_2^2 = 27.088$ P < .001

Religion	(n = 290)	(n = 150)	(n = 73)	(n = 77)
Protestant	33.5	54.7	50.7	58.5
Roman Catholic	53.8	38.7	39.7	37.7
Other	12.7	6.7	9.6	3.9
Total	100.0	100.1*	100.0	100.1*

2.3% Sample vs All Users; $x_2^2 = 19.027$ P < .001

2.3% Sample vs EU Users; $x_2^2 = 7.442$ P < .025

2.3% Sample vs NU Users; $x_2^2 = 17.348$ P < .001

Table 4 (Continued)

Country of Birth	2.3% Sample (Percent) (n = 350)	All Users (Percent) (n = 150)	Non-Urgent Users (Percent) (n = 73)	Emergency-Urgent Users (Percent) (n = 76)
Canada	50.9	78.7	83.6	75.0
United Kingdom	12.1	6.0		
Italy	13.5	4.0		
Poland	4.7	2.7	16.4	25.0
Other	18.8	8.7		
Total	100.0	100.1	100.0	100.0

2.3% Sample vs All Users; $x^2_4 = 35.879$ $P < .001$

2.3% Sample vs EU Users; $x^2_1 = 26.926$ $P < .001$

2.3% Sample vs NU Users; $x^2_1 = 15.092$ $P < .001$

Social Class	(n = 402)	(n = 124)	(n = 64)	(n = 60)
I-III (High)	11.0	4.0	1.6	6.7
IV	32.8	39.5	37.5	41.7
V (Low)	56.2	56.5	60.9	51.7
Total	100.0	100.0	100.0	100.1*

2.3% Sample vs All Users; $x^2_2 = 6.092$ $P < .05$

2.3% Sample vs NU Users; $x^2_2 = 5.608$ Not Significant

2.3% Sample vs EU Users; $x^2_2 = 2.312$ Not Significant

Table 4 (Continued)

Education	2.3% Sample (Percent)	All Users (Percent)	Non-Urgent Users (Percent)	Emergency-Urgent Users (Percent)
	(n = 404)	(n = 143)	(n = 71)	(n = 72)
At Least University	8.2	4.2	4.3	4.2
High School Grad	10.2	13.3	11.3	15.3
Grades 10-11	22.8	.23.8	24.0	23.6
Grades 7-9	35.7	45.5	46.5	44.5
Less Than Grade 7	23.2	13.3	14.1	12.5
Total	100.1*	100.1*	100.2*	100.1*

2.3% Sample vs All Users; χ^2_4 = 11.086 P < .05

2.3% Sample vs NU Users; χ^2_4 = 5.576 Not Significant

2.3% Sample vs EU Users; χ^2_4 7.339 Not Significant

* Due to rounding.

Table 5

GROUP 2: VARIABLES ASSOCIATED WITH THE NON-URGENT
USE OF THE EMERGENCY DEPARTMENT AT THE H.G.H.

Age	2.3% Sample (Percent) (n = 1507)	All Users (Percent) (n = 472)	Non-Urgent Users (Percent) (n = 226)	Emergency-Urgent Users (Percent) (n = 242)
0 - 9	19.6	14.2	15.5	12.8
10-19	19.4	24.6	29.2	20.2
20-29	14.9	17.0	13.7	20.2
30-39	12.0	12.3	13.3	11.6
40-49	12.0	12.9	16.4	9.5
50-59	8.4	7.2	5.3	9.1
60-69	7.4	6.4	3.5	9.1
70-79	5.0	3.8	3.1	7.4
≥ 80	1.4	1.7		
Total	100.1*	100.1*	100.0	99.9*

2.3% Sample vs All Users; χ^2_8 = 14.121 Not Significant

2.3% Sample vs NU Users; χ^2_7 = 24.457 P < .001

2.3% Sample vs EU Users; χ^2_7 = 11.476 Not Significant

Length of Residence Hamilton	(n = 430)	(n = 150)	(n = 72)	(n = 77)
< 2 Years	6.5	10.0	12.5	7.8
2 - < 3 Years	3.3	7.3	16.7	9.1
3 - < 5 Years	5.6	6.0		
5 - <10 Years	13.7	14.7	8.3	20.8
≥ 10 Years	70.9	62.0	62.5	62.3
Total	100.0	100.0	100.0	100.0

2.3% Sample vs All Users; χ^2_4 = 7.513 Not Significant

2.3% Sample vs NU Users; χ^2_3 = 8.808 P < .05

2.3% Sample vs EU Users; χ^2_3 = 3.056 Not Significant

Table 5 (Continued)

Length of Residence at Present Address	2.3% Sample (Percent) (n = 430)	All Users (Percent) (n = 149)	Non-Urgent Users (Percent) (n = 72)	Emergency-Urgent Users (Percent) (n = 77)
≤ 6 Months	12.6	28.9	36.1	33.8
6 Months-< 1 Year	7.0	6.0		
1 Year -< 2 Years	10.7	16.1	18.1	14.3
2 Years-< 3 Years	9.3	8.1	7.0	9.1
3 Years-< 5 Years	9.5	6.0	4.2	7.8
5 Years-< 10 Years	18.4	16.1	18.1	14.3
≥ 10 Years	32.5	18.8	16.7	20.8
Total	100.0	100.0	100.2*	100.1*

2.3% Sample vs All Users; $\chi_6^2 = 29.677$ P < .001

2.3% Sample vs NU Users; $\chi_5^2 = 18.132$ P < .01

2.3% Sample vs EU Users; $\chi_5^2 = 10.620$ Not Significant

* Due to rounding.

Approximately twice as many NU users than residents had
lived in Hamilton less than two years (12.5% vs 6.5%) and
between two and five years (16.7% vs 8.8%). The shorter
residential tenure in Hamilton of the non-urgent users con-
tributed most to statistical significance in this analysis.
Non-urgent users also tended to have less residential
tenure at their present address than did the North Hamilton
residents generally. It was the underrepresentation of the
NU users in the "less than six months" category that con-
tributed most to the statistically significant difference.

Group 3. Variables which did not differ statistically in
any of the comparisons were:

> Employment Status
>
> Job Description
>
> Family Income
>
> Family Physician

The distribution of these characteristics are pre-
sented in Table 6. Since they did not differ significantly
in any comparisons, they are discarded as predictors of
emergency department use, overall, non-urgent or emergency-
urgent.

The primary research question examined in the com-
parison of the 2.3% random sample and all H.G.H. users in-
dicates that considerable differences exist between the
emergency department user and the population from which they
come; six of the 13 individually assessed null hypotheses

Table 6

GROUP 3: VARIABLES WHICH WERE NOT STATISTICALLY

SIGNIFICANT IN THE COMPARISONS OF RESIDENTS AND USERS

	2.3% Sample (Percent)	All Users (Percent)	Non-Urgent Users (Percent)	Emergency-Urgent Users (Percent)
Employment Status*	(n = 430)	(n = 150)	(n = 73)	(n = 77)
Working	67.0	68.7	75.4	62.3

2.3% Sample vs All Users; $\chi^2_1 = 0.145$

2.3% Sample vs NU Users; $\chi^2_1 = 2.014$

2.3% Sample vs EU Users; $\chi^2_1 = .629$

Job Description	(n = 414)	(n = 129)	(n = 65)	(n = 64)
Professional, Managerial	11.8	5.4	6.2	4.7
Small Business	11.8	13.2	10.8	15.6
Skilled	23.7	21.7	23.1	20.3
Semiskilled	30.0	37.2	38.5	36.0
Unskilled	22.7	22.5	21.5	23.4

2.3% Sample vs All Users; $\chi^2_4 = 5.865$

2.3% Sample vs NU Users; $\chi^2_4 = 3.044$

2.3% Sample vs EU Users; $\chi^2_4 = 4.177$

Family Physician*	(n = 433)	(n = 150)	(n = 73)	(n = 77)
With	92.4	88.7	86.3	90.9

2.3% Sample vs All Users; $\chi^2_1 = 1.958$

2.3% Sample vs NU Users; $\chi^2_1 = 2.967$

2.3% Sample vs EU Users; $\chi^2_1 = .195$

Table 6 (Continued)

	2.3% Sample (Percent)	All Users (Percent)	Non- Urgent Users (Percent)	Emergency Urgent Users (Percent)
Family Income	(n = 388)	(n = 134)	(n = 68)	(n = 66)
≤ $2,999.	24.5	29.1	30.9	42.4
$3,000. - $3,999.	11.1	5.2		
$4,000. - $4,999.	7.2	7.5	4.4	6.1
$5,000. - $5,999.	9.5	9.0	10.3	7.6
$6,000. - $6,999.	10.8	17.9	23.5	12.1
≥ $7,000.	36.9	31.5	30.9	31.9

2.3% Sample vs All Users; $\chi^2_5 = 9.250$

2.3% Sample vs NU Users; $\chi^2_4 = 8.895$

2.3% Sample vs EU Users; $\chi^2_4 = 1.549$

*Category not given is the opposite of the one displayed.

were rejected because differences were statistically[6] sig-
nificant. The research question concerned with residents
and non-urgent users suggest that the socio-demographic
predictors of non-urgent use are age and residential tenure,
both in Hamilton and at present address. No single variable
differentiated emergency-urgent users from residents.

3. Comparison of the Non-Urgent With the Emergency-Urgent
   Subsets of H.G.H. Users

The previous section indicated that age and both
variables of residential tenure differentiated the NU users
from the EU users when each subset was compared with the
2.3% random sample. However, when EU and NU users are com-
pared to each other, age is the only variable which was
statistically significantly different; EU users were older
than NU users. Except for age, the two subsets are con-
sidered similar.

4. Linear Trend

Seven of the 13 demographic and socio-economic
variables have a natural ordering to their categories and
were analyzed for linear trend. These characteristics are:

            Age

            Length of Residence at Present Address

            Length of Residence in Hamilton

            Family Income

            Job Description

Education

Social Class

Of these, only age indicated a linear trend (due to linear regression ; $x_1^2 = 8.580$); the proportion of NU patients decreased with increasing age.

