An Initial Analysis of Emergency Departments and Urgent Care in Winnipeg

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We thank the University of Manitoba, Faculty of Medicine, and Health Research Ethics Board for their review of this project. MCHP complies with all legislative acts and regulations governing the protection and use of sensitive information. We implement strict policies and procedures to protect the privacy and security of anonymized data used to produce this report and we keep the provincial Health Information Privacy Committee informed of all work undertaken for Manitoba Health.

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Executive Summary

Introduction

Emergency departments (EDs) are intended to provide rapid access to essential care for acutely ill patients. Most of the research on EDs has been conducted using data from the United States and Europe, and the majority of Canadian-based research has been carried out in Alberta, Ontario, Quebec, and the Maritime Provinces. With some exceptions, very little research on EDs has been conducted in Manitoba.

The Manitoba Centre for Health Policy (MCHP) is renowned for using health care utilization records (administrative data) to describe the health and health care use patterns of Manitobans. Recently, MCHP received data from all six of the adult EDs in the Winnipeg Regional Health Authority (WRHA), and also from the Urgent Care Centre (UC) at the Misericordia Health Centre in the WRHA. Manitoba Health and Healthy Living requested that MCHP investigate the strengths and limitations of these data, describe users of EDs and UC in the WRHA, and provide suggestions for conducting follow-up and policy-relevant research. The specific questions addressed in this research are listed as follows:

1. What kind of data are available to describe ED/UC use in the WRHA, and what are the strengths and limitations of these data?

2. What are the demographic, health, health care use and visit-based characteristics of ED/UC users? Do individuals who visit EDs/UC more frequently have unique characteristics, versus people who visit these sites less frequently?

Focus of the Report

This report is written in two sections to address these distinct research questions. Section I (Chapters 3 through 5) is entitled *Defining the Parameters of Emergency Department (ED) and Urgent Care (UC) Use*. The type of data available in the ED/UC information systems is described. ED/UC utilization patterns are provided, and the strengths and limitations of these data are discussed. Recommendations are made to improve the quality of the ED/UC data, so that ongoing policy-relevant research and evaluation can be conducted.

Section II of this report (Chapters 6 through 10) is entitled *Profiling Emergency Department (ED) and Urgent Care (UC) Users*. The unique characteristics of frequent versus single ED/UC users are described, and comparisons are also made across sub-groups of frequent users. Variables used to make these comparisons include patient age, sex, and place of residence in Winnipeg, as well as patients' past diagnoses of mental and physical diseases, and their concurrent use of other health care services. Visit-based characteristics (e.g., time of day of the visit, visit duration) are also compared across ED/UC frequent user groups.

Factors that most strongly differentiate frequent from single ED users are discussed in this report, and frequent user profiles are also compared across ED sites. Results are provided separately for EDs and UC in both of Sections I and II of this report.

Study Methods

Overall Study Methods

This research was conducted on EDs/UC in the WRHA. There is one UC site in the WRHA located at the Misericordia Health Centre. At the time of this research, data were unavailable from the Children's ED located at the Health Sciences Centre. Analyses therefore focus on the remaining six adult ED sites:

- Health Sciences Centre (HSC, adult ED only)
- St. Boniface General Hospital (SBGH)
- Victoria General Hospital (VGH)
- Seven Oaks General Hospital (SOGH)
- Grace General Hospital (GGH)
- Concordia General Hospital (CGH)

It is important to note that scheduled visits (i.e., visits scheduled in advance by physicians for patients to receive ongoing care for things like blood transfusions and wound dressings) were excluded for EDs (but not UC) prior to conducting any data analyses, due to data quality issues. Also, some data are not captured at all ED sites. Additional exclusion criteria for select outcomes are therefore provided throughout this report.

Describing Data Quality and ED/UC Utilization Parameters

Annual trends in utilization are described from 1999/2000 to 2004/05 for EDs, and from 2001/02 to 2004/05 for UC. Many of our conclusions about data quality are based on these descriptive analyses, with input from our Working Group. Some ED data fields (that define patients who die, who are hospitalized, etc) were cross-tabulated with administrative data housed in the MCHP Repository. These comparisons have helped us to describe ED data quality.

Defining Frequent Users

To define frequent ED users, we counted the number of ED visits for each person, for one year preceding their last ED visit in 2004/05. This period of time, unique to every person, is referred to as the study period. Using this strategy, we defined people as being non-ED users (people with no ED visits in 2004/05), single users (people with 1 ED visit during the study period), intermediate users (2-6 visits) and frequent ED users (people with 7+ visits in the study period). Frequent users were also sub-divided into categories of moderately frequent ED users (7-11 visits in the study period), very frequent users (12-17 visits) and highly frequent ED users (people with 18+ visits in the study period). The identical process was used to define frequent UC users. As data from the Children's ED at HSC were not available, all frequent user analyses were conducted on people 17+ years old.

Findings

Population Use of EDs/UC

In 2004/05, 17.6 % of the Winnipeg population 17+ years old (91,959 people) visited an ED at least once. This rate of utilization was highest for 85+ year old males, and was also highest in the Winnipeg core (i.e., the Point Douglas and Downtown community areas (CAs)). With one site in Winnipeg, 4.0% of the Winnipeg adult population (21,079 people) visited UC at least once in 2004/05, and this rate of utilization was consistent across all age categories. While UC population use rates were highest in CAs nearby the Misericordia Health Centre (i.e., River Heights and Downtown), at least 2.4% of the adult population from all other CAs had 1+ visit to UC.

General Trends in ED/UC Use

As this is a 'first look' at ED utilization by MCHP, most data in this report are provided jointly for all ED sites. Annual trends in utilization are described as follows, separately for EDs and UC:

- *Use of ambulance services to arrive at EDs has increased in recent years*. People arrived by ambulance or stretcher to 13.8% of ED visits in 2000/01 as compared to 21.0% of visits in 2004/05. This increased use of ambulances and stretchers exists for all types of ED visits, but was greatest for less-urgent and non-urgent visits.

- *A large portion of ED visits are for people who have fairly minor medical problems*. On arrival to EDs, people are assessed ("triaged") as being either non-urgent (e.g., minor cuts), less urgent (e.g., sprains and broken bones), urgent (e.g., fairly minor injuries, but lots of pain), emergent (e.g., people having seizures or bad chest pains) or resuscitation (e.g., unstable or without vital signs). In 2004/05, 40.1% of all ED visits were triaged as being less urgent or non-urgent, while 15.7% of these visits were triaged as emergent or requiring resuscitation.

- *Patients are discharged home after most ED visits*. In 2004/05, 73.8% of visits ended with patients being discharged home, versus 16.2% of visits where patients were hospitalized. While patients left without seeing a physician during 6.0% of ED visits, in most instances these patients were triaged as having less urgent or non-urgent medical needs.

- *ED visit duration has increased in recent years, for all types of visits except those triaged as 'resuscitation'*. While ED visit duration has increased in the recent past, we cannot determine if this is due to increases in wait and/or care times. Wait time data are not available in the current ED information system.

- *As UC specializes in the handling of non-life threatening medical conditions, it is not surprising that patterns of ED and UC use are different*. For example, virtually all patients arrived to UC independently (i.e., not by ambulance or stretcher) during the study period. In 2004/05, 17.0% of UC visits were scheduled in advance at a physician's discretion. Patients in this fiscal year were discharged home after 91.2% of UC visits, and almost half (45.4%) of all

visits lasted less than two hours. Also, visit duration can be divided into wait and care times for most but not all of the UC visits in 2004/05. Analyses of these data demonstrate that wait times were shortest for patients with scheduled visits and for those who needed more urgent care.

Data Strengths and Challenges

Strengths and challenges of the ED/UC data are summarized as follows:

- *There are several advantages to using ED and UC data for population-based research*. In both the ED and UC information systems, the majority of users can be defined (anonymously) and linked to other data files housed in the MCHP Repository. In addition, commencing 2004/05, ED and UC patients are triaged using a computer-generated scoring system. This system enables researchers to make fair comparisons across ED sites in terms of patient urgency, and also to objectively compare users of EDs and UC. A similar statement can be made for most ED/UC patient disposition status options. Lastly, some basic assessments conducted in this research help to demonstrate the validity of select ED data fields, particularly as it relates to patients' triage scores and select disposition status options.

- *During the study period, ED sites captured some of their data differently, resulting in a significant loss of information*. Arrival method and scheduled visits were coded differently across ED sites during the study period, which limits the use of these data. Also, visit duration was not recorded consistently for patients who were hospitalized during their visit. These data challenges do not apply to UC. Given the need to evaluate health care systems, decision-makers are encouraged to use consistent strategies to capture data at all ED and UC sites.

- *Additional data limitations exist for EDs but not UC*. Wait times are not recorded in ED data. This is a major limitation, and with the current data it is not feasible to investigate factors that influence patient wait times and overcrowding. While wait times are available for about 70% of UC visits in 2004/05, "post-acute care" times (from the completion of a physician visit to patient discharge) are not captured at UC. Decision-makers in Canada are particularly interested in understanding how streamlining processes (e.g., treating "fast track" patients separately from all others, having physicians or nurse practitioners conduct triage, etc), and novel discharge strategies affect patient flow and overcrowding. ED/UC wait and post-acute care times are required to fully understand these and related issues.

- Physician diagnostic (ICD) codes are essential to understand the types of diagnoses made during ED visits, and from a health care system perspective, to determine if EDs are used for distinct reasons. In the years of data that we analyzed, ICD codes were available for 80% to 90% of ED visits at HSC and SBGH, and only for about 10% of ED visits at all other sites. However, effective July of 2007, ICD codes for ED patients are no longer submitted to Manitoba Health. This lack of diagnostic information curtails the ability to address policy-relevant research questions. ICD codes are available in the UC information system.

- *Knowledge would be gained by gathering additional key information*. Gathering more detailed information about ED/UC patients would help to further evaluate use of these services. For example, there is no data to describe ED/UC patients by their experience with violence, abuse, and homelessness. Information on these and related issues may help to identify ED/UC patients who are especially in need.

Describing Frequent Users

Most researchers agree that frequent ED users have complex health problems including mental illnesses. These individuals often belong to socially disadvantaged groups and also use a disproportionate volume of other health care services. Frequent ED use has often been attributed to patients' unmet needs, a lack of or inaccessibility to other health care and allied services, and convenience.

Defining frequent users has important implications from the perspective of both the patient and the health care provider. Frequent ED users, while making up only a small proportion (2.2%, N=2,400) of all ED patients, accounted for 13.5% (N=27,222) of all ED visits during the study period. Including their contacts with GPs and specialist physicians, UC, hospitalizations and Health Links-Info Santé, these frequent ED patients had a total of 79,876 contacts with the health care system during the study period, with a median of 27 contacts per year. While smaller in number (N=223), highly frequent users made up 3.6% (N=7,177) of all ED visits during the study period, and these patients had a median of 51 contacts with the health care system during the study period. Clearly, describing frequent ED users has important implications. The unique characteristics of these patients are summarized as follows:

- Compared to single users, frequent ED users tended to be older, impoverished, and lived in the Winnipeg core area. Also compared to single users, a disproportionate number of frequent ED users had comorbid chronic physical diseases, and many of these patients had been diagnosed in the past with mental illnesses such as personality disorders, schizophrenia, and substance abuse. Frequent ED users also had many contacts with other health care providers. Many of these patients were chronic frequent ED users with many ED visits in multiple years.

- The profile of highly frequent ED users (people with 18+ ED visits during the study period) is, in many instances, an exaggerated version of the frequent user profile. For example, like frequent users, many highly frequent ED users also were diagnosed previously with mental illnesses such as substance abuse, schizophrenia, and dementia. However, some differences between frequent and highly frequent ED users should be noted. For example, while several frequent and highly frequent ED users had many GP visits, these latter patients did not tend to have an excessive number of visits to specialist physicians and hospitalizations. Further, a disproportionate number of highly frequent users arrived at the ED by ambulance, only to be triaged as less- or non-urgent, or to leave without being seen. Lastly, while frequent ED users tended to be older, highly frequent users tended to be younger (25-64 years old).

- As a part of this research, we also conducted more complex analyses, to determine which patient-based risk factors most strongly differentiated frequent (7+ visits) from single ED users. We found that mental illness was the strongest determinant of frequent ED use. We also found that user-based profiles were similar across most but not all ED sites. For example, frequent users at SBGH and HSC were much more likely to live in the Winnipeg core, and this result was not reported for other ED sites in the WRHA. Also, while frequent users at all ED sites were more likely to have a past mental illness diagnosis, the risk of having two or more different mental illness diagnoses was especially high for frequent users at HSC. Perhaps not surprisingly, frequent versus single ED users at HSC were more likely to be younger (17-64 years old), while patient age did not differentiate frequent from single users at any other ED sites. Lastly, frequent versus single ED users at most ED sites were more likely to have muliple in-patient hospitalizations. This was not reported for frequent ED users at HSC and SBGH.

What about UC? Like ED users, a small proportion of UC patients (2.2% or 537 people) made up 16.6% (N=6,501) of all UC visits during the study period. These patients had a total of 17,247 contacts with the health care system (including contacts with UC, EDs, GP and specialist physicians, hospitalizations, and Health Links-Info Santé) during the study period, with a median of 23 contacts during this year. Highly frequent UC users, while negligible in number (N=76), made up 5.2% (N=2,037) of all UC visits in the study period, with a median of 40 health care system contacts during this time. The unique characteristics of frequent UC users are summarized as follows:

- Frequent UC and ED users share some similar characteristics, at least in terms of disease and their use of additional health care services. For example, frequent versus single ED and UC users were both more likely to have been diagnosed in the past with comorbid mental and physical diseases. Also, compared to single users, frequent UC and ED users had many more contacts with other health care providers.

- Frequent UC and ED users are in some instances very different. For example, frequent versus single UC users were similar in age, while highly frequent ED users tended to be younger than single ED users. Also, while a disproportionate number of highly frequent ED users left their visit without being seen, this was not reported for frequent or highly frequent UC patients. Lastly, while many of the visits of frequent ED users occurred after normal working hours (i.e., between 5:00 PM and 8:00 AM), the majority of visits for frequent UC users occurred during the day.

- Many of the diferences between frequent ED and UC users may be related to scheduled visits. Scheduled visits made up about 6% of all ED visits during the study period; these visits were excluded from this research due to data quality issues. Comparatively, 0.7% of single UC users' visits, versus 67.1% of frequent users' visits and 79.2% of highly frequent users' UC visits were scheduled in advance.

These results suggest that UC is fulfilling a much needed role in Winnipeg, by providing follow-up and ongoing care to people in need. Regardless, many of the issues for frequent ED versus UC users seem to be different.

Study Conclusions and Recommendations

This research provides an initial or "first look" at ED and UC utilization in the WRHA. Recommendations are made with respect to each research question outlined at the beginning of this report, and examples of policy-relevant follow-up research are provided in the following text.

Recommendation #1. Key improvements should be made to the WRHA ED data, so that ongoing and policy-relevant research can be conducted. Decision-makers in Canada are interested in understanding how ED streamlining processes and novel discharge strategies affect patient flow and overcrowding. To understand these and related process, ED wait times, care times, and post-acute care times should be captured. These data can be used to determine how factors such as patient volume and health care system interactions influence ED patient flow.

Without physician diagnostic codes, it is very difficult, if not impossible, to understand ED use in the larger context of the health care system. This is clearly an important issue, as frequent users had almost 80,000 contacts with the health care system in our one-year study period. Defining the overlap of care provided during ED and GP visits, for example, is crucial for defining how ED care is structured within the larger context of the health care system.

Recommendation #2. Policy makers should plan, from the perspective of both the patient and the health care system, to develop alternative services for select ED users. Frequent ED users, while small in number, have many visits to EDs as well as to other health care providers. Mental health issues, for example, substance abuse, schizophrenia, personality disorders, and dementia, are common amongst these patients. Many of these patients live in the Winnipeg core (Point Douglas and Downtown community areas), visit EDs between the hours of 5:00 PM and 8:00 AM, and have ongoing frequent ED visits for an extended period of time. Highly frequent users share many of these traits. Also, these latter patients are most likely to arrive at EDs by ambulance, only to be triaged as less-urgent or non-urgent, or to leave without being seen. Clearly, frequent and especially highly frequent ED users have a multitude of complex health-related challenges. Strategies to address these challenges will likely require a multifaceted approach, involving both the health and allied health sectors.

Recommendation #3. Additional and ongoing policy-relevant research is required, to further understand ED use in Winnipeg. Examples of follow-up research questions are provided in the following text, based on select findings in the current research:

- While a range of health care services are available to people living in Winnipeg, 40% of ED visits are triaged as less urgent or non-urgent. Research should be conducted to describe these individuals (e.g., where they live, what their health needs are, when they arrive at EDs, etc),

and also to understand how factors such as a lack of primary care resources and/or care continuity influences ED use for these patients. This type of information is invaluable to describe ED utilization in the larger context of the health care system.

- Alternate care strategies for frequent ED users may be costly, and at present there is limited evidence to estimate the potential health care cost savings that could arise from these strategies. Economic analyses should be conducted on frequent ED users, to estimate the potential savings associated with improving patient health, and hence possibly reducing the number of health care contacts made by these patients.

- In this report we have identified a sub-group of frequent ED users who arrive by ambulance only to either be triaged as less or non-urgent, or to leave without being seen. Profiling this particular sub-group of frequent users may help to adapt current emergency medical services (EMS) response protocols.

- Out of necessity, this research has excluded data from the Children's ED at HSC. Research conducted on these data will help to define pertinent emergency health care issues for children.

This research assesses the quality of ED/UC data in the WRHA, and describes the unique profile of frequent versus single ED/UC users. While responses to each of these research questions have been discussed separately, these issues are related. Making ongoing data improvements will vastly enhance the ability to conduct policy-relevant ED research in Winnipeg.

CHAPTER 1: INTRODUCTION AND RESEARCH PURPOSE

1.1 Introduction

Emergency departments (EDs) are intended to provide rapid access to essential care for acutely ill patients (Schull et al., 2003a). Recently, EDs in Manitoba have received substantive media attention criticizing excessive wait times, overcrowding and physician shortages (Brodbeck 2006; Rabson 2006a; Rabson 2006b; Sanders 2005; Squires 2006a; Squires 2006b), and in general these trends are reported Canada–wide and internationally. Most of the research on EDs has been conducted using data from the United States and Europe, and the majority of Canadian–based research has been conducted in Alberta, Ontario, Quebec and the Maritime Provinces (Beland et al., 1998; Brown and Goel, 1994; Chan and Ovens, 2002; Chaput and Lebel, 2007; Kennedy et al., 2004; McCusker et al., 1997; McCusker et al., 2007; Ovens and Chan, 2001; Saunders et al., 2004; Schull et al., 2001; Schull et al., 2003a; Schull et al., 2003b; Villeneuve et al., 2005). With exceptions noted (McMaster 2005; Menec et al., 2005; Mustard et al., 1998), very little research on EDs has been conducted in Manitoba.

The Manitoba Centre for Health Policy (MCHP) is renowned for using health care utilization records (**administrative data**[1]) to describe the health and health care use patterns of Manitobans. Recently, MCHP received data from all six of the adult EDs in the **Winnipeg Regional Health Authority** (**WRHA**), and also from the **Urgent Care Centre** (**UC**) at the Misericordia Health Centre in the WRHA. Manitoba Health requested that MCHP investigate the strengths and limitations of these data, describe users of EDs and UC in the WRHA, and provide suggestions for conducting follow–up and policy–relevant research.

1.2 Research Questions

This research is the first MCHP deliverable to investigate how WRHA EDs and UC are used. Two specific research questions are addressed:

1. What kind of data are available to describe ED/UC use in the WRHA, and what are the strengths and limitations of these data?

2. What are the demographic, health, health care use and visit–based characteristics of ED/UC users? Do individuals who visit EDs/UC more frequently have unique characteristics, versus people who visit these sites less frequently?

[1]Throughout this report, terms in **bold** typeface and acronyms are defined in the glossary located at the end of the report.

To answer this latter question, patients were categorized by how frequently they visited EDs and UC. Comparisons were then made between frequent and single ED/UC user groups, using the following types of risk factors:

- *Demographic:* These measures include patient age and sex. Location of residence was defined by **Winnipeg Community Area (CA)**. Area–level income was assigned to each patient as an index of **socioeconomic status (SES)**;

- *Health*: Administrative data were used to define the proportion of ED/UC users who had been diagnosed previously with diseases such as **asthma**, heart disease, and various mental illnesses;

- *Health care use*: During the same timeframe that people visited EDs and UC, data are presented to describe their number of contacts with other health care providers (e.g., **general practitioner (GP)** and **specialist physician** visits, **hospitalizations**, contacts with **Health Links–Info Santé**, etc); and,

- *Visit–based data*: ED/UC users' visits have also been described by when they occur (season, time of day, day of week), and also by visit duration, **triage** code (reflecting urgency of the visit) and by **disposition status** (where the patient went after the visit).

1.3 Focus and Organization of This Report

The methods used to conduct this research are explained in Chapter 2 of this report. Text in this chapter defines the years of data that were used for all analyses, and describes standard inclusion/exclusion criteria for study participants. Additional chapter–specific methods are provided throughout this report.

The remainder of this report is divided into two sections. Section I (Chapters 3 through 5) is entitled *Defining the Parameters of Emergency Department (ED) and Urgent Care (UC) Data.* The location of WRHA EDs and UC is provided in Chapter 3. This chapter also describes ED/UC data that are collected by the WRHA and highlights some of the presently known strengths and limitations of these data. Results are also provided in this chapter, to assess the validity of select ED data fields.

Chapter 4 describes some of the basic utilization parameters of EDs/UC. Text in this chapter defines, for example, the annual number of ED/UC visits that are triaged as more and less urgent, and describes how visit duration and patient disposition status has changed in recent years.

Highlights of the main findings from Section I are provided in Chapter 5 of this report. Some suggestions are made to help optimize the quality of ED/UC data so that ongoing policy–relevant research can be conducted.

Section II of this report (Chapters 6 through 10) is entitled *Profiling Emergency Department (ED) and Urgent Care (UC) Users*. This section describes the demographic, health and health–care use profile of ED as well as UC users. The unique characteristics of frequent ED/UC users are emphasized.

Winnipeg population use rates for EDs/UC are provided in Chapter 6, and Chapter 7 explains how we developed frequency of use categories. ED patients are described by their frequency of use in Chapter 8, and the same information is provided in Chapter 9 for UC patients.

Multivariable statistical analysis is used to determine how several risk factors uniquely affect a given outcome. This technique was used in this study to "zero–in" on the unique characteristics of frequent ED users. For example, analyses in Chapter 8 demonstrate that many frequent ED users are mentally ill and also tend to live in the Winnipeg core. Statistical modeling was used to determine if both of these risk factors are important—i.e., if place of residence still influences frequency of use after accounting for the effect of mental illness. Highlights of this analysis are included in Chapter 8, and details of this analysis are provided in Appendix II. Multivariable analysis was conducted only for frequent ED users in this research.

The main findings from Section II of this report are summarized in Chapter 10. This chapter highlights the profile of frequent ED/UC users, and provides some policy implications from these findings. Suggestions for conducting ongoing ED/UC research are also included.

1.4 Report Significance

Data for UC and especially EDs are essential for describing health care use patterns in Manitoba. Understanding the strengths and challenges of these data is an important first step to conduct on going policy relevant research. Also, this research helps to describe the complexity of issues facing frequent ED and UC patients. This type of information is essential to help optimize patient care.

CHAPTER 2: AN OVERVIEW OF RESEARCH METHODS

2.1 Data Sources Used in the Research

MCHP houses data collectively referred to as the **Population Health Research Data Repository** (**Repository**), derived from administrative claims data that are collected to administer the universal healthcare system in Manitoba. The Repository includes information of key interest to health care planners, and includes person–level data on (for example) mortality and birth, contacts with physicians and hospitals, pharmaceutical dispensing, as well as use of **home care** services and **personal care homes** (**PCHs**).

Person–level data in the Repository contains anonymized information only, and does not contain identifying information such as patient and provider name, street address and true health number. However, person–level data in each Repository file can be linked using a fictitious number assigned to each registered Manitoban. This allows us to investigate, for example, the relationship between ED use and visits to GPs. Strict regulations are enforced at MCHP to protect patient anonymity in the Repository.

The following Repository files were used to conduct this research:

- Emergency Department and Urgent Care
- Health Links–Info Santé
- **Hospital Discharge Abstract** data (using ICD[2]–9–CM data until March 31, 2004, and ICD–10–CA data commencing April 1, 2004)
- **Physician Claims**
- Pharmaceutical use (**Drug Programs Information Network** (**DPIN**) **Database**)
- Personal Care Home and **Home Care** Databases

This research was reviewed by the Health Research Ethics Board (Bannatyne Campus) at the University of Manitoba in the summer of 2005. Additionally, the study description was sent to the Health Information Privacy Committee at Manitoba Health and Healthy Living for review and comment.

2.2 Basic Research Parameters

2.2.1 ED/UC Sites Included in the Research

This research was conducted on EDs/UC in the WRHA. The geographic location of these sites is shown in Figure 2.1. There is one UC site in the WRHA, located at the Misericordia Health Centre. UC provides 24–hour treatment to patients and specializes in the handling of non–life threatening medical emergencies.