5. Correlation and Regression Analyses

Ten socio-economic variables which pertained to the head of the household or the family of North Hamilton H.G.H. emergency users were analyzed for pairwise association. Of the 45 possible combinations, 30 were analyzed by the chi-square statistic and 15 by the Spearman rank correlation statistic. Seven chi-square results were statistically significant and therefore suggest a lack of independence. All pairwise associations are displayed in Table 7 and the significant associations are listed here:

(1) Unemployment and low income are associated.

(2) More Roman Catholics are in the lower social class than Protestants.

(3) Unemployment is associated with a more recent length of address at present address.

(4) Those without family physicians have less residential tenure at present address.

(5) Those without family physicians have lower income.

(6) Canadian born residents have less residential tenure than immigrant Canadians.

Table 7

PAIRWISE ASSOCIATIONS OF THE 10 SOCIO-DEMOGRAPHIC

VARIABLES RELATING TO THE HEAD OF THE HOUSEHOLD

Where   Var 1 = Length of residence at present address

Var 2   Length of residence in Hamilton

Var 3   Religion.

Var 4   Country of Birth

Var 5   Job Classification

Var 6   Education

Var 7   Social Class

Var 8   Income

Var 9   Employment Status

Var 10   Family Physician

x^2: chi-square statistic with $\alpha = .05$

r_s: two tailed Spearman rank correlation statistic with $\alpha = .05$

Var 1 vs Var 2 $r_s = .4204$; $n = 138$; $P < .001$

Var 3 $\chi^2_2 = 2.372$; $n = 138$;   N.S.

Var 4 $\chi^2_2 = 10.168$; $n = 149$; $P < .01$

Var 5 $r_s = .2684$; $n = 118$; $P < .01$

Var 6 $r_s = -.2316$; $n = 137$; $P < .01$

Var 7 $r_s = .1473$; $n = 114$;   N.S.

Var 8 $r_s = .1671$; $n = 137$; $P < .05$

Var 9 $\chi^2_2 = 8.882$; $n = 138$; $P < .025$

Var 10 $\chi^2_2 = 12.201$; $n = 149$; $P < .01$

Table 7 (Continued)

Var 2 vs Var 3	$\chi_2^2 = .367;$	n = 138;	N.S.
Var 4	$\chi_2^2 = 2.629;$	n = 149;	N.S.
Var 5	$r_s = .2282;$	n = 118;	P < .02
Var 6	$r_s = -.1260;$	n = 148;	N.S.
Var 7	$r_s = .1474;$	n = 114;	N.S.
Var 8	$r_s = -.0106;$	n = 137;	N.S.
Var 9	$\chi_2^2 = 2.777;$	n = 138;	N.S.
Var 10	$\chi_2^2 = 1.859;$	n = 149;	N.S.
Var 3 vs Var 4	$\chi_1^2 = 3.586;$	n = 150;	N.S.
Var 5	$\chi_3^2 = 3.248;$	n = 119;	N.S.
Var 6	$\chi_4^2 = 12.459;$	n = 138;	P = .025
Var 7	$\chi_1^2 = .387;$	n = 115;	N.S.
Var 8	$\chi_1^2 = .407;$	n = 138;	N.S.
Var 9	$\chi_1^2 = 3.497;$	n = 150;	N.S.
Var 10	$\chi_1^2 = 1.605;$	n = 149;	N.S.
Var 4 vs Var 5	$\chi_3^2 = 2.133;$	n = 129;	N.S.
Var 6	$\chi_3^2 = 17.497;$	n = 149;	P < .001
Var 7	$\chi_2^2 = 2.131;$	n = 124;	N.S.
Var 8	$\chi_1^2 = 3.100;$	n = 149;	N.S.
Var 9	$\chi_1^2 = 1.632;$	n = 150;	N.S.
Var 10	$\chi_1^2 = .022;$	n = 149;	N.S.
Var 5 vs Var 6	$r_s = .0914;$	n = 118;	N.S.
Var 7	$r_s = .8708;$	n = 115;	P < .001
Var 8	$r_s = -.1100;$	n = 118;	N.S.
Var 9	$\chi_3^2 = 4.653;$	n = 119;	N.S.
Var 10	$\chi_3^2 = 2.081;$	n = 128;	N.S.

Table 7 (Continued)

Var 6 vs Var 7 $r_s = .2716;$ $n = 115;$ $P < .01$

       Var 8 $r_s = -.0018;$ $n = 137;$ N.S.

       Var 9 $\chi_3^2 = 1.293;$ $n = 149;$ N.S.

       Var 10 $\chi_4^2 = 3.887;$ $n = 148;$ N.S.

Var 7 vs Var 8 $r_s = .0982;$ $n = 114;$ N.S.

       Var 9 $\chi_1^2 = .504;$ $n = 124;$ N.S.

       Var 10 $\chi_1^2 = .516;$ $n = 123;$ N.S.

Var 8 vs Var 9 $\chi_1^2 = 34.315;$ $n = 149;$ $P < .001$

       Var 10 $\chi_1^2 = 5.041;$ $n = 148;$ $P < .025$

Var 9 vs Var 10 $\chi_1^2 = 1.767;$ $n = 149;$ N.S.

(7) Immigrant Canadians are overrepresented in the lowest educational category.

'The Spearman rank correlation coefficients are also displayed in Table 7 and the statistically significant results listed here:

(1) Length of residence at present address is positively associated with family income, job classification and length of residence in Hamilton and negatively associated with education.

(2) Social class is positively associated with education and occupation, but is, of course, derived from these two variables.

(3) Length of residence in Hamilton and job classification are positively associated.

These statistically significant correlations indicate the association of two variables with each other. By way of examples, two of the predictors of general emergency department use, education and country of birth, are seen to be significantly correlated in the user sample. This does not suggest that these two characteristics are in fact one or the same variable, but indicates the strong relationship they have with one another for North Hamilton users. Family physician, which was not a predictor variable, is statistically correlated with the predictor variable of length of residences at present address. This indicates the high degree of association between those who are recent

residents and those who are without family physician and
vice versa.

Twelve of the 13 variables were dichotomized and
examined using stepwise regression with urgency classifica-
tion as the "dependent" variable. Social class was not used
in the analysis since this variable was not stored on cards;
however, the two variables used to derive social class,
education and job description, were included as separate
variables. Their positive association with social class
has already been demonstrated. The results are displayed
in Table 8. Sex was the variable first chosen by this re-
gression method as the best predictor of urgency classifica-
tion. However, sex accounts for just 3.7% of the variance
in the dependent--variable. The F-value (3.027) was not
statistically significant (P = .086). In a similar fashion
the other variables, as listed from job through education,
were selected in a stepwise fashion. In all, the eleven
variables entered in the equation explained only 16.3% of
the variance in the dependent variable. The probability
of the overall F-value (1.223) for the eleven characteristics
was not significant (P = .289).

These results reaffirm the findings for the uni-
variate analyses of EU compared with NU, except for age.
It appears that none of the demographic and socio-economic
characteristics used in the multivariate analysis can account
for a significant difference between emergency-urgent and
non-urgent users. Age and both measures of residential

Table 5

STEPWISE REGRESSION*

DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

(Low Level = 0/High Level = 1)

STEP	VARIABLE ENTERED	Cumulative Total R-Square	Coefficient	Standard Error	F-Value	Significance of Coefficient
1	Sex (Male/Female)	.0369	.2071	.1191	3.027	.086
2	Job Classification (I-IV/V-VII)	.0556	.1763	.1417	1.547	.217
3	Family Physician (With/Without)	.0718	.1774	.1531	1.341	.250
4	Marital Status (Married/Non-Married)	.0864	-.1305	.1183	1.215	.274
5	Religion (Catholic/Non-Catholic)	.1057	.1502	.1183	1.613	.208
6	Country of Birth (Canada/Other)	.1156	.1262	.1382	.834	.364
7	Family Income (<$7,000./>$7,000.)	.1281	.1220	.1192	1.048	.309
8	Length of Residence at Present Address (< 2 Years/≥ 2 Years)	.1378	-.1177	.1307	.8107	.371

Table 6 (Continued)

STEP	VARIABLE ENTERED	Cumulative Total R-Square	Coefficient	Standard Error	F-value	Significance of Coefficient
9	Age (< 40/> 40)	.1530	.1556	.1361	1.269	.264
10	Employment Status (Employed/Unemployed)	.1592	-.1227	.1711	.5141	.476
11	Education (<Grade 11/>Grade 11)	.1531	.8896E-01	.1552	.3234	.568

Dependent Variable: Urgency Status (Emergency-Urgent=0/Non-Urgent=1)

tenure did differentiate non-urgent users from residents in
the univariate analysis. Lavenhar, Ratner and Weinerman (29)
in their examination of a United States emergency department,
used multiple regression to develop a "Demographic Index"
(age, marital status, family income) which explained approxi-
mately 7% of the criterion variance. It is interesting to
note that the first three variables entered in the present
investigation (sex, job classification, family physician)
accounted for approximately the same proportion of the total
variance (7.2%).

Stepwise regression was done on the same characteris-
tics of the H.G.H. users who did not live in North Hamilton
to assess whether this group had predictive characteristics.
Similarly, no variables were significant as predictors of
non-urgency with this group of users.

b. Illness Related Characteristics: A Further Comparison
    of the Non-Urgent and Emergency-Urgent Subsets of
    Hamilton General Hospital Users

Despite the demographic and socio-economic similari-
ties between the EU and NU users, there were differences
when the 16 recorded illness and utilization characteristics
were compared for these two groups of users.

Statistically Significant

Difference

Accident (P < .001)

Trauma (P < .001)

Ambulance (P < .001)

Where care preferred (P < .05)

Non-Significant

Difference

Time since contacting physician

Time since onset of symptoms

Associated Pain

Associated Worry

Arrival Time

Use of Emergency Department in past year

Most Frequent Source of Medical Care

Satisfaction with Past Medical Care

Health Insurance

Reason for Care at H.G.H. Emergency Department

Number of Visits to an Emergency Department in Last Year

First Care Sought Before This Visit

The four statistically significant results would be expected to differ. More EU than NU users were involved in accidents (65.6% vs 46.0%), suffered trauma (64.8% vs 45.1%), arrived by ambulance (16.9% vs 4.9%) and preferred care at the emergency department than at any other facility (61.0% vs 46.6%). The results are displayed in Table 9.

Table 9

STATISTICALLY SIGNIFICANT HEALTH CARE AND
ILLNESS CHARACTERISTICS

	Emergency-Urgent Users (Percent)	Non-Urgent Users (Percent)
Accident	(n = 244)	(n = 226)
Yes	65.6	46.0
No	34.4	54.0
Total	100.0	100.0

χ^2 = 18.226 (1df) P < .001

Trauma	(n = 244)	(n = 226)
Yes	64.8	45.1
No	35.3	54.9
Total	100.1*	100.0

χ^2 = 18.275 P < .001 (1df)

Ambulance	(n = 245)	(n = 226)
Yes	16.9	4.9
No	83.1	95.1
Total	100.0	100.0

χ^2 = 17.119 P < .001 (1df)

Where Care Would Have Been Preferred	(n = 76)	(n = 73)
HGH Emergency Department	61.0	46.6
Own Physician	11.0	28.8
Other	28.0	24.6
Total	100.0	100.0

χ^2 = 8.335 P < .05 (2df)

*Due to rounding.

The results of the non-significant comparisons are shown in Table 10 and summarized in this paragraph. Almost twice as many of the NU patients (who preferred care at the H.G.H.) gave the reason for this preference as "good service". Approximately 17% of both subsets had contacted their family physician within the last 24 hours, but more of the NU visitors had made contact between one day and two weeks ago. More of the EU group (75.3% vs 61.7%) had experienced their presenting symptom within the last 24 hours. However, more of the non-urgent group expressed worry over their condition. When arrival time was compared, one half of the NU users visited during the evening shift; the day and evening shift saw the same proportion (40.9%) of EU users. More NU users had used an emergency department in the last year.

Almost three-quarters (72.7%) of the EU group usually go to their family physician for regular care as compared to two thirds (64.4%) of the NU group. Of the individuals who could identify a usual source of care, the EU group expressed more satisfaction with this source. Approximately 23% of both groups attempted to receive care from a physician before this visit; some 70% did not seek care from any source in both the EU and NU subsets. The proportion with medical insurance was nearly the same for each group (91.0%).

The three characteristics with ordered categories -- time since onset of symptoms, when physician contacted

Table 10

NON-SIGNIFICANT HEALTH CARE AND ILLNESS CHARACTERISTICS

	Emergency-Urgent Users (Percent)	Non-Urgent Users (Percent)
Time Since Contacting Family Physician	(n = 70)	(n = 63)
< 24 Hours	17.2	17.5
1 day-< 2 weeks	14.3	25.4
2 weeks-< 1 Month	20.0	9.5
1 month-< 6 Months	28.6	30.2
≥ 6 Months	20.0	17.5
Total	100.1*	100.1*

$\chi^2 = 4.658$ (4df) $0.25 < P < 0.5$

Time Since Onset of Symptoms	(n = 77)	(n = 73)
< 24 Hours	75.3	61.7
12 - < 24 Hours	6.5	13.7
1 day -< 7 days	9.1	12.3
≥ 1 Week	9.1	12.3
Total	100.0	100.0

$\chi^2 = 3.703$ (3df) $0.25 < P < 0.5$

Associated Pain	(n = 76)	(n = 72)
Great/Somewhat	68.4	61.1
Hardly/None	31.6	38.9
Total	100.0	100.0

$\chi^2 = .867$ (1df) $0.25 < P < 0.5$

Table 10 (Continued)

	Emergency-Urgent Users (Percent)	Non-Urgent Users (Percent)
Associated Worry	(n = 75)	(n = 72)
Great/Somewhat	68.0	75.0
Hardly/None	32.0	25.0
Total	100.0	100.0

$x^2 = .882$ (1df) $0.25 < P < 0.5$

Arrival Time	(n = 242)	(n = 217)
0000-0759	18.2	15.7
0800-1559	40.9	33.7
1600-2400	40.9	50.7
Total	100.0	100.1*

$x^2 = 4.443$ (2df) $0.1 < P < 0.25$

Use of Emergency Department in Past Year	(n = 77)	(n = 73)
Yes	40.3	45.2
No	59.8	54.8
Total	100.1*	100.0

$x^2 = .375$ (1df) $0.5 < P < 0.75$

Most Frequent Source of Medical Care	(n = 76)	(n = 73)
Family Physician	72.7	64.4
Hospital	20.8	30.1
Other/Nowhere	6.5	5.5
Total	100.0	99.9*

$x^2 = 1.739$ (2df) $0.25 < P < 0.5$

Table 10 (Continued)

	Emergency-Urgent Users (Percent)	Non-Urgent Users (Percent)
Satisfaction with Past Medical Care	(n = 73)	(n = 70)
Satisfied	93.2	90.0
Dissatisfied	6.8	10.0
Total	100.0	100.0

x^2 = .462 (1df)   0.25 < P < 0.5

Health Insurance	(n = 76)	(n = 72)
OHIP	90.8	93.1
Other Insurance	9.2	6.9
Total	100.0	100.0

x^2 = .253 (1df)   0.5 < P < 0.75

Reason for Care at HGH Emergency Department	(n = 57)	(n = 34)
Location	63.8	53.0
Good Service	17.0	32.4
Other	19.2	14.7
Total	100.0	100.1

x^2 = 2.597 (2df)   0.25 < P < 0.5

Number of Times Used an Emergency Room in Last Year	(n = 32)	(n = 34)
< 2	56.3	50.0
> 2	43.8	50.0
Total	100.1*	100.0

x^2 = .259 (1df)   0.5 < P < 0.75

Table 10 (Continued)

First Care Sought Before This Unit	Emergency-Urgent Users (Percent)	Non-Urgent Users (Percent)
	(n = 77)	(n = 73)
Physician	24.7	21.9
Other Source	6.5	6.9
None	68.8	71.2
Total	100.0	100.0

χ^2 = .160 (2df)   0.9 < P < 0.975

*Due to rounding.

and arrival time -- did not show evidence of linear trend when analyzed.

Six of the illness related variables that relate to the patient's experience at the time of the visit to the emergency department were chosen for inclusion in stepwise regression along with the four univariate predictors. These variables were:

> when contacted physician
>
> time since onset of symptoms
>
> associated pain
>
> first source of care sought.
>
> associated worry
>
> arrival time

The results of the regression are shown in Table 11. Two (ambulance and trauma) of the four characteristics that were significant in the univariate analysis were significant in this multivariate analysis. None of the six "experiential" characteristics reached statistical significance and would not seem to influence NU use.

7. Comparison of Patient, Illness and Use Characteristics for North Hamilton Residents at Two Hamilton Emergency Departments (H.G.H. and S.J.H.)

This section deals with an analysis of North Hamilton residents who used the emergency department at either of two

Table 11

STEPWISE REGRESSION*

SELECTED ILLNESS AND HEALTH CARE CHARACTERISTICS

STEP	VARIABLE ENTERED (LOW LEVEL=0/HIGH LEVEL=1)	CUMULATIVE TOTAL R-SQUARE	COEFFICIENT	STANDARD ERROR	F-VALUE	SIGNIFICANCE OF COEFFICIENT
1	AMBULANCE (YES/NO)	.1001	.4597	.1243	13.682	.000
2	TRAUMA (YES/NO)	.1535	.2484	.0896	7.696	.006
3	ARRIVAL (8AM-4PM/4PM-8AM)	.1709	.1352	.0848	2.543	.113
4	WHERE CARE PREFERRED (HGH EMERGENCY DEPT./OTHER)	.1779	.0897	.0844	1.014	.316
5	PAIN (CONSIDERABLE/MILD)	.1843	.0864	.0890	.9418	.334
6	WHEN CONTACTED PHYSICIAN (<2 DAYS/≥2 DAYS)	.1857	-.0496	.1111	.1994	.656
7	ACCIDENT (YES/NO)	.1862	.0497	.1896	.0687	.794
8	WORRY (CONSIDERABLE/MILD)	.1865	.0200	.0999	.0401	.842
9	WHO CONTACTED FIRST (SOME HEALTH SOURCE/NO ONE)	.1868	.0204	.1021	.0403	.541

* DEPENDENT VARIABLE: URGENCY STATUS (EMERGENCY-URGENT=0/NON-URGENT=1)

Hamilton hospitals, the Hamilton General and St. Joseph's.

In the comparison of the 13 demographic and socio-economic characteristics in common to the two studies by Vayda, the statistical results were:

Statistically Significant Non-Significant
Difference Difference

Demographic

Age (P < .05) Sex

Marital Status (P < .01) Length of residence at address

Length of residence in Hamilton

Socio Economic

Country of Birth

Religion (P < .025)

Employment Status

Job Description

Education

Social Class

Income

Family Physician

The three characteristics which were significantly different between the two samples of users are displayed in Table 12. There were fewer individuals under 30 years and more over 60 years of age at the H.G.H. than at S.J.H. The mean and median age at the H.G.H. were 30.7 years and 26 years, and at S.J.H. 28.2 years and 24 years. Considerably more married (41.8% vs 29.4%) and fewer single (35.5% vs 54.8%) visitors used the H.G.H. than S.J.H. Religion was the only statistically significant socio-economic variable;

Table 12

STATISTICALLY SIGNIFICANT

DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Age	(n = 435)	(n = 472)
0-9	18.9	14.2
10-19	19.1	24.6
20-29	24.1	17.0
30-39	12.0	12.3
40-49	9.2	12.9
50-59	7.8	7.2
60-69	4.8	6.4
70-79	3.2	3.8
$\geq$ 80	0.9	1.7
Total	100.0	100.1*

$\chi^2 = 16.995$ (8df) P < .05

Marital Status	(n = 184)	(n = 110)
Single	54.8	35.5
Married	29.4	41.8
Other	15.8	22.7
Total	100.0	100.0

$\chi^2 = 10.428$ (2df) P < .01

Table 12 (Continued)

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Religion	(n = 398)	(n = 150)
Protestant	41.2	54.7
Roman Catholic	52.5	38.7
Other	6.3	6:7
Total	100.0	100.1*

$\chi^2 = 8.709$ (2df) P < .025

*Due to rounding.

considerably more North Hamilton Roman Catholics (52.5% vs 38.7%) visited St. Joseph's Hospital.