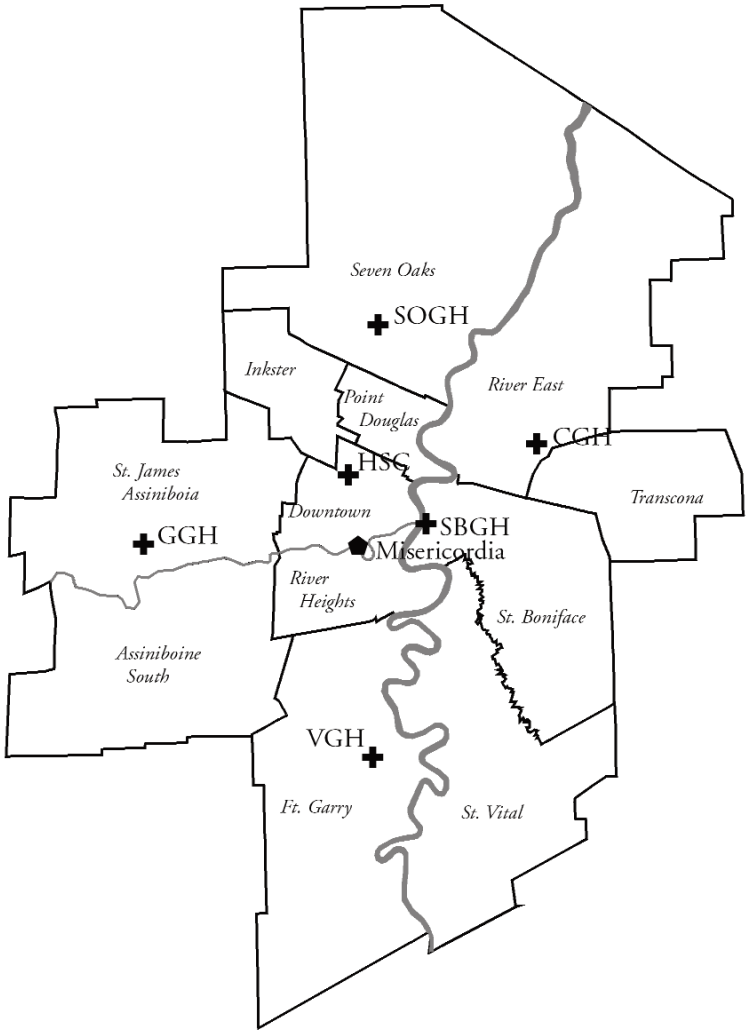
[2]ICD - International Classification of Disease

The following ED sites were also included in this research:

- Health Sciences Centre (HSC)
- St. Boniface General Hospital (SBGH)
- Victoria General Hospital (VGH)
- Seven Oaks General Hospital (SOGH)
- Grace General Hospital (GGH),
- Concordia General Hospital (CGH).

At the time of this research, data from the HSC Children's ED were not available.

Figure 2.1: Location of Emergency Departments and Urgent Care Centre in Winnipeg, 2004/05



Source: Manitoba Centre for Health Policy, 2008

2.2.2 Research Study Period

To conduct this research, MCHP received ED data from the 1999/2000 to 2004/05 **fiscal years**,[3] and UC data from 2001/02 to 2004/05. While in some instances analyses were conducted on multiple years of these data, the majority of the study results are based on data from 2004/05.[4]

2.2.3 General Exclusion Criteria

Prior to conducting any analyses, select ED/UC visits were excluded based on predetermined criteria, listed as follows:

- Visits with missing person–level scrambled identifiers. This affected 3.8% of all ED visits from 2000/01 to 2004/05, and 2.7% of all UC visits from 2001/02 to 2004/05. These identifiers are required to link person–level ED/UC data to other files housed in the Repository.

- Duplicate visits by scrambled identifier, hospital registration date/time and hospital ID. This affected 0.8% of all ED records and three UC records.

- Visits with missing or out of range (i.e., occurring before or after the study period) hospital registry dates. This affected one ED record and eight UC records. These visits were viewed as data entry errors.

- Direct admissions to ED (330 ED visits). This admission code is used only at SBGH, to define hospital in–patients who are admitted to ED while waiting for a hospital bed.

- Scheduled ED visits (about 6.0% of all ED visits). As discussed in Chapter 3 (Section 3.2) of this report, scheduled ED visits cannot be extracted reliably from the ED information system. Scheduled ED visits were therefore removed prior to conducting any data analysis.

Additional exclusion criteria were used for specific outcomes, noted throughout this report.

2.2.4 An Additional Note About ED/UC Users

This report is about the use of Winnipeg EDs and UC. While most users of these sites are from Winnipeg, data for all Manitobans who visited these sites are included in this report. In addition, because data from the Children's ED were not available for this research, analysis in Section II of this report (Population Use Rates and Defining Frequent Users) is restricted to people 17 years and older.

2.2.5 Data Suppression

As per policy at MCHP, data in this report are suppressed when the units of measurement (i.e., patients, visits) range from one to five. This process of suppressing data is conducted to protect the anonymity of study participants.

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[3]ED data from 1999/2000 were not included in any of our analyses due to data limitations in that year.
[4]Note: All analyses for this research were performed using SAS® statistical analysis software, version 9.1.

SECTION I: DATA PARAMETERS

CHAPTER 3: AN OVERVIEW OF EMERGENCY DEPARTMENTS (EDS) AND URGENT CARE (UC)

This chapter describes the data captured during a typical ED/UC visit, and discusses the strengths and potential challenges of these data. Most of the information in this chapter was provided by members of the Working Group. In particular, Randy Martens, Administrative Director, WRHA Emergency & Critical Care Programs, was invaluable for helping us understand the uses and challenges of ED data. Trudy Wilgosh, Manager of Health Records and Privacy Officer for the Misericordia Health Centre, was key for helping us understand UC data.

3.1 Data Collected During an ED Visit

From 1999/2000 to 2004/05, ED utilization data were captured using: i) an **admission, discharge and transfer** (**ADT**) dataset (for all fiscal years), and; ii) an **electronic triage** (**E triage**) dataset (during 2004/05). Collectively, these datasets contain information on patient triage code, arrival method, disposition status and visit duration (Table 3.1). Highlights of these data fields are provided in the following text.

Table 3.1: Data Captured at Emergency Departments in Winnipeg, 1999/2000-2004/05

	Fiscal Year					
	1999/2000	**2000/01**	**2001/02**	**2002/03**	**2003/04**	**2004/05**
Databases						
ADT	Data not captured at HSC.	Data captured at all six adult ED sites.				
E triage	Data not captured using E triage					Data captured at all sites, for about 80% of ED visits in this fiscal year.
ADT Data Fields						
Triage Code (TC)	3 level TC, generated manually.	5 level TC, generated manually.				5 level TC, computer generated.
Arrival Method	Data not captured at SBGH. Various response options are used at remaining sites.					
Disposition Status	Data not captured at SOGH. Similar response options are used at remaining sites.					
Time in ED	Data not available at SOGH. Total visit duration can be calculated for remaining sites, but must exclude disposition status="in-patient".					

Source: Manitoba Centre for Health Policy, 2008

3.1.1 Triage Code

On arrival to EDs, patients are triaged at a registration desk, to establish an order of priority based on urgency of care (Murray, 2003). In 1999/2000, ED patients were triaged using a 3-level coding system ("emergent", "urgent", or "deferrable") that was based on patients' complaints, a description of their pain and/or nurse observations. Patients who were assigned the status of "emergent" were thought to require the most immediate care.

The **Canadian Emergency Department Triage & Acuity Scale (CTAS)** was implemented in 2000/01. CTAS allocates patients into one of five categories based on their urgency of need (Beveridge et al., 1998):

- *Resuscitation (Level I)*. These are patients who have conditions that are a threat to their life or to a limb, and who require immediate aggressive interventions—e.g., patients who are non–responsive, who have absent or unstable vital signs, who are experiencing severe respiratory distress, etc;

- *Emergent (Level II)*. These are patients who have conditions that are a potential threat to their life, limb or function, and who require rapid medical interventions or delegated acts— e.g., patients experiencing seizures or with head trauma, continuous visceral or sudden sharp chest pains, vomiting of blood, severe dyspnea, etc;

- *Urgent (Level III)*. These are patients who have conditions that could potentially progress to a serious problem requiring immediate interventions—e.g., patients with a head injury who are alert, those with moderate dyspnea or who are experiencing intense pain associated with minor problems, etc;

- *Less Urgent (Level IV)*. These are patients who have conditions that are related to their age, distress, or who require reassurance—e.g., patients with minor fractures, sprains or contusions, earaches, chronic back pain, etc;

- *Non Urgent (Level V)*. These are patients who have minor acute conditions or chronic conditions that are stable—e.g., patients with minor lacerations not requiring closure, those with mild abdominal pain, patients with psychiatric symptoms causing minor problems or who are frustrated with a lack of alternate services.

ED visits can also be triaged as "scheduled". This classification is reserved for patients who, at a physician's discretion, are asked to visit an ED on a regular or semi–regular basis, to (for example) change wound dressings, receive ongoing blood work, or to monitor ongoing medical conditions.

When CTAS was first implemented, triage nurses used their professional discretion and experience to assign triage codes (Lori Motluk, personal communication, Spring, 2007). Commencing 2004/05, this process was computerized using the E triage system, where triage codes are computer–

generated based on patient responses to predetermined questions and nurse observations.[5] These computer–generated triage codes are stored electronically in an E triage file, and are then entered into the ADT system. Also, ED patients with a scheduled visit are provided with a CTAS score of I through V in the E triage system, and are assigned a score of VI (representing a scheduled visit) in the ADT system. It is important to note that E triage data are unavailable for about 20% of ED visits in 2004/05, mostly due to network outages. In these instances, triage codes were assessed using the ADT system, as was done in previous years.

3.1.2 Arrival Method

Patients are also described by how they arrive to an ED. From 1999/2000 onward, these data have been collected at all sites except SBGH (Table 3.1). Also, some sites record arrival methods using predetermined response options (e.g., "ambulance", "carried", "newborn", "stretcher", "walking", "wheelchair"), while other sites (i.e., SOGH) use free text. To make fair inter–site comparisons in this research, arrival methods at each site were dichotomized into response options of "dependent" (all options involving the words "ambulance" or "stretcher") and "independent" (all other forms of transportation/locomotion, such as walking, use of a cane, arrival by police, etc).

3.1.3 Disposition Status

Patients are assigned a disposition status at the end of their visit (Table 3.1). Most ED sites use identical disposition status options to indicate whether patients are sent home, hospitalized, or transferred to another site. Other disposition status options indicate patients who die, leave against medical advice, or who leave without being seen.[6] Disposition status options were not recorded reliably at SOGH during the study period (Randy Martens, personal communication, Spring, 2007). These data were therefore not used in this research.

3.1.4 Visit Duration

Visit duration is calculated as the time between patient triage and discharge. Ideally, visit duration should be divided into: i) wait time (from triage to the start of patient care); ii) total care time (from the start of patient care to discharge), and; iii) post–acute care time (from the end of patient care to discharge) (Canadian Institute for Health Information, 2007).

Only total visit duration can be calculated in the current ED system. Also, this calculation should exclude visits where patients are hospitalized. Discharge times for these latter visits are captured inconsistently between ED sites. Some ED sites record discharge times when the decision is made to hospitalize a patient, while other sites record discharge times when the patient is actually hospitalized (Randy Martens, personal communication, Spring, 2007). ED visit duration cannot be calculated at SOGH during the study period.

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[5]Triage nurses have the ability to override the computer-generated E triage code; this happened in approximately 5.0% of E triage records in 2004/05. The percent of visits with this override varies by ED site, and ranges from 1.2% of E triage records at CGH, to almost 9.0% of E triage records at SBGH and VGH.

[6]"Left not seen" indicates patients who leave after being triaged but prior to being seen by a physician. Patients who leave during a physician consult are defined as "left before discharge or against medical advice".

3.2 Challenges of the ED Data

Some of the challenges with ED data are because sites collect data differently. This affects measures of patient arrival method and visit duration. There are two additional limitations of the ED data:

- Physician diagnostic data (i.e., **International Classification of Disease (ICD) codes**) are not captured in the ADT system, which makes it difficult to determine a patient's illness at the time of an ED visit. Further, since physicians in most EDs are salaried or contract funded, ICD data for their visits are not available in the physician–based medical claims files.[7] Overall, this lack of physician diagnostic data is a major limitation. Without these data it is difficult to establish the types of diagnoses made during ED visits. This information is essential for programming planning purposes, and also for defining ED use in the context of the larger health care system.

- Scheduled visits are reported inconsistently between ED sites. Some ED sites record only the first of a series of a patient's scheduled visits, while other sites report each visit separately. In addition, there are computer software problems at one ED site (GGH), and the number of scheduled visits extracted from this site is vastly exaggerated (Randy Martens, personal communication, Spring, 2007). For these reasons, scheduled ED visits could not be counted accurately during the study period, although we estimate that they account for about 6.0% of all ED visits annually. Because of this limitation, all scheduled ED visits were excluded from this research.

3.3 Validation of Select ED Data Fields

In addition to describing strengths and limitations of the ED data, cross–tabulations were conducted on 2004/05 data, to assess the validity of select data fields. Detailed results from these assessments are not provided in this report, but are available from the main author of this report. Highlights of these analyses are provided in the following text.

3.3.1 Assessments of Construct Validity

Construct validity assesses the extent to which a variable corresponds with an acceptable theory or assumption (e.g., more emergent versus non–urgent patients should arrive by ambulance, be hospitalized, die, etc) (Last, 2001). Select results from these assessments are as follows:

- As one would expect, more urgent patients tended to arrive more often by ambulance or stretcher. In 2004/05, people arrived by ambulance or stretcher to 83.6% of resuscitation ED visits versus 11.8% of non–urgent visits. Conversely, people arrived independently to 83.7% of non–urgent visits as compared to 14.2% of resuscitation visits. These results help to cross validate arrival method and triage code data.

[7] As outlined in Chapter 4 (Section 4.2.6) of this report, ICD codes are available in the medical claims files, for 80% - 90% of ED visits to HSC and SBGH during the study period. These codes are not available at other ED sites.

- A greater proportion of more versus less urgent ED visits ended with patient death or hospitalization. For example, people were hospitalized after 50.2% of resuscitation visits as compared to only 4.9% of non–urgent visits. Similarly, people died during 19.2% of resuscitation visits as compared to a negligible proportion of all other ED visits. Lastly, people left prior to seeing a physician during 13.0% of non–urgent ED visits versus only during 1.5% of emergent and 0.2% of resuscitation ED visits. These findings provide evidence that triage codes differentiate patients with graded acute care needs, and also provide some evidence that disposition status data are recorded accurately.

3.3.2 Assessments of Concurrent Criterion Validity

Assessments of **concurrent criterion validity** compare the accuracy of newly derived measures to "gold standard" data. Results from select assessments are as follows:

- Similar counts of hospital admissions were obtained using the ED and hospital abstract data.[8] From the ED data, patients were hospitalized during 24,713 ED visits, and the vast majority (N=23,361, 94.5%) of these hospitalizations were found in the hospital discharge abstract data. Alternatively, 25,974 ED–related hospital admissions were counted in the hospital abstract file, and 23,940 (92.2%) of these hospitalizations were reported in ED data. This slight under-reporting of hospitalizations in the ED data may be attributed to SOGH, were disposition status options are not recorded.

- According to the ED data, 354 people died during an ED visit in 2004/05. The vast majority (N=348, 98.3%) of these deaths were also reported in the administrative data.

3.4 Data Collected During a UC Visit

Data captured during a UC visit are summarized in Table 3.2. Highlights of these data are as follows:

- The UC triage process is similar to that used in EDs. From 2001/02 through 2003/04, CTAS scores were created "manually" during all UC visits. Commencing 2004/05, CTAS scores were generated using a computerized E triage system.

- UC data are interfaced daily with medical charts to produce a hospital-like abstract. Commencing 2004/05, UC began abstracting these data using the **National Ambulatory Care Reporting System (NACRS)**. NACRS is the **Canadian Institute for Health Information's (CIHI)** standardized abstracting system for **ambulatory care** in Canada, to facilitate inter-provincial comparisons in health care use.

- NACRS data contains all fields that are captured during ED visits (e.g., triage code, arrival method, disposition status, and visit duration). NACRS also captures the most clinically significant and up to nine additional physician diagnoses made during a UC visit. Minor interventions (e.g., eye surgery, setting broken bones) are also recorded using the

[8]As data for the Children's ED were not available, counts of hospitalizations in the hospital discharge abstract file were confined to patients 17+ years old.

Canadian Classification of Health Interventions (**CCI**) procedural codes. Consultations with specialist physicians and allied health professionals, and also the use of diagnostic tests (e.g., X–rays, ultrasound) are abstracted for each visit (Trudy Wilgosh, personal communication, Fall, 2007). Collectively, these data give a clear picture of UC use patterns and treatments provided.

- Visit duration is reported for almost all UC visits in 2004/05, and wait times are available for about 72% of all visits. This calculation of wait time requires physicians to record when patient care was started. Post–acute care time (from the end of patient care to discharge) is not captured in NACRS.

- All scheduled visits are captured in NACRS. In the present research, these visits have been included in all UC analyses.

Table 3.2: Data Captured at Urgent Care in Winnipeg, 2001/02-2004/05

	Fiscal Year			
	2001/02	**2002/03**	**2003/04**	**2004/05**
Databases				
ADT	Data captured in each fiscal year.			
E triage	Database not yet initiated.			Data captured during all UC visits.
3MS	Database used .			3MS discontinued.
NACRS	Database not yet initiated.			Database initiated.
Data Fields				
Triage Code (TC)	Data captured but not useable.	5 level TC, generated manually.		5 level TC, computer generated.
Arrival Method	Data unavailable.			Data available.
Disposition Status	Data available.			
Time in UC	Data available for total time only.			Wait & care time data available for about 70% of visits.

Source: Manitoba Centre for Health Policy, 2008

3.5 Chapter Summary

This chapter was developed in consultation with key Working Group members, and highlights the strengths and limitations of the ED/UC data.

Information on patient arrival method, triage code, disposition status and visit duration is collected during ED visits. Data that describe patient arrival methods, visit duration and scheduled visits are captured inconsistently across ED sites. In addition, physician diagnoses are not recorded during ED visits, and these data are not stored in other administrative health care files in Manitoba. Total visit duration can be calculated for some ED visits, but it is not possible to determine visit wait and care times. Despite these limitations, it is important to note that triage code and disposition status data seem to validly define graded levels of patient urgency and ED visit outcomes, respectively. Improvements to ED data should focus on standardizing data collection strategies, and on collecting additional key information to further describe ED utilization and care provision patterns.

Most of the data challenges reported for EDs do not exist for UC, although UC decision–makers are encouraged to capture wait times for all visits. In addition, decision–makers generally should ensure that comparable data continue to be captured between EDs and UC.

CHAPTER 4: DESCRIPTIVE ANALYSES OF EMERGENCY DEPARTMENT (ED) AND URGENT CARE (UC) DATA

Can we identify (anonymously) people who visit EDs/UC? What percent of ED/UC visits are triaged as more urgent and how often are patients admitted to a hospital? How long is a typical ED visit, and how long do people wait to be seen by a physician at UC? Answers to these and other questions are provided in this chapter.

4.1 Points to Remember When Interpreting the Results of this Chapter

- Data in this chapter describe ED/UC visits by arrival method, triage code, visit duration and disposition status. Data for EDs are provided annually from 2000/01 to 2004/05, and data for UC are provided from 2001/02 to 2004/05.

- Standard exclusions in this chapter are defined in Chapter 2. Additional exclusions exist for some outcomes in this chapter (e.g., disposition status data are not available at SOGH, arrival method data are not captured at SBGH, etc). Footnotes are provided in each figure to define these additional outcome–specific exclusion criteria.

- Electronic copies of the figures in this chapter are available on the MCHP website.

4.2 Results

4.2.1 Counts of Users and Visits

Annual use of EDs has remained quite stable in the recent past. For example, 119,139 individuals made 183,714 ED visits in 2000/01, while 116,689 people made 184,649 visits in 2004/05 (Table 4.1). Annual trends in UC use have also remained stable. In 2004/05, 25,257 individuals made 37,808 visits to UC.

Table 4.1: Annual Counts of Emergency Department and Urgent Care Users and Visits, 2000/01-2004/05

	Fiscal Year					
	2000/01	**2001/02**	**2002/03**	**2003/04**	**2004/05**	**All**
Emergency Department						
Users	119,139	117,637	114,776	117,183	116,689	683,331
Visits	183,714	183,761	179,981	185,659	184,649	1,059,506
Urgent Care						
Users	--	27,128	27,453	26,788	25,257	106,626
Visits	--	39,947	40,826	39,875	37,808	158,456

Source: Manitoba Centre for Health Policy, 2008

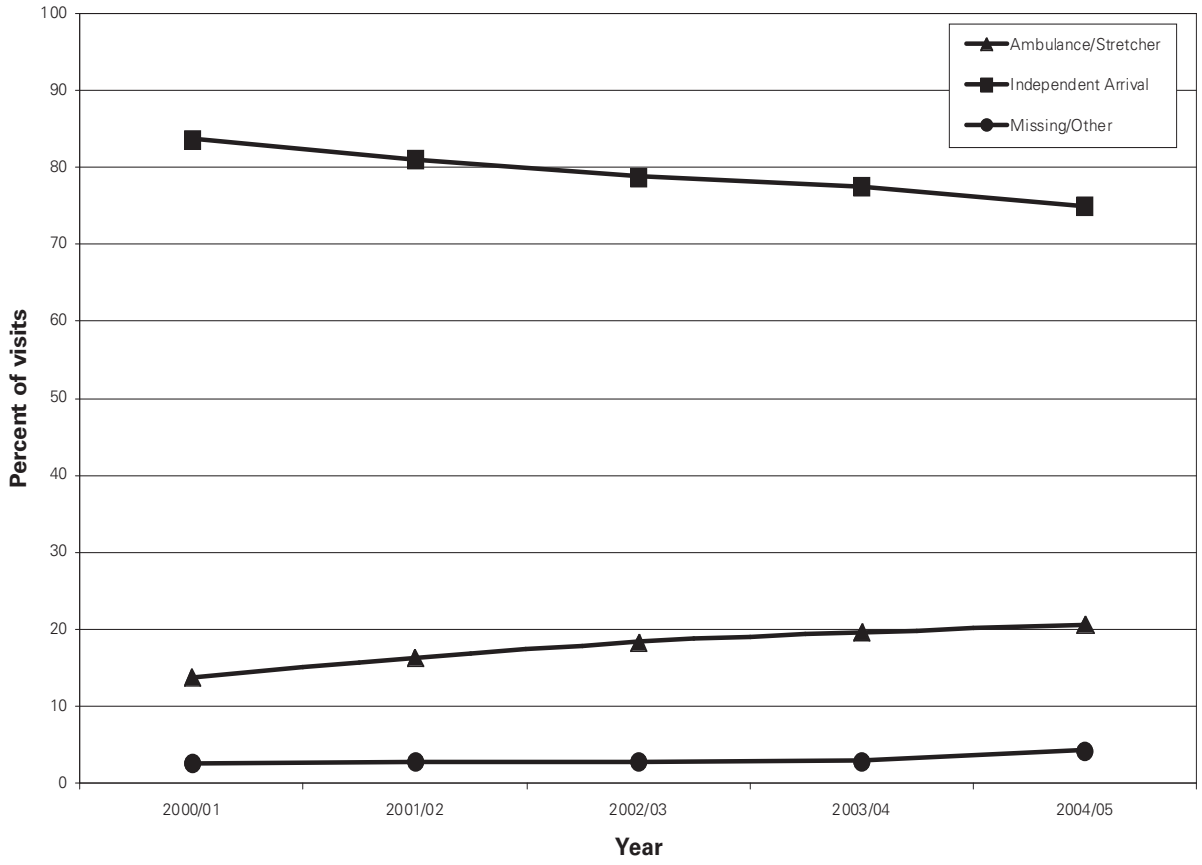
4.2.2 Arrival Method

Annual trends in ED arrival methods are presented in Figure 4.1. Highlights of these results are as provided:

- Arrival method data are missing for fewer than 4.0% of ED visits annually. The vast majority of arrival method data are therefore available for use.

- People arrived independently (see section 3.1.2 for a definition of "independent") to most ED visits throughout the study period, although this pattern changes somewhat in more recent years. For example, people arrived independently to 83.7% of ED visits in 2000/01 versus 74.7% of visits in 2004/05. Conversely, people arrived by ambulance or stretcher to 13.8% of ED visits in 2000/01 as compared to 21.0% of visits in 2004/05. The increased use of ambulances and stretchers is reported for all types of ED visits, but is greatest for less–urgent and non–urgent visits (data not shown). For example, people arrived by ambulance or stretcher to 26.1% of ED visits triaged as emergent in 2000/01, as compared to 33.4% of these visits in 2004/05. Conversely, people arrived by ambulance or stretcher to 2.6% of ED visits triaged as non–urgent in 2000/01, as compared to 11.8% of these visits in 2004/05.

Figure 4.1: Percent of Emergency Department Visits by Arrival Method by Year, 2000/01-2004/05



Exclusion: Visits to SBGH (arrival method data not captured at this site during study period.)

Source: Manitoba Centre for Health Policy, 2008

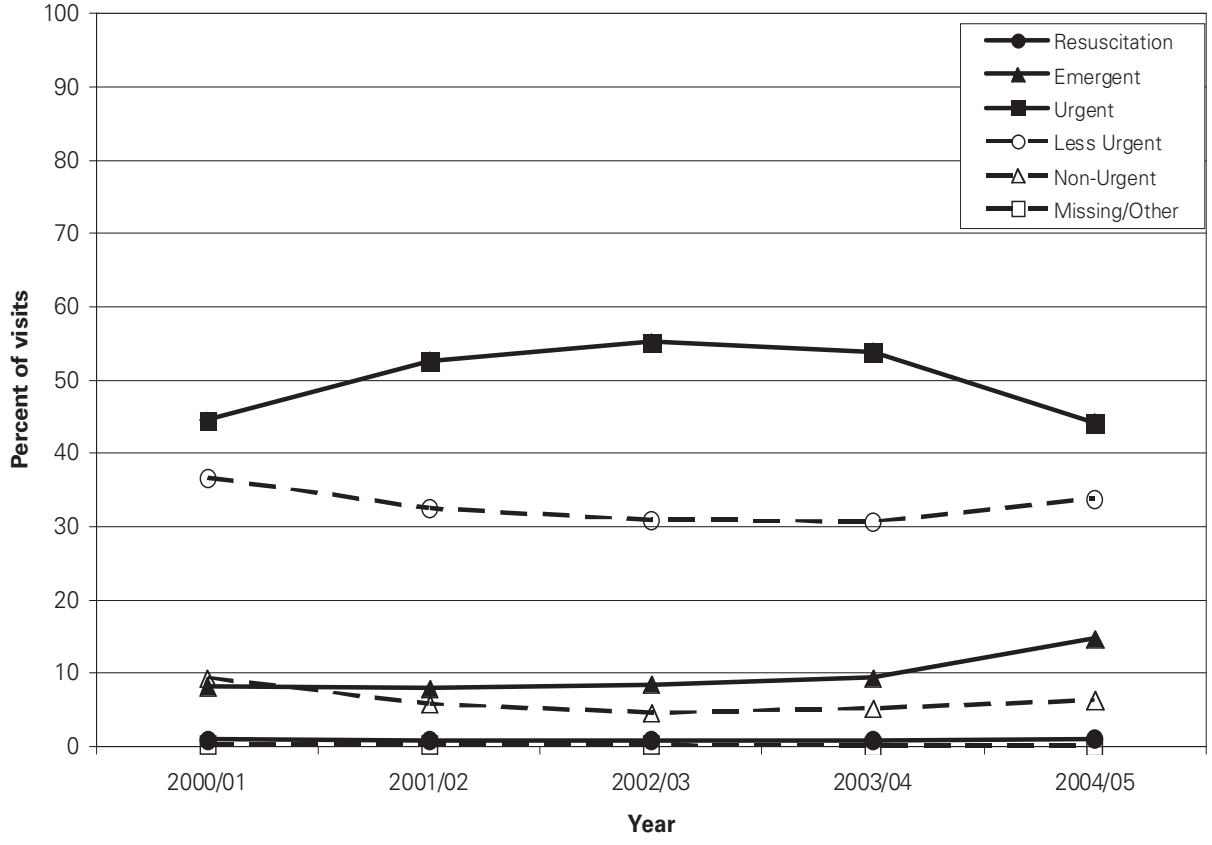
Arrival method data were not captured in UC until 2004/05. During this year, people arrived independently to all UC visits (data not shown).