The ten non-significant socio-demographic variables are displayed in Table 13 and summarized in this paragraph. Although there were more males than females at both hospitals, the proportion of males at the H.G.H. (64.2%) was greater than at S.J.H. (59.1%). Users at both hospitals had similar residential tenure; approximately 28% had lived at their present address for less than six months and an additional 20% had lived in Hamilton for less than two years. Although fewer Canadian born North Hamilton residents used S.J.H., more than twice as many Italians (9.3% vs 4.1%) sought care there. More S.J.H. patients had occupations classified as professional, executive and managerial than did those using the H.G.H. Considerably more S.J.H. had at least graduated from high school (28.9% vs 17.5%) and more were in social classes I-III (9.0% vs 4.0%) than users of the H.G.H. The higher educational, occupational and social class profile of the St. Joseph's users was not, however, associated with high family income: almost 60% of the S.J.H. group had incomes of less than $6,000. compared to 47% of the H.G.H. group.

Illness-Related Characteristics

In the comparison of the illness-related characteristics in common to the H.G.H. and S.J.H. groups of users, the results were as follows:

Table 13

NON-SIGNIFICANT DEMOGRAPHIC

AND SOCIO-ECONOMIC CHARACTERISTICS

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Sex	(n = 435)	(n = 472)
Male	59.1	64.2
Female	40.9	35.8
Total	100.0	100.0

$\chi^2 = 2.507$ (1df) $0.1 < P < 0.25$

Length of Residence at Present Address	(n = 190)	(n = 149)
< 6 Months	28.4	28.9
6 - < 12 Months	10.0	6.1
1 - < 2 Years	10.5	16.1
2 - < 3 Years	8.4	8.1
3 - < 5 Years	12.6	6.1
5 - <10 Years	14.7	16.1
≥ 10 Years	15.3	18.8
Total	99.9*	100.2*

$\chi^2 = 8.056$ (6df) $0.1 < P < 0.25$

Table 13 (Continued)

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Length of Residence in Hamilton	(n = 191)	(n = 149)
< 2 Years	9.4	10.0
2 - < 3 Years	3.2	7.3
3 - < 5 Years	8.4	6.0
5 - <10 Years	15.7	14.7
≥ 10 Years	63.4	62.0
Total	100.1*	100.0

χ^2 = 3.722 (4df) 0.25 < P < 0.5

Employment Status	(n = 194)	(n = 150)
Working Full or Part Time	65.0	68.7
Not Working	35.1	31.3
Total	100.1*	100.0

χ^2 = .526 (1df) 0.25 < P < 0.5

Family Physician	(n = 194)	(n = 150)
With	85.6	88.7
Without	14.4	11.3
Total	100.0	100.0

χ^2 = .715 (1df) 0.25 < P < 0.5

Country of Birth	(n = 194)	(n = 150)
Canada	74.2	78.7
United Kingdom	4.6	6.0
Italy	9.3	4.1
Other	11.9	11.3
Total	100.0	100.1*

χ^2 = 3.916 (3df) 0.25 < P < 0.5

Table 13 (Continued)

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Education	(n = 166)	(n = 143)
At Least University	6.6	4.2
High School Grad	22.3	13.3
Grades 10-11	21.7	23.8
Grades 7-9	33.7	45.5
Less Than Grade 7	15.7	13.3
Total	100.0	100.1*

$\chi^2 = 7.401$ (4df) $0.1 < P < 0.25$

Occupation	(n = 166)	(n = 129)
Professional, Managerial	7.8	5.4
Small Business	15.1	13.2
Skilled	21.1	21.7
Semi-Skilled	29.5	37.2
Unskilled	26.5	22.5
Total	100.0	100.0

$\chi^2 = 2.594$ (4df) $0.25 < P < 0.5$

Social Class	(n = 166)	(n = 124)
I-III (High)	9.0	4.0
IV	37.4	39.5
V (Low)	53.6	56.5
Total	100.0	100.0

$\chi^2 = 2.768$ (2df) $0.25 < P < 0.5$

Table 13 (Continued)

Income	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
	(n = 169)	(n = 124)
< $4,000.	34.9	29.0
$4,000-$4,999	11.8	8.1
$5,000-$5,999	12.4	9.7
$6,000-$6,999	8.9	19.4
≥ $7,000	32.0	33.9
Total	100.0.	100.1*

$\chi^2 = 8.216$ (4df)   .05 < P < 0.1

*Due to rounding.

Statistically Significant Difference	Non-Significant Difference
Urgency Assessment (P < .01)	Pain Associated
Trauma (P < .001)	Worry Associated
Accident (P < .001)	When contacted Physician
Time Since Onset of Symptoms (P < .05)	Use of Emergency Department Before
Care First Sought (P < .05)	Number of Times to ER.
Time to Get to Hospital (P < .01)	Arrival Time
	Transportation
	Admission
	Use of X-Ray
	Use of Laboratory

The six characteristics which were statistically
significantly different are displayed in Table 14. Almost
one-half of the H.G.H. users presented with non-urgent con-
ditions compared to 39% of the St. Joseph's group. This con-
trast cannot be completely explained by the statistically
significant differences found with trauma and accident.
More H.G.H. than S.J.H. visitors had suffered trauma (55.3%
vs 43.5%) and had experienced an accident (56.2% vs 41.9%).
Almost four-fifths of the H.G.H. users had their presenting
symptoms for less than one day, compared to two-thirds of
the S.J.H. group; a difference which was statistically signi-
ficiant. Considerably more St. Joseph's users sought care
from a physician before this visit; but, by and large, the
majority of both samples sought care from no one. It took

Table 14

STATISTICALLY SIGNIFICANT

ILLNESS RELATED CHARACTERISTIC

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Assessment	(n = 435)	(n = 468)
Emergency-Urgent	60.9	51.7
Non-Urgent	39.1	48.3
Total	100.0	100.0

$x^2 = 7.767$ (1df) P < .01

Trauma	(n = 435)	(n = 470)
Yes	43.5	55.3
No	56.6	44.7
Total	100.1*	100.0

$x^2 = 12.735$ (1df) P < .001

Accident	(n = 434)	(n = 470)
Yes	41.9	56.2
No	58.1	43.8
Total	100.0	100.0

$x^2 = 18.292$ (1df) P < .001

Table 14 (Continued)

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Time Since Onset of Symptoms	(n = 194)	(n = 159)
< 24 Hours	68.6	79.2
1 - < 3 Days	5.2	6.7
3 - < 7 Days	9.3	4.0
≥ 1 Week	17.0	10.0
Total	100.1*	99.9*

$\chi^2 = 7.878$ (3df) P < .05

Care First Sought	(n = 194)	(n = 139)
Physician	34.0	23.8
Other Source	3.1	7.2
None	62.9	69.1
Total	100.0	100.1*

$\chi^2 = 6.186$ (2df) P < .05

Time to Get to The Emergency Department	(n = 224)	(n = 159)
≤ 15 Minutes	70.6	84.6
16-29 Minutes	22.2	11.4
≥ 30 Minutes	7.2	4.0
Total	100.0	100.0

$\chi^2 = 9.181$ (2df) P < .01

*Due to rounding.

longer for the user to arrive at S.J.H. than at H.G.H. emergency department.

The differences which were not statistically significant are displayed in Table 15 and some of the proportional differences are outlined in this paragraph. The S.J.H. group reported experiencing more pain with their presenting symptom. The H.G.H. group were less likely to have been in contact with their family physician in the 48 hours before the visit. Although approximately 44% of both groups had visited an emergency department in the last year, more S.J.H. users had made more than three visits (23.3% vs 18.0%).

Use of ambulance was twice as frequent among H.G.H. than S.J.H. users, although the H.G.H. users live closer to the H.G.H. and more were classified as non-urgent. The percent who were admitted, and used X-Ray and laboratory facilities was similar at both hospitals. The evening shift (4:00 to 12:00 p.m.) was the busiest at both hospitals, accounting for 45% of all visits at both.

8. Urgency Classification at the Hamilton General Hospital

The degree of agreement between the single rater and the casualty officers on the three urgency classifications was highly significant (P < .001). When the emergency and urgent classifications were combined into the EU classification, the degree of agreement, as would be expected, was also highly significant. The agreement between the

Table 15

NON-SIGNIFICANT HEALTH CARE AND ILLNESS CHARACTERISTICS

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Associated Pain	(n = 190)	(n = 158)
Great/Somewhat	67.4	60.8
Hardly/None	32.6	39.3
Total	100.0	100.1*

$\chi^2 = 1.643$ (1df) $0.1 < P < 0.25$

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Associated Worry	(n = 194)	(n = 123)
Great/Somewhat	77.3	76.4
Hardly/None	22.7	23.6
Total	100.0	100.0

$\chi^2 = .034$ (1df) $0.5 < P < 0.75$

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Time Since Contacting Physician	(n = 161)	(n = 124)
< 48 Hours	23.0	19.4
2 - < 7 Days	11.8	8.1
1 - < 2 Weeks	9.3	8.1
2 - < 4 Weeks	13.1	15.3
1 - < 6 Months	27.3	31.5
$\geq$ - 6 Months	15.5	17.8
Total	100.0	100.2*

$\chi^2 = 2.393$ (5df) $0.75 < P < 0.9$

Table 15 (Continued)

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Use of Emergency Department in the Last Year	(n = 193)	(n = 139)
Yes	43.5	43.9
No	56.5	56.1
Total	100.0	100.0

$\chi^2 = .004$ (1df) $0.9 < P < 0.975$

Number of Times to an Emergency Department in the Last Year	(n = 86)	(n = 61)
≤ 2	46.5	50.8
3	30.2	31.2
> 3	23.3	18.0
Total	100.0	100.0

$\chi^2 = .609$ (2df) $0.5 < P < 0.75$

Arrival Time	(n = 435)	(n = 461)
0000-0759	17.7	16.9
0800-1559	37.9	37.5
1600-2400	44.4	45.6
Total	100.0	100.0

$\chi^2 = .159$ (2df) $0.9 < P < 0.975$

Table 15 (Continued)

	Users of St. Joseph's Hosp. (Percent)	Users of Hamilton General Hosp. (Percent)
Transportation	(n = 193)	(n = 144)
Ambulance	7.3	15.3
Car	62.7	51.4
Taxi	14.0	19.5
Bus	5.2	3.5
Walked	10.9	10.4
Total	100.1*	100.1*

$\chi^2 = 8.853$ (4df) $0.05 < P < 0.1$

Admission	(n = 435)	(n = 444)
Yes	9.0	9.9
No	91.0	90.1
Total	100.0	100.0

$\chi^2 = .229$ (1df) $0.5 < P < 0.75$

Use of X-Ray	(n = 435)	(n = 444)
Yes	33.1	36.7
No	66.9	63.3
Total	100.0	100.0

$\chi^2 = 1.259$ (1df) $0.25 < P < 0.5$

Use of Laboratory	(n = 435)	(n = 444)
Yes	26.2	21.4
No	73.8	78.6
Total	100.0	100.0

$\chi^2 = 2.806$ (1df) $0.05 < P < 0.1$

*Due to rounding.

validator and the casualty officers reflects the reliability of the two raters' characterization of the patients urgency and suggests the possibility, but not the guarantee, that the ratings do in fact reflect the true degree of urgency within the criteria constraints developed.