4.2.3 Triage Code

Annual trends in CTAS scores are provided in Figure 4.2, with the following highlights:

- Triage code data were captured during the vast majority of ED visits in the study period.
- The distribution of CTAS scores is fairly consistent from 2001/02 to 2003/04. In this last year, people were triaged as "less urgent" or "non–urgent" during 35.9% of ED visits, as "urgent" during 53.9% of visits, and as "emergent" or "resuscitation" during 10.1% of ED visits.
- The distribution of CTAS scores is different in 2004/05. Patients were triaged as "urgent" during fewer (44.2%) visits in this fiscal year as compared to 2003/04 (53.9% of visits). Conversely, patients were more likely to be triaged as "emergent" in 2004/05 (14.7% of visits) versus 2003/04 (9.3% of visits), and were also somewhat more likely to be triaged as "less urgent" in 2004/05 (33.8% of visits) versus 2003/04 (30.7% of visits). These unique results in 2004/05 may be partly attributed to implementation of the computer generated CTAS system in this year.

Figure 4.2: Percent of Emergency Department Visits by Triage Code by Year, 2000/01-2004/05



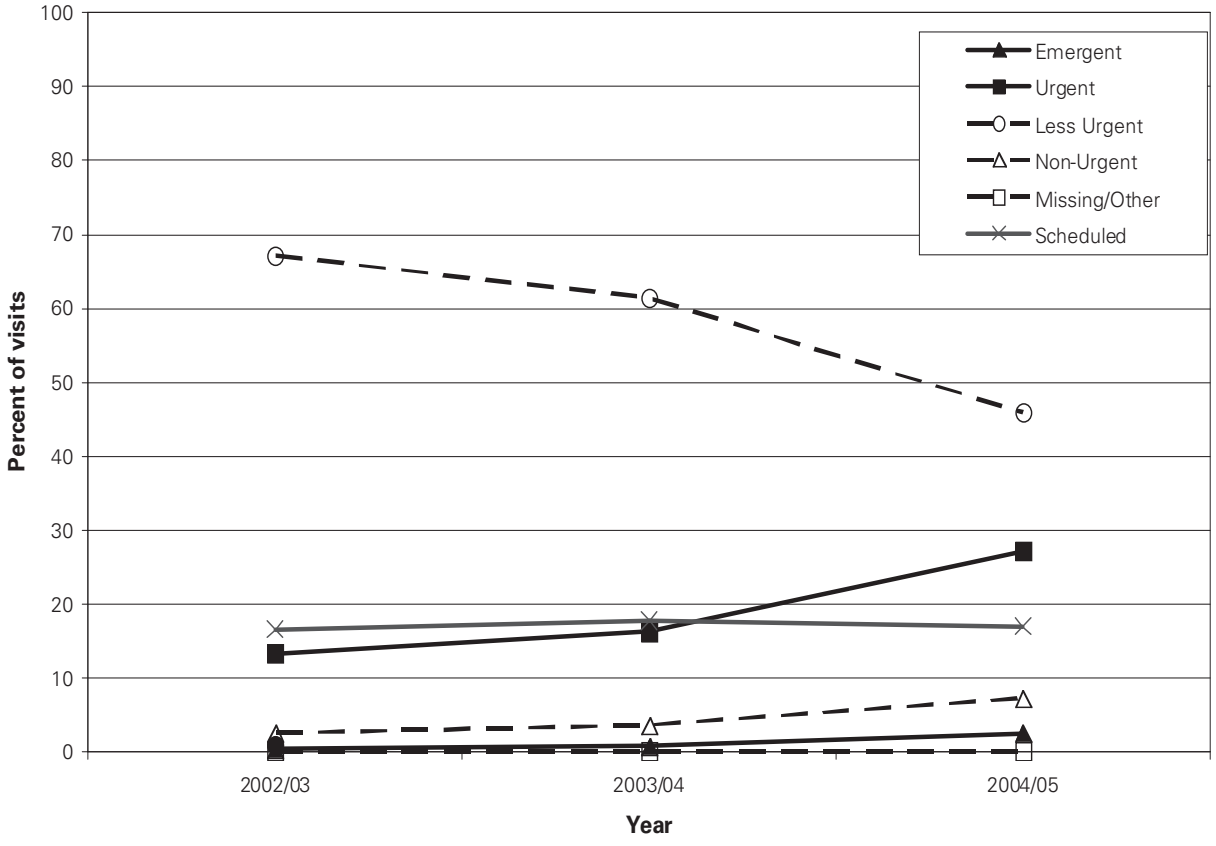
Source: Manitoba Centre for Health Policy, 2008

Annual distributions of UC triage scores are provided from 2002/03 to 2004/05[9] (Figure 4.3). Highlights of these data are provided below:

- In all fiscal years combined, only fewer than six UC visits were triaged as "resuscitation". These visits are not included in Figure 4.3. Triage scores are available for the vast majority (>99.9%) of remaining UC visits, in each fiscal year.

- UC triage scores are also different in 2004/05 versus previous fiscal years. Patients were assigned a CTAS score of "less urgent" during fewer (45.9%) UC visits in 2004/05 as compared to 2003/04 (61.4% of visits). Conversely, patients were triaged as "urgent" during more (27.2%) UC visits in 2004/05 versus 2003/04 (16.3% of visits), and were also triaged as "non–urgent" during more (7.3%) visits in 2004/05 versus 2003/04 (3.7% of visits). These unique UC results in 2004/05 also coincide with implementation of the computer generated CTAS system.

Figure 4.3: Percent of Urgent Care Visits by Triage Code by Year, 2002/03-2004/05



Source: Manitoba Centre for Health Policy, 2008

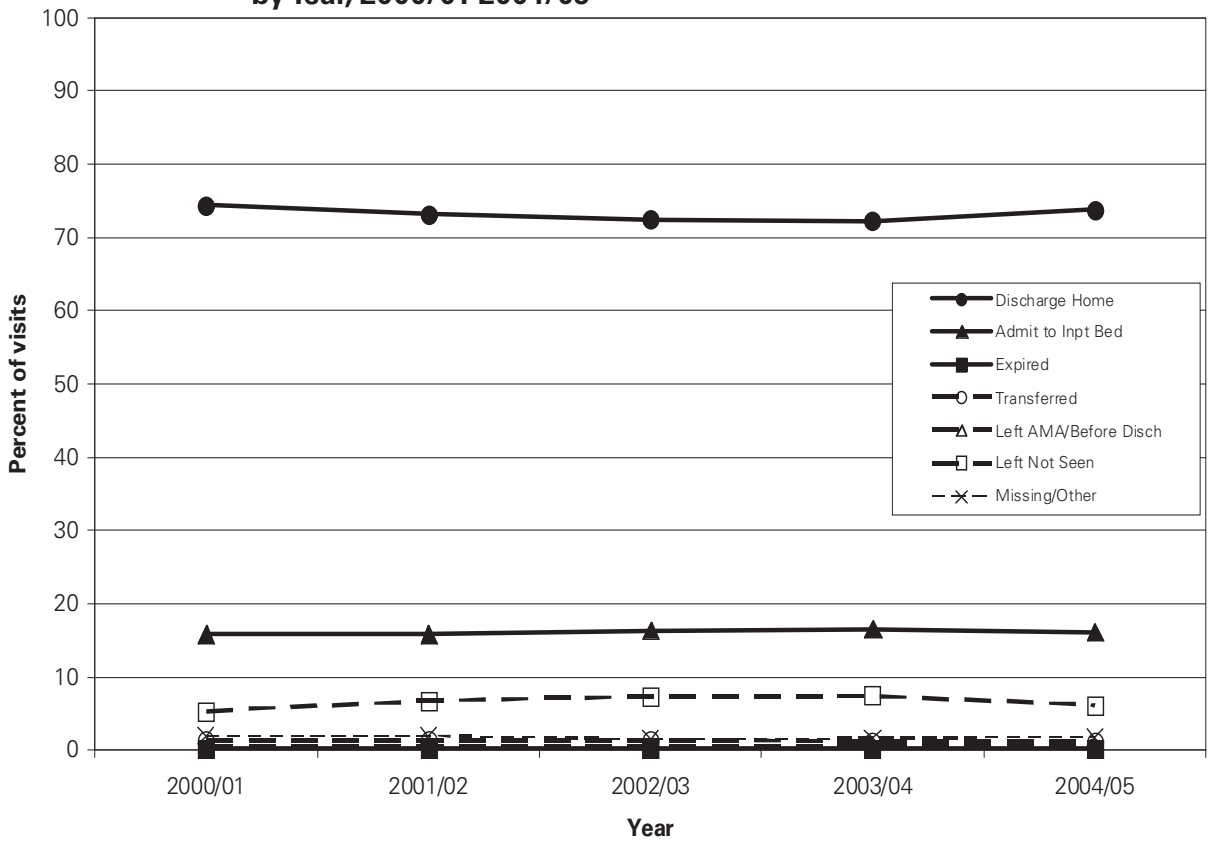
[9]While UC CTAS scores were captured in 2001/02, Working Group members explained that data in this fiscal year should not be used, because of difficulties implementing the triage process.

4.2.4 Disposition Status

At the end of an ED visit, patients are typically discharged home, admitted to a hospital, or transferred to another site. Other disposition status options identify patients who die during the visit, or who leave without being seen or against medical advice. Similar disposition status options are used for UC, except that there is no option for in-patient hospital admissions. This is because the Misericordia Health Centre does not have in-patient beds except for people who require specialized eye care. Remaining UC patients requiring hospitalization are typically coded as "transferred" in the UC data (Trudy Wilgosh, personal communication, Spring, 2007).

The distribution of ED visits by disposition code is shown in Figure 4.4, for each year of the study period. This distribution is similar across fiscal years. In 2004/05, the vast majority of ED visits ended with patients being either discharged home (73.8% of visits) or hospitalized (16.2% of visits). Also in this fiscal year, patients left prior to seeing a physician during 6.2% of ED visits, and either died, left against medical advice, or were transferred to another ED site during 2.0% of ED visits.

Figure 4.4: Percent of Emergency Department Visits by Disposition Status Option by Year, 2000/01-2004/05

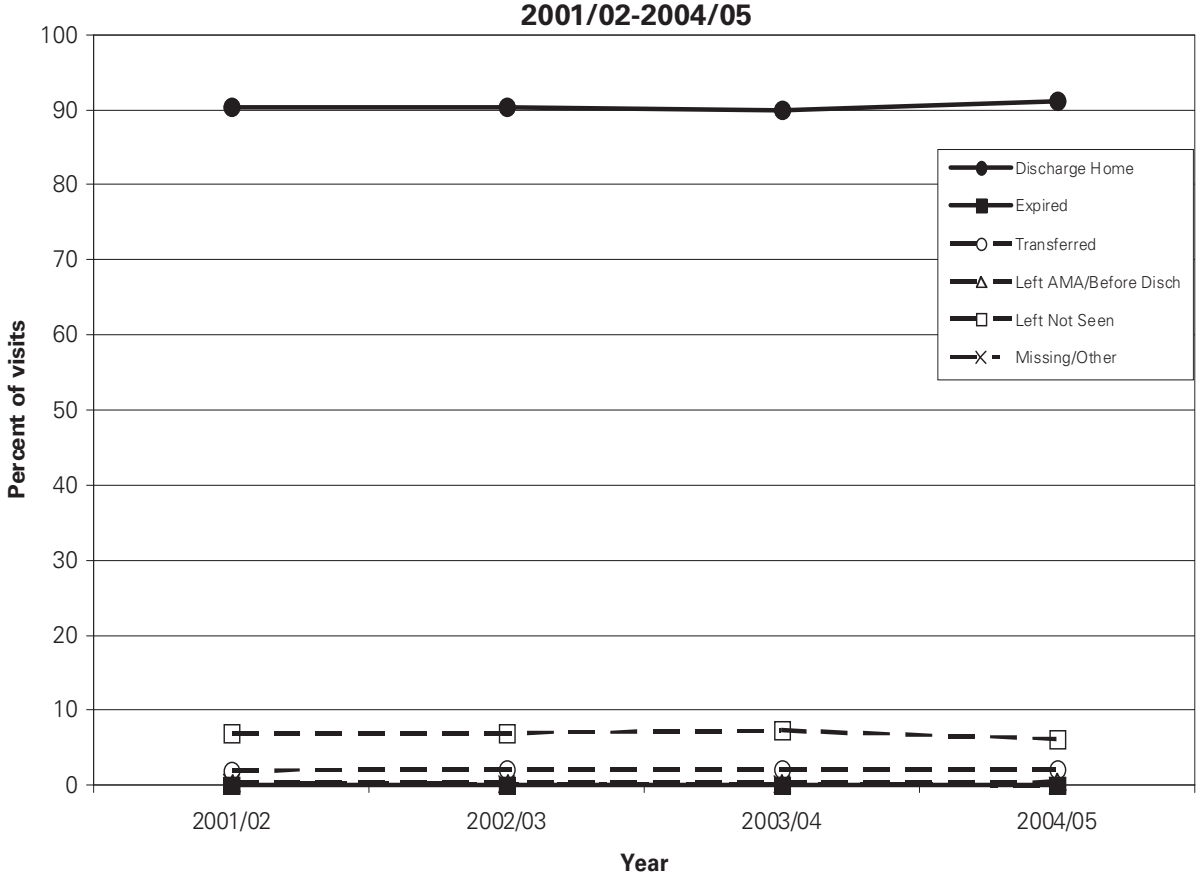


Exclusions: Visits to SBGH (arrival method data not captured at this site during the study period)

Source: Manitoba Centre for Health Policy, 2008

The distribution of UC visits by disposition code is also similar across fiscal years. Patients were discharged home after 91.2% of visits in 2004/05, and left prior to seeing a physician during 6.2% of UC visits. While no patients died during a UC visit in 2004/05, they left against medical advice during 0.5% of visits, and were transferred to another health care facility during 2.2% of UC visits.

Figure 4.5: Percent of Urgent Care Visits by Disposition Status Option by Year, 2001/02-2004/05



Source: Manitoba Centre for Health Policy, 2008

4.2.5 Visit Duration

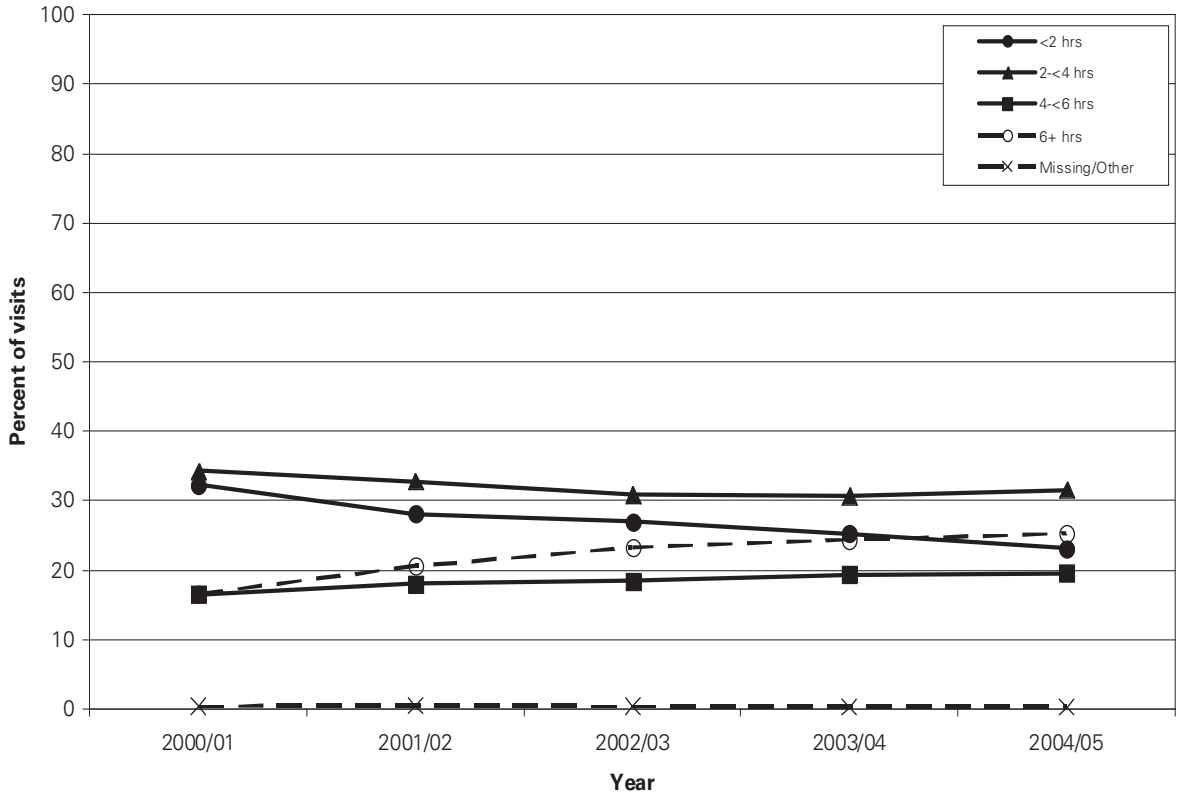
ED visit durations are provided in Figure 4.6, for each year of the study period. Highlights of these results are as follows:

- In 2004/05, 23.1% of ED visits lasted <2 hours, while 31.6% of visits lasted between 2 and 4 hours. Also, 25.3% of all ED visits lasted 6+ hours.

- ED visit durations have increased since 2000/01. For example, 32.3% of ED visits lasted <2 hours in 2000/01, versus 23.1% of visits in 2004/05. Conversely, 16.6% of ED visits lasted 6+ hours in 2000/01, versus 25.3% of visits in 2004/05.

- ED visit durations have increased since 2000/01 irrespective of CTAS score (data not shown). For example, 32.4% of emergent ED visits lasted 6+ hours in 2000/01 as compared to 43.0% of these visits in 2004/05. This trend for increased visit duration is especially pronounced for less urgent and non–urgent ED visits, but is negligible for resuscitation ED visits. Further analysis of these data is challenging without wait and care time information.

Figure 4.6: Percent of Emergency Department Visits by Visit Duration by Year, 2000/01-2004/05

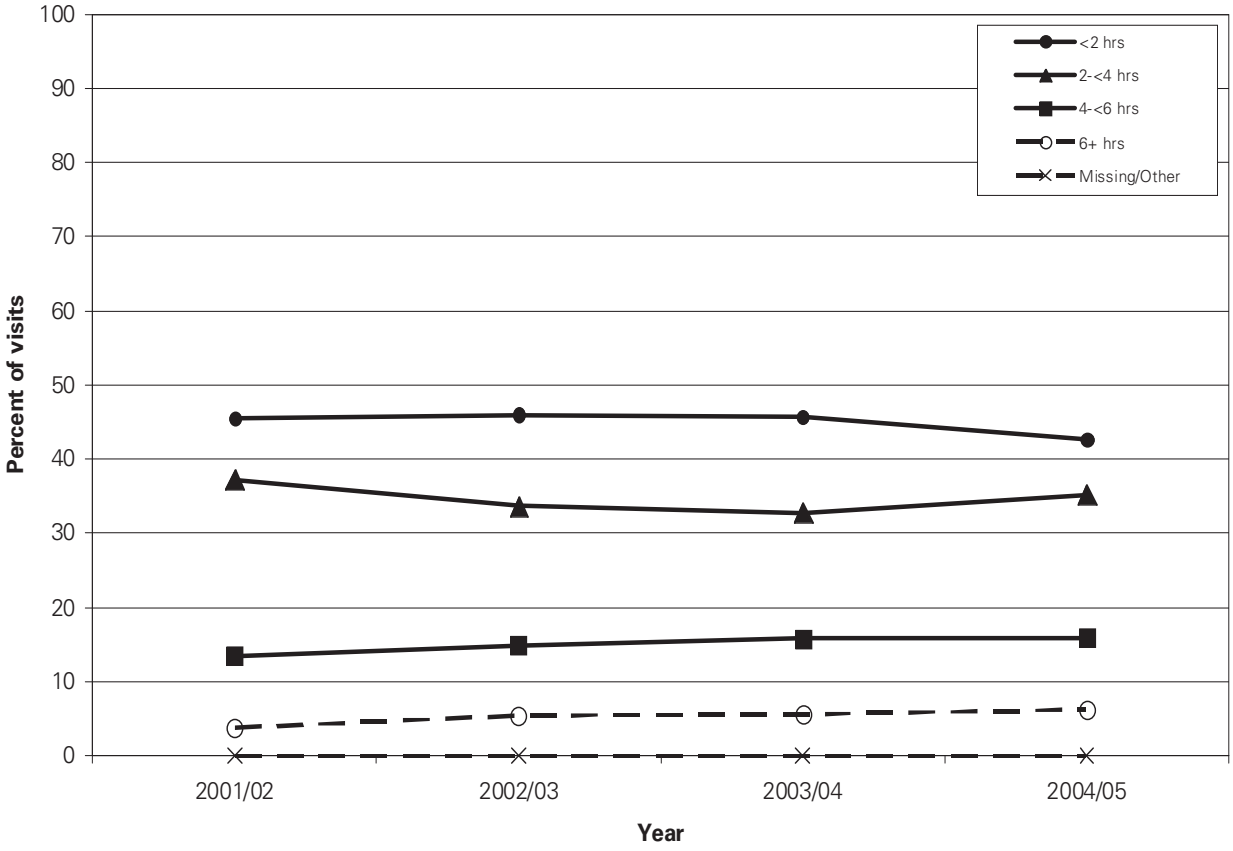


Exclusion: SOGH - (visit duration data weren't captured at this site during the study period)

Source: Manitoba Centre for Health Policy, 2008

UC visit durations are provided in Figure 4.7, for each year of the study period. These durations have remained fairly stable since 2001/02. For example, 45.4% of UC visits lasted <2 hours in 2001/02 as compared to 42.6% of visits in 2004/05. Similarly, 3.8% of UC visits lasted 6+ hours in 2001/02 versus 6.2% of visits in 2004/05.

Figure 4.7: Percent of Urgent Care Visits by Visit Duration by Year, 2001/02-2004/05



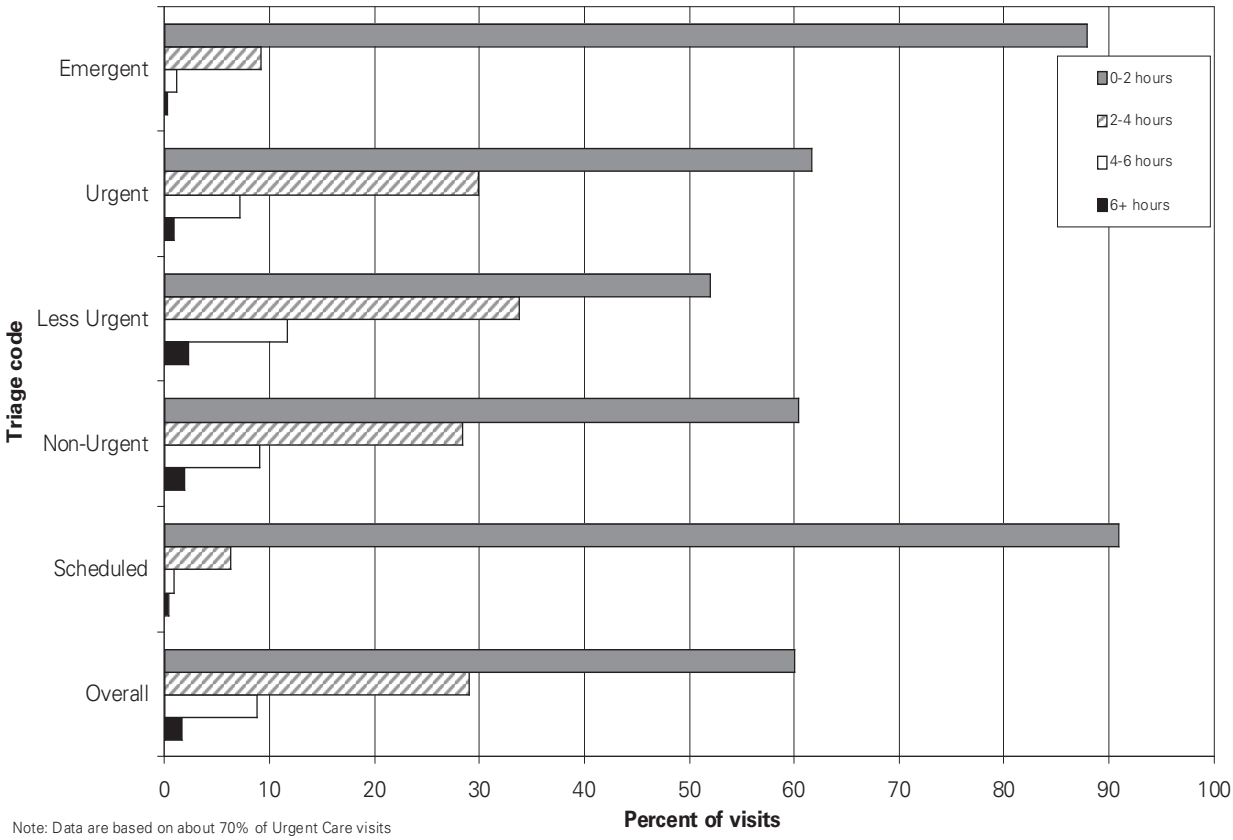
Source: Manitoba Centre for Health Policy, 2008

Commencing 2004/05, UC visit duration can be divided into wait and care time components (see Chapter 3, Section 3.4, "Data Collected During a UC Visit"). To illustrate the benefits of having these more detailed data, wait and care times were cross-tabulated by triage code. These analyses show that more urgent patients tend to have shorter wait and longer care times. Further details about these analyses are provided:

- UC wait times vary by triage code (Figure 4.8). Wait times lasted <2 hours for the majority (87.8%) of emergent visits in 2004/05. Conversely, wait times lasted <2 hours during 52% of less urgent visits, and for 60.4% of non–urgent visits. On average, therefore, wait times in 2004/05 were inversely related to CTAS scores, and patients with less urgent needs generally waited longer to see a physician.