CHAPTER VII

DISCUSSION

The results will be discussed in four parts. The first examines possible socio-demographic predictors of emergency department use, especially non-urgent use. The next deals with differing roles of the Hamilton General Hospital Emergency Department for North Hamilton users classified as emergency-urgent and non-urgent. The third section considers different roles of the Hamilton General Hospital and St. Joseph's Hospital emergency departments for North Hamilton users. A final note considers the validity of urgency classifications at the Hamilton General Hospital.

1. Socio-Demographic Predictors of Emergency Department Use, Especially Non-Urgent Use.

(a) Residents compared to Emergency Department Users in General.

Once the representative nature of the 2.3% random sample of residents was established, they could be compared with the Hamilton General Hospital emergency department users from North Hamilton. Six socio-demographic characteristics were statistically significantly different between the two groups. The Hamilton General Hospital emergency department users were more likely to be males, non-single, Protestants,

native Canadians, less educated and of lower social class than the North Hamilton residents generally regardless of the nature of the visit.

The proximity of the Hamilton General Hospital to heavy industry could be associated with the overrepresentation of males; particularly since more North Hamilton males (59%) than females (49%) presented at the Hamilton General Hospital with trauma.

The overrepresentation of North Hamilton Protestants and native Canadians at the Hamilton General Hospital is most likely related to the overrepresentation of North Hamilton Catholics and Italians at St. Joseph's Hospital and is a function of the preference that Catholics have for a Catholic hospital.

The overrepresentation of non-single users is difficult to interpret. The greater proportion of separated/widowed/ divorced individuals in the user sample (22.7%) than in the resident sample (8.8%) might reflect that their older age profile and possibly their tendency to have fewer social supports may predispose these individuals, which are considered 'non-single' in this analysis, to the greater use of the emergency department for all types of medical care.

Both social class and educational level, from which social class was partially derived, indicate that individuals from the higher social classes are less apt than those from lower classes to use the emergency department as a source of

medical care. Persons in the higher social classes (I - III) prefer alternate sources of care since their overall use of all health services has been shown to be higher (28). Conversely, the overrepresentation of the lower social classes among users might reflect the continuing presence of a premedicare attitude held by the socially/underprivileged. To them the emergency department may still be, as it was before medicare, a major source of primary care. Evidence of the "Clinic Habit" in the use of dental services has been reported previously (37). The use of this 24-hour facility may be enhanced because of reduced opportunity costs. Persons from the lower social classes can thus arrange emergency department visits during their "off-hours" without loss in pay and without incurring added expenses such as babysitting and transportation. In addition, family physicians may be giving either conscious or unconscious messages to individuals in the lower social classes which encourage the use of the emergency department during the physicians' off-hours.

(b) Characteristics Associated with the Use of the
    Emergency Department for Non-Urgent Care.

Three socio-demographic characteristics specifically separated non-urgent users from residents. Non-urgent users were younger and more recent residents both in Hamilton and at their present addresses. Younger age reaffirms an earlier finding that urgency rating increases proportionately with

age; therefore, younger individuals are more likely to be non-urgent than older users.. More recently residential tenure probably relates to the lack of an established relationship with a family physician. Indeed, fourteen of the fifteen North Hamilton users without a family physician had lived at their present address for less than two years. Recent residents are likely to be young, partially explaining the overrepresentation of younger users in the non-urgent sample.

Of the 13 socio-demographic characteristics examined, these three variables were the only ones associated with emergency department use for non-urgent care, and, as such, are the characteristics which this study has identified as predictors of non-urgent use by North Hamilton residents.

(c) Emergency-Urgent Users Compared to Non-Urgent Users.

When the non-urgent and emergency-urgent users were compared to each other, the only difference was the older age configuration of the emergency-urgent group. The multivariate analysis indicated that none of the socio-demographic variables were predictors of non-urgent as compared to emergency-urgent use for North Hamilton residents.

Thus, the non-urgent and emergency-urgent users are similar socio-demographically and represent a homogeneous group of North Hamilton residents. On the other hand, younger age and more recent residential tenure did differentiate the non-urgent users from the rest of the community in which they

lived. The two variables of residential tenure might have reached statistical significance in the comparison of the non-urgent and emergency-urgent groups if a larger sample had been available.

2. Different Roles of the Hamilton General Hospital Emergency Department for the Non-Urgent and Emergency-Urgent Users from North Hamilton

Both the univariate and multivariate analyses indicated that the emergency-urgent and non-urgent users were similar in their illness and health care characteristics. However, the possibility that the Hamilton General Hospital emergency department is performing two different roles is suggested by two findings. First, because the socio-demographic profiles of the emergency-urgent and non-urgent users are similar, the emergency department is not serving two distinct patient groups. Second, since the proportion of emergency-urgent (51%) and non-urgent (49%) visits were almost equal and trauma was present in over one-half the visits, the Hamilton General Hospital emergency department is used equally as a trauma treatment centre and a substitute for other sources of primary care. The four variables (trauma, accident, ambulance, and emergency department as preferred source of care for this visit) that characterized the emergency-urgent group would be expected because of the criteria applied in emergency and urgent classifications.

The different emergency department roles outlined by
Torrens and Yedvab (82) appear to apply to the use of the
Hamilton General Hospital emergency department by North
Hamilton residents. These roles are:

(1)   As a trauma treatment centre providing acute care for
problems related to trauma, accidents and other serious,
unpredicted events.

(2)   As a substitute for the family physician and the
outpatient clinic during off-hours when these services are
not available.

(3)   As the 'family physician'; the emergency department
is seen as the place to go for all health problems whether
they are urgent or not.

The third role can be excluded since the majority of
both EU (92.3%) and NU (88.5%) users indicated that they had
family physicians and the vast majority of both groups had
health insurance.

Of the illness related characteristics, the following
six can be considered to be related to the trauma centre
function and the acute, urgent nature of the patients
complaints:

Ambulance -- yes

Trauma -- yes

Accident -- yes

Onset of Symptoms -- acute

Pain -- considerable

Attempted to contact Physician -- yes

The proportion of EU patients who showed these characteristics is shown in Table 16A. The H.G.H. emergency department is functioning as an acute care, trauma centre for those classified EU. More EU than NU arrived by ambulance, suffered trauma and were involved in accidents, experienced sudden onset of symptoms and considerable pain and preferred care at the emergency services and, therefore, used the emergency department as an acute care, trauma centre.

The following five characteristics are compatible with the use of the emergency department for non-acute conditions (the family physician substitute role):

Transportation -- walked or took the bus

Usual source of care -- hospital

Family physician -- without

Multiple visits to emergency

department in previous 12 months -- yes

Arrival time -- 4 p.m. to 12 p.m. rather than

8 a.m. to 4 p.m.

Table 16B displays the proportion who were NU for each of these characteristics. For the NU users the emergency department serves as a physician substitute.

Further support for the two role theory is suggested by the fact that of those users who had been in contact with their physician between one day and two weeks prior to the visit, more were classified as NU than EU; while more EU users were in contact within the 24 hours prior to the visit. This

ILLNESS AND HEALTH CARE VARIABLES

INDICATING DIFFERENT ROLES FOR THE HGH EMERGENCY DEPARTMENT.

Table 16A

VARIABLES INDICATING HGH's ACUTE CARE, TRAUMA CENTRE
ROLE

	EU Users as a Percentage of Those Who	
Arrived by Ambulance*	78.8	$\frac{41}{52}$
Experienced Trauma*	60.8	$\frac{158}{260}$
Were Involved in An Accident*	60.6	$\frac{160}{264}$
Experienced Acute Onset of Symptoms	56.3	$\frac{58}{103}$
Attempted to Contact Physician	54.3	$\frac{19}{35}$
Experienced Considerable Pain	54.2	$\frac{52}{96}$

Table 16B

VARIABLES INDICATING HGH's SURROGATE PHYSICIAN ROLE

	NU Users as a Percentage of Those Who	
Walked or Took the Bus to the HGH	65.0	$\frac{13}{20}$
Use a Hospital As Usual Source of Care	57.9	$\frac{22}{38}$
Are Without a Family Physician	57.8	$\frac{26}{45}$
Made Multiple Visits to An Emergency Department in the Last Year	54.8	$\frac{17}{31}$
Arrived Between 4 p.m. and 12 p.m. as Compared to 8 a.m. and 4 p.m.	52.6 42.4	$\frac{110}{209}$ $\frac{73}{172}$

*Comparisons which were statistically significant in
univariate analysis.

indicates the non-acute, longer duration of the NU symptoms
and the more recent onset of EU symptoms. More EU than NU
users preferred care at the emergency department for this
visit because of the more sudden, painful nature of their
symptoms. For them, the emergency department was appropriately
used in its acute care role, and was being utilized as the
appropriate treatment source. The emergency department was
not the preferred source of care for the NU users. More NU
than EU patients stated that they would have preferred to
receive care from their family physician for the illness in
question. This difference in preference, which was statistically
significant, reflects the fact that NU users would use sources
of care other than the emergency department if such sources
were available or perceived as available.