- UC care times also vary by triage code (Figure 4.9). For example, care times lasted 4+ hours for only 1.2% of non–urgent visits in 2004/05, as compared to 17.3% of emergent visits in this fiscal year. UC care times were directly related to CTAS scores, and were longer for patients with more urgent needs.

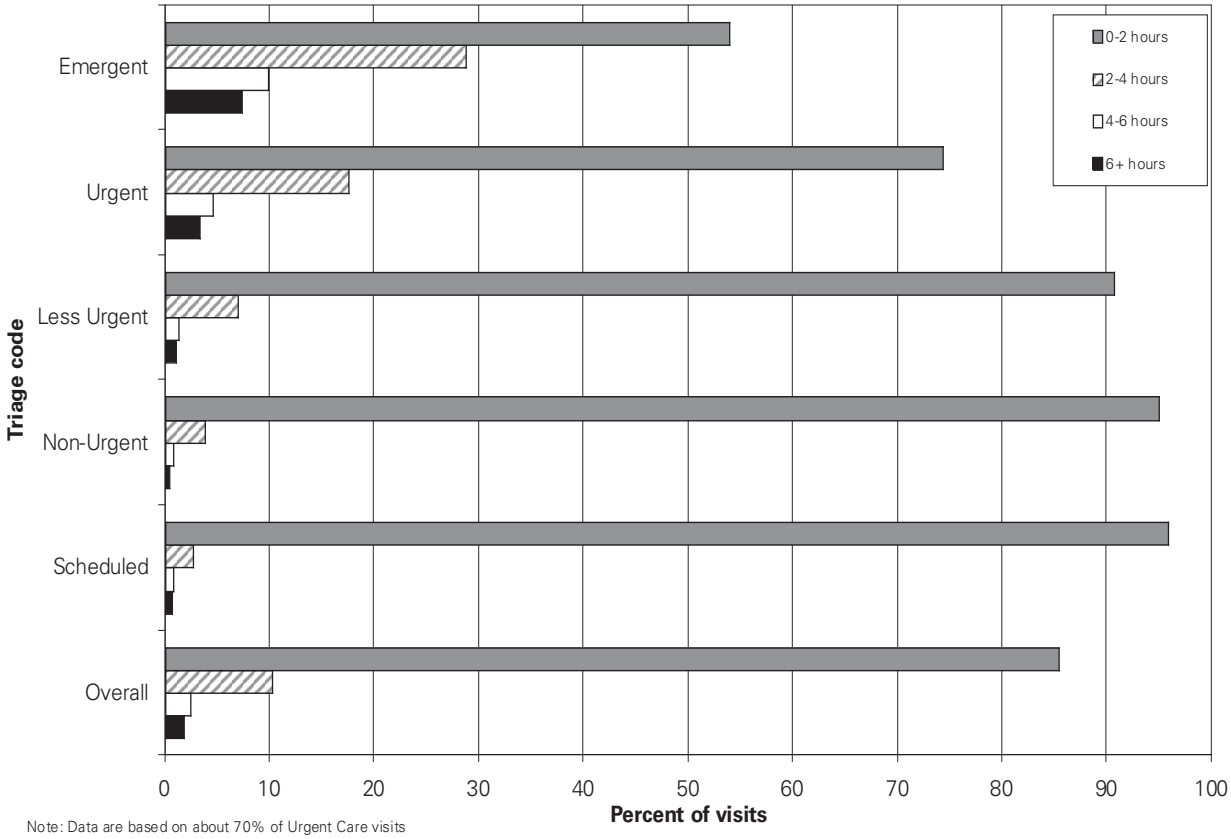
Figure 4.8: Percent of Urgent Care Visits by Triage Code and Wait Time, 2004/05



Note: Data are based on about 70% of Urgent Care visits
Exclusion: All visits where physician care initiation times are not recorded. (about 30% of visits)

Source: Manitoba Centre for Health Policy, 2008

Figure 4.9: Percent of Urgent Care Visits by Triage Code and Care Time, 2004/05



Note: Data are based on about 70% of Urgent Care visits
Exclusion: All visits where physician care initiation times are not recorded. (about 30% of visits)

Source: Manitoba Centre for Health Policy, 2008

4.2.6 Medical Records

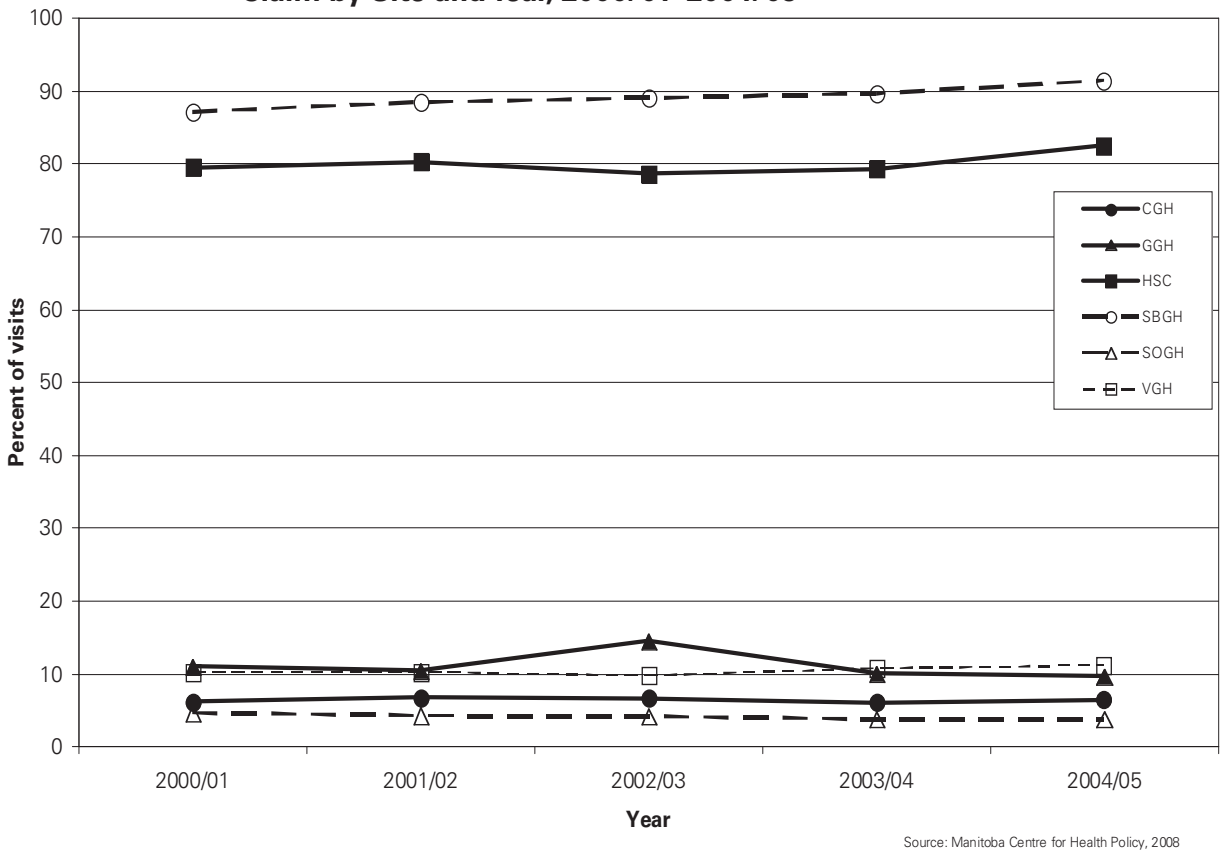
As outlined in Chapter 3, physician diagnostic (ICD) codes are not captured in the ED data, but instead must be obtained from the physician claims data. These codes are required to determine a physician's diagnosis made during an ED visit.

The percent of ED visits with a physician's diagnosis is provided in Figure 4.10. Highlights of these data are as follows:

- For four of the six adult EDs (CGH, SOGH, GGH, and VGH), ICD codes are available for at most 10% of all visits, for each year of the study period. In general, physicians at these sites are contract funded or salaried, and do not submit **shadow billings** (claims) to Manitoba Health for administrative purposes. This means that the medical reason for the visit, as diagnosed by the physician, is unavailable for the vast majority of visits at these ED sites.
- From 2000/01 to 2004/05, ICD codes are available for about 80% of ED visits at HSC, and for about 90% of ED visits at SBGH.

- Effective June 2007, physicians at all EDs (including HSC and SBGH) are no longer required to submit ICD codes to Manitoba Health. This is a major limitation of ED data. Without these codes, it is difficult to know the types of medical diagnoses made during ED visits, or to compare these types of diagnoses between EDs and other sectors of the health care system (e.g., during GP visits). This type of information is essential for program planning purposes.

Figure 4.10: Percent of Emergency Department Visits with a Physician Diagnostic Claim by Site and Year, 2000/01–2004/05



Source: Manitoba Centre for Health Policy, 2008

As discussed in Chapter 3 of this report (see Section 3.4, "Data Collected During a UC Visit"), starting 2004/05, ICD codes are captured for nearly all (99.5%) UC visits (data not shown).

4.3 Chapter Summary

This chapter describes the basic patterns of ED/UC use. In any given year, most patients arrive at EDs independently (i.e. not by ambulance or stretcher), and patients are triaged as less– or non–urgent during almost half of all ED visits. It is not surprising, therefore, that patients are sent home after the vast majority of ED visits, are hospitalized much less frequently, and die rarely. About one–quarter of ED visits in a given year are completed in less than two hours while about one–quarter of these visits last longer than six hours.

UC and ED utilization patterns are quite different. Patients arrive to virtually all UC visits independently, and are discharged home after the vast majority of visits. Further, close to one in five UC visits are scheduled in advance, and patients are often triaged as less–or non-urgent during the remaining visits. Compared to EDs, UC visits tend to be shorter in duration.

More detailed data are available to describe UC versus ED use patterns. Results in this chapter demonstrate that UC patients triaged as emergent tend to have the shortest wait times followed by longer care times, while the reverse is true for patients triaged as less urgent and non urgent. This more detailed information is presently unavailable for EDs.

CHAPTER 5: OVERVIEW OF SECTION I

One of the goals of this research has been to investigate the parameters of the ED/UC data, and to examine the strengths and limitations of these data. Four conclusions are made with respect to this research goal:

1. *ED and UC data have some benefits for conducting population-based research*. In both the ED and UC data systems, the majority of users can be identified (anonymously) and linked to information in other data files in the Repository. In addition, commencing 2004/05, ED and UC patients are triaged using a computer-generated scoring system. This system enables researchers to make fair inter-ED site comparisons in terms of patient urgency, and also to objectively compare users of EDs and UC. A similar statement can be made for most ED/UC patient disposition status options. Lastly, some basic assessments conducted in this research help to demonstrate the validity of select ED data fields, particularly as it relates to patients' CTAS scores and select disposition status options.

2. *Significant information is lost because ED sites capture some of their data differently*. ED sites capture some of their data inconsistently, which results in a significant loss of information. For example, arrival method data are coded differently across ED sites, and many of these response options were combined for use in this study. Similarly, visit duration is not reported accurately for patients hospitalized during their ED visit, and accurate counts of scheduled visits are unavailable. These ED data challenges do not apply to the one UC site in the WRHA. However, given the need to evaluate health care systems, decision-makers are encouraged to use consistent data capturing strategies, between EDs and UC.