3. Different Roles of the Hamilton General Hospital and

    St. Joseph's Hospital Emergency Departments for the

    Residents of North Hamilton.

    The analysis of the socio-demographic characteristics
of North Hamilton users at the H.G.H. and S.J.H. indicates
similar patient profiles for the two groups, except that
H.G.H. users were likely to be Protestants, older and non-
single. The overrepresentation of Protestants at the H.G.H.
is a reflection that North Hamilton Catholics prefer care at
St. Joseph's. The greater proportion of older and non-single
H.G.H. patients may indicate that as patients get older they are

less likely to travel to the more distant (S.J.H.) of the two facilities. Travel time was, in fact, statistically significantly shorter to the H.G.H. than to S.J.H. for North Hamilton residents. The historical role that the H.G.H. played for the North Hamilton residents in pre-Medicare days may be another major reason why there were more older North Hamilton users at the H.G.H.

Thirty-five percent of all visits to the H.G.H. during the two week study period were made by residents of North Hamilton, but only 17% of all visits to S.J.H. were made by North Hamilton residents. For North Hamilton residents the H.G.H., relative to S.J.H., is functioning as a neighbourhood health centre. This role is understandable since the H.G.H. is in North Hamilton. However, the S.J.H. is less than one-half mile from the southwest corner of North Hamilton and one and one-half miles from the H.G.H.

Concomitant with the H.G.H.'s role as neighbourhood hospital-health centre is its apparent function as physician surrogate. Statistically significantly more NU visits were registered at the H.G.H. than at S.J.H. by North Hamilton residents. Furthermore, fewer H.G.H. than S.J.H. users sought care from their family physician before the emergency visit and fewer contacted their physicians in the last 48 hours before the visit.

There were significantly more visits due to trauma among North Hamilton residents at the H.G.H. than S.J.H.

(p<.001). This difference in trauma probably accounts for the statistically significantly greater number of visits with acute onset of symptoms experienced by the H.G.H. users. The H.G.H.'s role of trauma centre is also in part related to its proximity to the industrial complex of Hamilton. Many North Hamilton residents both live and work in the North End of Hamilton.

Approximately 44% of North Hamilton users at both emergency departments registered at least one other emergency visit in the preceding 12 months; of these approximately half had made three or more visits. This suggests either real or perceived unavailability of primary care physicians or services or, possibly, misconceptions held by patients as to the appropriate use of family physicians, particularly during off-hours.

4. Urgency Classification at the H.G.H.

The statistically significant level of agreement between the independent rater and the casualty officers indicates the reliability of their classification of patients. If the single retrospective rater can be assumed to report the 'true' urgency ratings then the casualty officers' EU and NU classifications have a sensitivity of .90 and a specificity of .81 (Table 17). Thus, just 10% of the EU patients were labelled as NU and 19% of the NU users mislabelled EU by the casualty officer group. However, since the ratings given by

Table 17

URGENCY CLASSIFICATIONS OF SINGLE VALIDATOR (DR. VAYDA)

AND CASUALTY OFFICERS AT THE HGH

		Dr. Vayda			
		Emergency	Urgent	Non-Urgent	
Casualty Officers	Emergency	12	3	0	15
	Urgent	3	133	25	161
	Non-Urgent	0	16	103	119
		15	152	128	295

Cohen's Kappa K = .7056 (P < .001)

		Dr. Vayda (True)		
		Emergency-Urgent	Non-Urgent	
Casualty Officers	Emergency-Urgent	151	25	176
	Non-Urgent	16	103	119
		167	128	295

Cohen's Kappa K = .7147 (P < .001)

$$\text{Sensitivity} = \frac{151}{167} = .904$$

$$\text{Specificity} = \frac{103}{128} = .805$$

both the independent evaluator and the casualty officer group

are not based on objective or quantifiable criteria the

accuracy of the classifications will remain unknown until

such measures are developed. The agreement indicates that the

criteria were followed, but does not assure their accuracy or

their reflection of the true urgency status.

CHAPTER VIII

CONCLUSIONS

This study has examined the relationship between the residents and emergency department users from the Hamilton General Hospital's immediate catchment area. As such, the results are not generalizable to other hospitals because the residents were restricted to North Hamilton and the North Hamilton users were confined to a two week study period.

The representative nature of the 2.3% random sample of residents indicates the feasibility of using small random samples in health care research. The comparison of the randomly chosen residents and emergency department users at the H.G.H. indicated that the users were characterized as male, non-single, Protestants, native Canadians, less educated and of lower social class. These results suggest that North Hamilton emergency department users have socio-demographic profiles which are different from the population of this community. The differences indicate the substantial problems of planning regionalized health services. It is not enough to know the general socio-demographic mix of a region based on census information. The characteristics associated with the utilization of a service must be identified to facilitate the accessible placing of a service for those most likely to be at risk.

Whether the statistical association that exists between these six characteristics or "states" and emergency department use is causal or not deserves mention. The associations satisfy just two of the five criteria of causal relationship set forth by Mausner and Bahn (38): the characteristics certainly predate the visit to the emergency department (temporarily correct association) and three of the user characteristics - male, less educated and lower social class - are consistent with user characteristics reported by others (consistency of the association). However, the ratio of those with and without the possible causal characteristics is of questionable strength (strength of the association); for example, the ratio of male to female users is 1.7:1. A higher ratio would probably be expected if, in fact, being male caused the use of the emergency department. The multiple nature of the six possible characteristics indicates that none of the characteristics alone is sufficient to produce the observed overrepresentation of users compared to residents (specificity of the association). Finally, the biological plausibility of the characteristics themselves can and have been explained in terms of underlying conditions that indicate the indirect, not causal, association of these characteristics and emergency department use. For example, the greater proportion of males than females with trauma is a probable explanation for the overrepresentation of males at the emergency service.

The non-urgent users were characterized as being
recent residents both in Hamilton and at their present
addresses and as being younger than North Hamilton residents
generally. Many observers feel that the quality of medical
care is enhanced by continuity. If in fact this is a valid
assumption, then the non-urgent users, particularly the recent
residents without family physicians, could represent a high
risk group who use the emergency department because of non-
existent or inadequate medical care or follow-up. The risk
to this group of recent residents is compounded by the
increased life stresses associated with mobility such as lack
of social supports and unfamiliar surroundings. The magnitude
of people at risk is very substantial; 44% of all Canadians
changed residences in the period 1956-61 (39). As such, the
non-urgent use of the emergency department may be the result
not only of symptoms perceived but also of life stress
precipitated by mobility.

A social agency such as the Welcome Wagon could both
identify new residents and act as a facilitator by providing
lists of community physicians whose practices are open to new
patients to these residents. Since the residential tenure of
over one-third of the NU patients was less than one year, the
emergency department staff could also provide similar physician
lists, be alert to the possibility that the recent resident's
physical complaint might be a manifestation of psychosocial
stress and assure by proper follow-up that contact was made.

The overrepresentation of younger users in the non-urgent group represents a challenge to the primary care system which is less amenable to change. Both cultural and behavioural factors make it difficult for the child to articulate his immediate medical needs and the result is often that neither the child nor his parents can differentiate between the urgent or the non-urgent nature of the distress. This uncertainty leads to immediate self-referral to the emergency department or other ready resources in many instances. The teenager, given his particular developmental life stress, is probably less likely to go to the family's physician or have a personal physician of his own; thus, he is more likely to prefer the 'anonymity' of the emergency department. In addition, trauma is relatively frequent in younger age groups.

The differences that do exist between both the H.G.H. and S.J.H. and the NU and EU users at the H.G.H. depend upon the urgency classifications assigned by the casualty officers. Although the ratings assigned by the group of casualty officers and the independent rater were reliable, it is not possible to determine their accuracy. Valid urgency ratings must be developed since any measures of accuracy in the estimation of urgency are dependent upon the validity of the true urgency classifications. A possible means of improving the detection of true urgency is to review the cases of misclassification and refine the definitions of emergency, urgent and non-urgent.

The H.G.H. is functioning both as an acute care trauma centre for the EU patients and as a physician surrogate for the NU user. The physician surrogate role suggests real or perceived unavailability and or inaccessibility of primary care physicians for some North Hamilton residents at certain hours and on certain days.

Further research is needed to develop measures of the patients' perception of "unavailable" and "inaccessible" primary care resources as well as research into their actual availability and accessibility. Such research could facilitate constructive planning for the large proportion of self-referred non-urgent patients. If, in fact, the perceived unavailability and/or inaccessibility is not verified, efforts should be undertaken to enhance the visibility of resources that presently exist. Efforts would have to be diverse and unique to the communities in question. On the other hand, if unavailability and inaccessibility of primary care resources do exist for this or other communities, government and the meidcal profession should actively encourage primary care personnel to practice in underserviced areas, both urban and rural, or to keep offices open for longer periods. Physician redistribution in underserviced urban areas does not entail the same cultural uprooting that would result from relocation to northern areas. Existing primary care resources in North Hamilton could, with proper organization, reduce or eliminate emergency department use. Organization could include extended

hours of practice or better 'off-hour' coverage by grouping

or rota schemes. Extended coverage seems particularly

relevant given the H.G.H.'s physician surrogate role.

The H.G.H.'s physician surrogate function, especially

at off-hours, raises issues which relate to the patient's

perception of the role of the family physician. In most

instances, the NU patient makes a conscious decision to

bypass his regular physician and go to the emergency department.

As part of this decision making process the patient undoubtedly

questions the benefits to be gained by contacting his physician

during 'off-hours'. Some NU patients may base their

relationship with their physician on infrequent, episodic

care. Given this casual relationship, the patient's choice

of who provides his medical care is no longer determined by

the traditional trust and security resulting from a continuing

patient-physician relationship. Thus, the availability and

visibility of alternate medical resources, such as the

emergency department, offer the patient an equally acceptable,

or perhaps more acceptable, form of medical care. For some

patients, whatever special quality of care provided by their

own physician, as compared to medical care offered by the

emergency department, is negligible or non-existent.

There are patients who have good relationships with

their family physicians. Such patients may be reluctant to

disturb their physicians' leisure time. Some patients may

also be concerned with the image they portray to their

physician. Reluctant to be labelled as abusers of what they consider to be the physicians' valid free time, they prefer to use other alternatives regardless of the nature or severity of their complaints.

In some instances, the H.G.H.'s physician surrogate off-hour role is affected by messages which physicians, either consciously or unconsciously, give to different patients. The overrepresentation of lower social class users could indicate that the physician is more likely to encourage such patients to use the emergency department during 'off-hours'. Accurate assessment of this issue would depend upon the development of an instrument sensitive enough to measure physician attitudes towards people in different social classes.

Both the H.G.H. and S.J.H. are trauma treatment centres for the residents of North Hamilton. However, the H.G.H., more than S.J.H., is functioning as a hospital based health clinic for those with non-urgent problems whether due to trauma or not. This clinic role is understandable, since the H.G.H. is a part of the North Hamilton community. The documentation of two roles of the H.G.H. emergency department has important planning implications. A proposed primary care or emergency service system has to either compensate for the emergency department's physician surrogate role or provide equally accessible and acceptable sources of care for the non-urgent, ambulatory patient.

The S.J.H. users were more likely to be Roman Catholics than the users at the H.G.H. This difference suggests the difficulties inherent in establishing catchment areas for individual hospitals. People have preferences for institutions that override considerations such as proximity.

There appears to be a definite need for an effective triage process to distribute patients arriving at the H.G.H. emergency department. A triage system would enhance treatment by directing the NU and EU patients to sources of care most appropriate for each. This process would alleviate the frustrations of emergency department nurses who have special acute care training; clinical skills in acute care could be maintained by concentrating acutely ill patients.

Provision could be made for a recognized non-urgent care component at the H.G.H. emergency department. All patients would initially see a triage officer who would direct the EU and trauma patinets to the emergency service, and the NU patients to a special screening clinic. This screening clinic could be located in the hospital outpatient department during evenings and on weekends. When the OPD is operating, a predetermined area and staff could be alloted to this screening clinic. To accommodate the dual roles of acute care and ambulatory care, new nursing staff patterns and both acute and ambulatory care in-service education would increase the quality of care provided for the NU and EU patients. Such a NU unit could also make provision for

continuing care in the OPD or assure that care by a private physician was continued.

The identification of characteristics of emergency department use and non-urgent emergency department use has been achieved by a unique comparison of emergency department users from an area with a random sample of residents from the same area. Such a comparison has not been reported previously. To resolve some of the unanswered questions identified in this investigation, specific studies will have to be conducted. The interfaces of the emergency department, the community and the primary care system are relationships which are inadequately understood today.

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APPENDIX A

THE HAMILTON GENERAL HOSPITAL
EMERGENCY DEPARTMENT QUESTIONNAIRE

-1-

Project number

| | 1 | | 2 | |

Patient's identification number I.D. No. Int. V.

3 4 5 6 7 8

Record Type

| 2 |

9

1. Are you the patient?

```
yes..................1    ) go to Q. 3
no...................2
don't know..........8
no answer...........9
```
10/

2. What is your relationship to the patient?

```
spouse..................1
Parent..................2
grandparent.............3
other relative..........4
friend..................5
other...................6
don't know..............8
no answer...............9
```
11/

3. Do (does) you (_____) have a family doctor?

```
yes...............1
no................2
don't know.......8      go to Q. 6
no answer........9
```
12/

4. In what city or town is your (_____) doctor's office located?

```
Hamilton
Ancaster
Dundas
Stoney Creek | – – – – – within the Hamilton area........1[ ]
Burlington
Freelton
Mount Hope
Waterdown
```

```
                    outside the Hamilton area.......2[ ]
                    don't know.........................8[ ]
                    no answer..........................9[ ]          13./
                    Specify_____
```

5. When did you (_____) most recently contact your
   (his, her) family doctor?

```
                    within the last 24 hours............1[ ]
                    more than 1 day ago, but
                    less than 2 days ago................2[ ]
                    2 days but less than 7 days.........3[ ]
                    1 week but less than 2 weeks........4[ ]
                    2 weeks but less than 4 weeks.......5[ ]  — go to Q. 7
                    4 weeks but less than 6 months......6[ ]
                    greater than 6 months...............7[ ]
                    don't know..........................8[ ]
                    no answer...........................9[ ]          14./
```

6. Could you tell me the main reason why you (_____)
   don't (doesn't) have a family doctor?

_____

_____

_____

_____

_____

_____ [ ][ ]
                                                   15 16
_____

-3-

7. Where do (does) you (_____) most often go when you (he, she)
   need(s) medical care?

   _____

   _____

   _____

   _____

17 18

◄ IF THE PATIENT SEES SOMEONE OR GOES SOME PLACE FOR MEDICAL
   CARE, ASK QUESTION 8.)

8. In general, are (is) you (_____) satisfied or dissatisfied
   with the medical care you (he, she) receive(s) from (this
   doctor, person, place?)

                    satisfied..............1
                    dissatisfied...........2
                    don't know.............8
                    no answer..............9   19 /

9. Have (has) you (_____) been to an emergency room for treatment
   in the past year other than this visit?

                    yes................1
                    no.................2
                    don't know.........8 } go to Q. 13
                    no answer..........9   20 /

10. Including this visit, how many times have (has) you (_____)
    been to an emergency room for treatment in the past year?

                    number of times

                    don't know................88
                    no answer.................99   21/22 /

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(MORE THAN ONE ANSWER IS ALLOWED FOR QUESTION 11)

11. To which emergency room or rooms did you (_____) go?

        emergency room at the H.G.H. in Hamilton........1▢
        ER at another Hamilton hospital..................2▢
        ER at a hospital outside the city
        of Hamilton......................................4▢
        don't know.......................................8▢
        no answer..9▢   ▢
                                                              23

(TO BE ASKED ONLY OF THOSE WHO HAVE BEEN TO THE H.G.H. EMERGENCY ROOM,
                        EXCLUDING THIS VISIT)

12. In general, were (was) you (_____) satisfied or dissatisfied
    with your (his, her) experience at the Hamilton General
    Hospital's emergency room?

                            satisfied............1▢
                            dissatisfied.).......2▢
                            don't know..........8▢
                            no answer...........9▢   24/

---

13. What kind of medical care did you (_____) first try to get
    before coming to HGH Emergency Room today?

                    doctor.........................01▢
                    hospital clinic................02▢
                    student health services......03▢
                    pharmacist.....................04▢ ⟍ go to Q. 15
                    health clinic at work........05▢
            ┌──   other..........................06▢
            │   none...........................07▢ ⟩ — go to Q. 17
            │   don't know.....................88▢
            │   no answer......................99▢   ▢ ▢
            │   25 26
            └→Specify_____

---

14. When you (_____) tried to get medical care from a doctor,
    what happened?

    _____

    _____

    _____   ▢ ▢
                                                                  27 28

    _____

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15. What kind of medical care did you (_____) next try to get
before coming to HGH Emergency Room today?

```
doctor.........................01 ☐ ⎫
hospital clinic................02 ☐ ⎬
student health services.......03 ☐ ⎪
pharmacist....................04 ☐ ⎪
health clinic at work.........05 ☐ ⎬ go to Q. 17
other.........................06 ☐ ⎪
none..........................07 ☐ ⎪
don't know....................88 ☐ ⎪
no answer.....................99 ☐ ⎭
```

Specify _____   ☐☐
                                         29 30

16. When you (_____) tried to get medical care from a doctor,
what happened?

_____

_____

_____   ☐☐
                                                             31 32

17. If you (_____) had your (his, her) way, where would you
(_____) have liked to get your (his, her) medical care
for this problem? (in respondent's own words).

_____

_____

_____   ☐☐
                                                             33 34

(IF THE PATIENT WANTED TO GET HIS MEDICAL CARE IN THE ER AT THE
HGH, ASK Q. 18).

18. Could you tell me why you (_____) wanted to receive your
(his, her) medical care for this problem here in the
emergency room at the Hamilton General Hospital?

_____

_____   ☐☐
                                                             35 36

_____   ☐☐
                                                             37 38

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IF DOCTOR ALREADY CONTACTED OMIT:

19. Why did you (_____) come <u>directly</u> to the emergency room
    for medical care instead of going to a family doctor or
    general practitioner?

    _____

    _____

    _____

    _____

---

20. How long have (has) you (_____) had the symptoms which
    brought you (him, her) to the emergency room today?
    (How long ago did you (_____) receive the injury which
    brought you (him, her) to the emergency room?)

         less than 24 hours.................1
         12-24 hours......................2 } go to Q. 22
         greater than 1 day, but less
         than 3............................3
         3 days or more, but less
         than 7............................4
         one week or more..................5
         don't know........................8
         no answer.........................9

---

21. Why did you (_____) come to the emergency room at this
    particular time?

    _____

    _____

    _____

    _____

    _____

    _____

-7-

22. When you came to the emergency room did the symptom(s)
    (injury) hurt or pain you................(When you
    brought _____ to the emergency room did you think the
    symptom(s) (injury) hurt or pained_____

                    a great deal...............1
                    somewhat...................2
                    hardly at all, or.........3
                    not at all?...............4
                    don't know................8
                    no answer..................9   46/

_____

23. When you came to the emergency room were you worried or
    concerned about the symptom(s) (injury)..................
    (When you brought _____ to the emergency room were
    you worried or concerned about his (her) symptom(s)
    (injury)..................

                    a great deal...........1
                    somewhat...............2
                    hardly at all, or.......3
                    not at all?............4
                    don't know.............8
                    no answer..............9   47/

_____

24. What kind of transportation did you (_____) use to get
    to the emergency room?

                    ambulance..............1
                    car....................2
                    taxi...................3
                    bus....................4
                    walked.................5
                    other..................6
                    don't know.............8
                    no answer..............9   48/

_____

25. How long did it take you (_____) to get from your (his, her)
    home (site of the injury) to the emergency room?

                    0-15 minutes...........1
                    more than 15 minutes,
                    but less than 30.......2
                    30 minutes or more,
                    but less than 60.......3
                    1 hour or more.........4
                    don't know.............8
                    no answer..............9   49/

-8-

26. How old were (was) you (____) on your (his,her) last birthday?

(Code 00 if less than 1 year)

years [. |] └─→ If less than 15 years, go to Q. 28

don't know........98[ ]
no answer........99[ ]

50 / 51 /

---

27. Are (is) you (____) single, married, separated, divorced, or widowed?

single...............1[ ]
married..............2[ ]
separated............3[ ]
divorced.............4[ ]
widowed..............5[ ]
other................6[ ]
don't know...........8[ ]
no answer............9[ ]

52 /

---

28. In what country were (was) you (____) born?

Canada..................01[ ]
U.S.A...................02[ ]
U.K.....................03[ ]
France..................04[ ]
Italy...................05[ ]
Germany/Austria.........06[ ]
Russia..................07[ ]
Poland/Czechoslavakia...08[ ]
Portugal................09[ ]
other...................10[ ]
don't know..............88[ ]
no answer...............99[ ]

Specify_____

53   54

-9-

29. In what city or town are (is) you (_____) presently living?

```
Hamilton
Ancaster
Dundas
Stoney Creek   ───── within the Hamilton area.....1[ ]
Burlington
Freelton
Mount Hope
Waterdown
```

```
                   outside the Hamilton area....2[ ]
                   don't know......................8[ ]  } go to Q. 32
                   no answer........................9[ ]
```

| Specify_____   35/

---

30. How long have (has) you (_____) lived in the Hamilton area?

```
                   0-6 months.......................I[ ]
                   greater than 6, but less
                   than 12 months.................2[ ]
                   1 year, but less than 2 yr...3[ ]
                   2 years, but less than 3 yr..4[ ]
                   3 years, but less than 5 yr..5[ ]
                   5 years, but less than 10....6[ ]
                   10 or more years..............7[ ]
                   don't know....................8[ ]
                   no answer......................9[ ]         36/
```

---

31. How long have (has) you (_____) lived at your (his,her) present address?

```
                   0-6 months....................1[ ]
                   greater than 6, but less
                   than 12 months................2[ ]
                   1 year, but less than 2 yr...3[ ]
                   2 years, but less than 3 yr..4[ ]
                   3 years, but less than 5 yr..5[ ]
                   5 years, but less than 10....6[ ]
                   10 or more years.............7[ ]
                   don't know....................8[ ]
                   no answer.....................9[ ]         57/
```

32. Who is the head of your (_____) household?

```
            patient.....................1
            patient's husband..........2
            patient's father...........3
            any male other than
            father in the family.....4
            patient's mother...........5
            any female other than
            mother in the family.....6
            don't know.................8
            no answer..................9                    58 /
```

---

33. Are (is) you (the male head of the household, _____)
    presently working in a full or part-time job?

```
            yes..................1  ) — go to Q. 37
            no...................2
            don't know.........8
            no answer..........9                            59 /
```

---

34. Are (is) you (the male head of the household, _____)
    on vacation or sick leave from a job?

```
            yes..................1  ) — go to Q. 37
            no...................2
            don't know.........8
            no answer..........9                            60 /
```

---

35. Are (is) you (the male head of the household, _____)either.....

```
            retired from work...............1   go to Q. 37
            a student, or,..................2
            a housewife?....................3   go to Q. 38
            none of the above...............4
            don't know......................8   go to Q. 37
            no answer.......................9                61 /
```

-11-

36. Have (has) you (_____) ever. worked, apart from summer or
    part time jobs?

                          yes...............1
                          no................2)—— go to Q. 38
                          don't know.......8
                          no answer........9

_____

37. What kind of work (did you (_____) last do) (are you (_____)
    doing now?)

    JOB TITLE:_____

    _____

    DESCRIBE WORK:_____

    _____

    _____

                                                    [|]
                                                     63   64

_____

38. How many years of schooling did you (the male head of the
    household, _____) complete?

                  years [|]   If less than 10
                                         yrs. go to Q. 44

              don't know...........88
              no answer...........99

_____

39. Did you (the male head of the household, _____) graduate
    from high school?

                          yes...........1
                          no............2
                          don't know.....8 } go to Q. 44
                          no answer......9

_____

40. Did you (the male head of the household, _____) attend
    college or university?

                          yes..........1
                          no...........2
                          don't know....8 } go to Q. 44
                          no answer....9

-12-

41. Did you (the male head of the household, _____) graduate
    from college or university?

                        yes................1
                        no.................2
                        don't know........8   go to Q. 44.
                        no answer.........9

                                                            <u>aa</u>/

42. Do (does) you (the male head of the household, _____) have
    a post graduate degree?

                        no.................1
                        yes ◯

                   master's degree............2
                   P.H.D. degree..............3   go to Q. 44
                   M.D. degree................4
                   other......................5
                   don't know.................8
                   no answer..................9

                                                            <u>ab</u>/

TO BE CODED AFTER THE INTERVIEW)

43. The educational score of the head of the household:

    post graduate degree holder....................1
    undergraduate degree holder only (B.A.; B.Sc.)....2
    attended college or university, but
    did not graduate....................................3
    high school graduate only...........................4
    completed only grades 10 or 11......................5
    completed only grades 7, 8, or 9....................6
    completed less than 7 years.........................7
    don't know..8
    no answer...9

                                                            <u>71</u>/

-13-

44. Which of these income groups (show card) represents your
(_____) total combined family income for the past 12 months?
That is, all the income from all sources, such as wages,
salaries (social security), (old age) pensions, family
allowances, help from relatives, rents from property and
so forth.

    (A) under $3,000 per year.............01☐
    (B) $3,000 or more but less
        than $4,000....................02☐
    (C) $4,000 or more but less
        than $5,000....................03☐
    (D) $5,000 or more but less
        than $6,000....................04☐
    (E) $6,000 or more but less
        than $7,000....................05☐
    (F) $7,000 or more but less
        than $10,000...................06☐
    (G) $10,000 or more but less
        than $12,000...................07☐
    (H) $12,000 or more but less
        than $14,000...................08☐
    (I) $14,000 or more.................09☐
        don't know....................88☐
        no answer.....................99☐

                 72/ 73/

45. What is your (his, her) religion?
        Protestant.................1 ☐
        Roman Catholic............2 ☐
        Jewish....................3 ☐
       ┌─Other....................4 ☐
       │ Don't know...............8 ☐
       │ No answer................9 ☐
       └→Specify_____

                 74/

46. Do you (_____) have OHIP or any other form of medical
insurance for this visit?

        OHIP....................1 ☐
      ┌─Other...................2 ☐
      └→Specify_____

        Don't know..............8 ☐
        No answer...............9 ☐

                 75/

- 14 -

TO BE COMPLETED AFTER THE INTERVIEW

47. Was this interview conducted at the time of the patient's
    visit to the emergency room?

                              yes..................1
                              no...................2
                              no answer...........9   76/

48. Status of the interview:

                    completed by patient......................1
                    completed by proxy........................2
                    completed by patient and proxy...........3
                    completed by junior patient (under
                    15) and confirmed by family..............4
                    broken off................................5
                    refused...................................6
                    no answer.................................9   77/

49. Was an interpretation used?

                              yes................1
                              no.................2   78/

50. Interviewer's code number

                    number [| |]   79/ 80/

APPENDIX B

URGENCY DEFINITIONS AND EXAMPLES

Definitions and examples of emergent, urgent, and nonurgent conditions*

EMERGENT   Condition requires immediate medical attention;
time delay is harmful to patient;
disorder is acute and potentially threatening to
     life or function;
cases of this type will usually require
     hospitalization.

Examples: Unconsciousness
Rapid change in level of consciousness
Severe crushing chest pain
Arrythmia or tachycardia
Shock
Pulmonary edema
Poisoning
Perforated viscus
Gunshot wound involving a major organ
Major accidental or traumatic injury
Head injury with unconsciousness or rapid change
     in level of consciousness
Major hemorrhage with or without trauma,
     regardless of site
Acute arterial embolus or thrombosis
Acute burn - second or third degree - 10% or
     more of body surface
Suicide attempt
Foreign body in trachea
Convulsions

URGENT   Condition requires medical attention within a
     few hours
there is possible danger to patient or ultimate
     outcome is not promptly medically attended;
disorder is of acute onset but not necessarily
     severe or life threatening;
patients will not usually but may require
     hospitalization.

Examples: Chest pain or recent onset or of suddenly
     increasing severity
Shortness of breath of recent onset
Semi-consciousness or stupor
Laceration of less than 24 hours requiring
     sutures or dressing
Injury less than 24 hours with severe pain,
     severe limitation of motion, swelling and
     the possibility of a fracture requiring x-
     ray

Fracture of recent onset requiring treatment
Acute abdominal pain of recent onset - or acute
    abdomen
Foreign body in eye of less than 24 hours
    duration
Auto accident of recent onset (24 hours)
    requiring evaluation
Depression with threat of suicide
Acute psychosis
Neurosis not manageable by family or physician
High fever of sudden onset (>103°F)
Persistent diarrhea or vomiting - severe and of
    sudden onset
Rape
Incomplete abortion without major hemorrhage

NONURGENT   Condition does not require the resources of an
                 emergency service;
             symptoms of long duration without sudden change
                 in severity.
             referral for routine medical care is all that is
                 needed;
             disorder is not acute, it is minor in severity;
             routine care in a physician's office or no
                 medical care is required.

Examples: Upper respiratory infection
             Sore foot for 5 days (regardless of cause)
             Prescription renewal
             Fever, mild or immediate in nature (99°F -
                 102.9°F)
             Sprains, minor bruises or small cuts not
                 requiring x-ray or suturing
             Minor injuries or cuts of greater than 24 hour
                 duration
             Ill defined symptoms especially if over 24 hours
                 in duration

Source: Vayda, E., Gent, M. & Paisley, L. St. Joseph's
             Hospital - McMaster emergency study: I Methodology
             and findings. Unpublished manuscript, McMaster
             University, Department of Clinical Epidemiology and
             Biostatistics, 1972.