3. *EDs have some additional data limitations that do not exist for UC*. Wait times are not recorded in ED data. This is a major limitation, and it not feasible to investigate factors that influence excessive ED waiting and overcrowding. While wait times are available for about 72% of UC visits in 2004/05, "post-acute care" times (from the end of a patient visit to discharge) are not captured at EDs or UC. Decision-makers in Canada are particularly interested in understanding how streamlining processes (e.g., treating "fast track" patients separately from all others, having physicians or **nurse practitioners** conduct triage, etc), and novel discharge strategies affect patient flow and overcrowding (CIHI, 2007). ED/UC wait and post-acute care times are required to fully understand these and related processes.

   Effective July of 2007, physician diagnostic (ICD) codes are no longer available for ED patients. These data are essential to understand the types of diagnoses made during ED visits, and from a health care systems perspective, to determine if EDs are used for distinct reasons. This lack of diagnostic information curtails the ability to address these and other policy-relevant questions. ICD codes are currently captured during UC visits.

4. *Expanding select ED/UC data response options would increase knowledge in key areas*. Gathering more detailed information about ED/UC patients would help to further evaluate the use of these services. For example, there are no data to describe ED/UC patients by their experience with violence, abuse, homelessness or substance abuse. Information about these and related factors may help to identify ED/UC patients who are especially in need.

SECTION II: PROFILING FREQUENT USERS

CHAPTER 6: POPULATION USE RATES OF WRHA EDS AND UC

This chapter describes the percent of Winnipeg residents who visited EDs and UC in 2004/05. Data are presented by resident age, sex and Winnipeg CA. As noted in Chapter 2, all results in this chapter are restricted to individuals 17+ years old, for both EDs and UC.[10]

6.1 Chapter Results

In 2004/05, 17.6 % of Winnipeg residents (n= 91,959 people) visited an ED at least once. Similar rates of ED use have been reported elsewhere, ranging from 19.1% to 21.1% of the Ontario population (Brown and Goel, 1994; Ovens and Chan, 2001), to 23.0% of adults living in the United States (Hunt et al., 2006). During 2004/05, 4.0% of Winnipeg residents (n=21,079 people) visited UC at least once.

6.1.1 Population Use Rates by Resident Age and Sex

ED population use rates are shown in Figure 6.1, by resident age and sex. Results are summarized as follows:

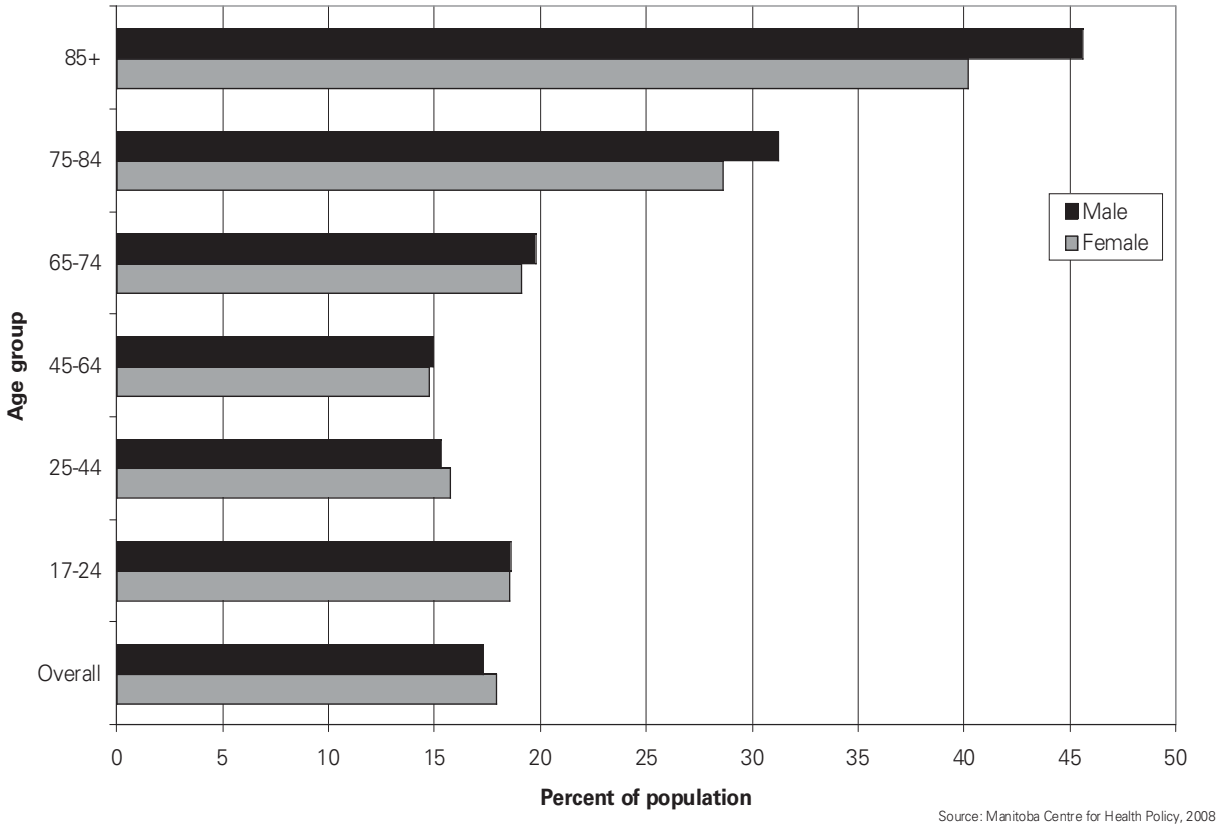
- As a general rule, older Winnipeg residents are more likely to visit an ED. For example, 18.6% of Winnipeggers 17–24 years old had at least one ED visit in 2004/05, versus 29.6% of residents 75–84 years old, and 41.7% of residents 85+ years old (percentages for combined sexes not shown in Figure 6.1).

- In 2004/05, a similar proportion of Winnipeg males and females in most age categories visited an ED. As one exception, 45.6% of males versus 40.2% of females 85+ year old visited an ED at least once in 2004/05.

UC population use rates are provided in Figure 6.2, by Winnipeg resident age and sex. In total, 4.3% of Winnipeg females and 3.7% of Winnipeg males visited UC at least once in 2004/05. Similar rates of use are reported for Winnipeggers in all age categories.

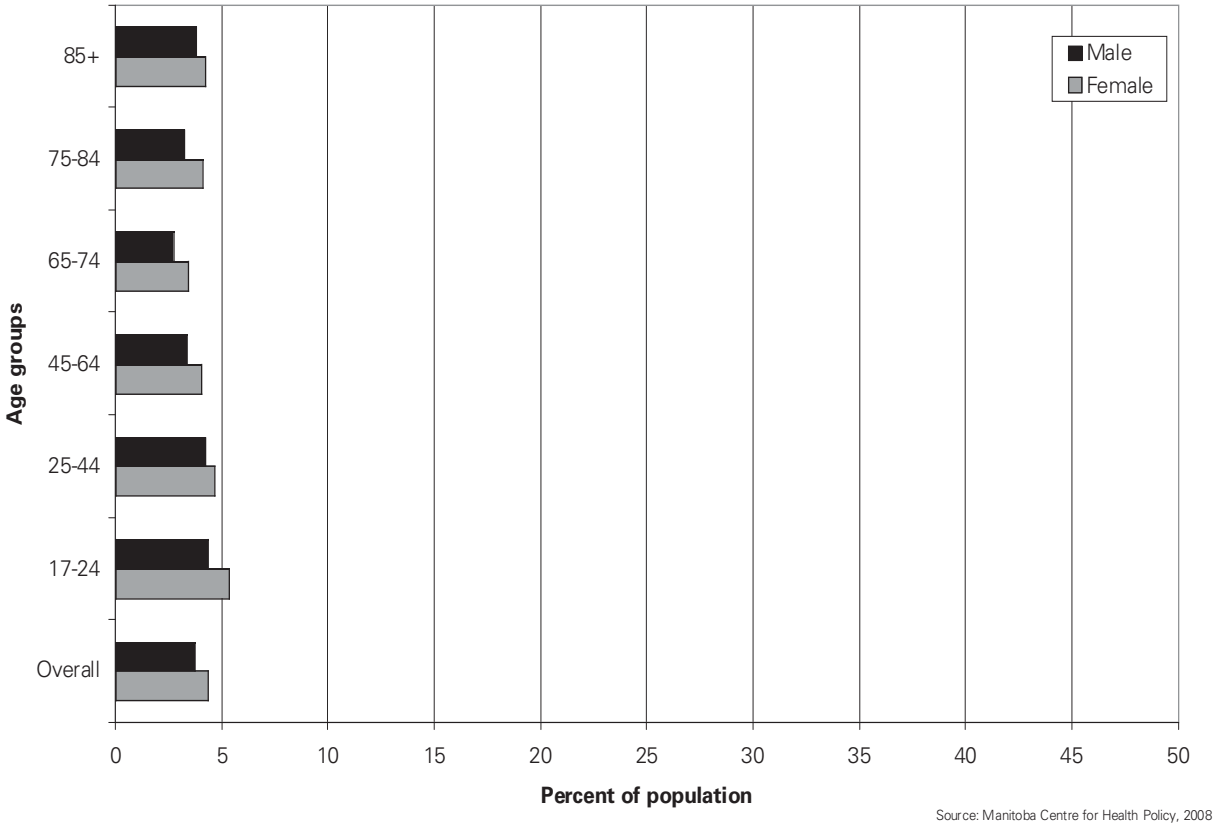
[10] In 2004/05, 7.0% of Winnipeg residents 0-17 years old visited an adult ED at least once, comprising 9.5% of all users at these ED sites. Similarly, 1.5% of Winnipeg residents 0-17 years old visited UC at least once in 2004/05, comprising 9.0% of all UC users (data not shown).

Figure 6.1: WRHA Population Use of Emergency Departments by Age (17+years) and Gender, 2004/05



Source: Manitoba Centre for Health Policy, 2008

Figure 6.2: WRHA Population Use of Urgent Care by Age (17+ years) and Gender, 2004/05



Source: Manitoba Centre for Health Policy, 2008

6.1.2 Population Use Rates by Winnipeg Community Area (CA)

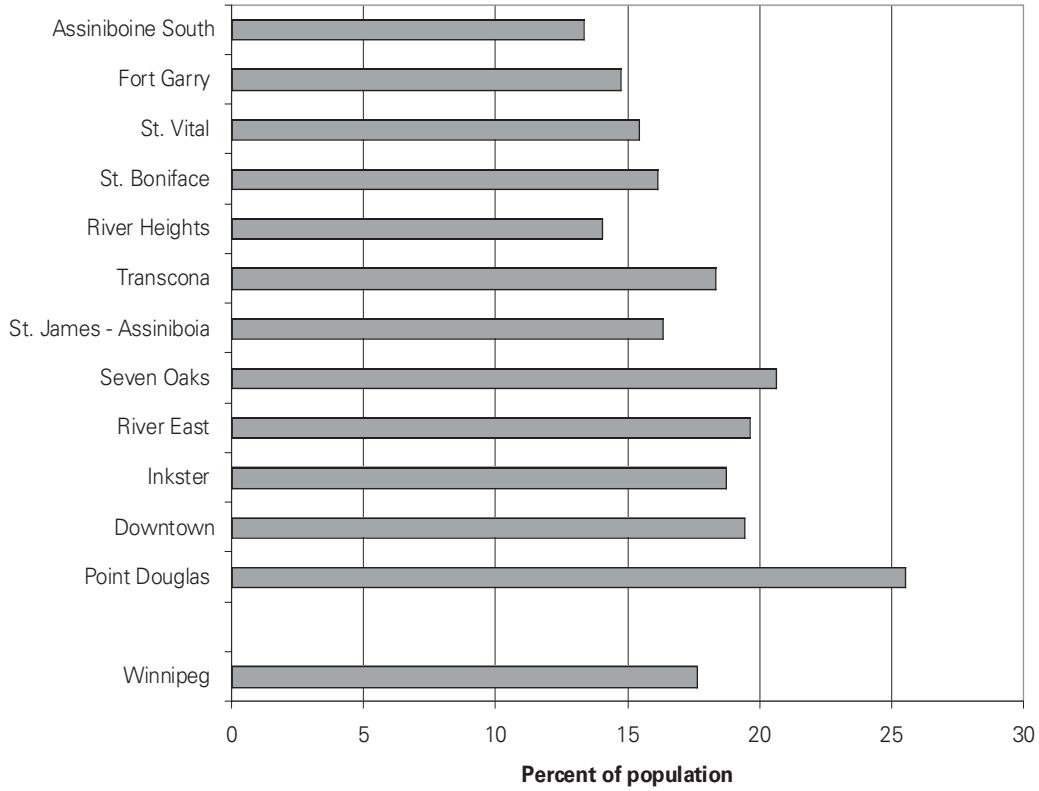
ED/UC population use is provided by Winnipeg CA, in Figures 6.3 and 6.4, respectively. Highlights of these data are as follows:

- In both Figures 6.3 and 6.4, Winnipeg CAs are ordered from highest to lowest by population SES. This strategy of ranking CAs is based on an algorithm called the **Socioeconomic Factor Index** (**SEFI**). Using SEFI, population SES is highest in the Assiniboine South CA and lowest in the Point Douglas CA.

- ED use in Winnipeg is inversely related to population SES (Figure 6.3). For example, 13.3% of the Assiniboine South population visited an ED at least once in 2004/05, as compared to 25.5% of the Point Douglas population.

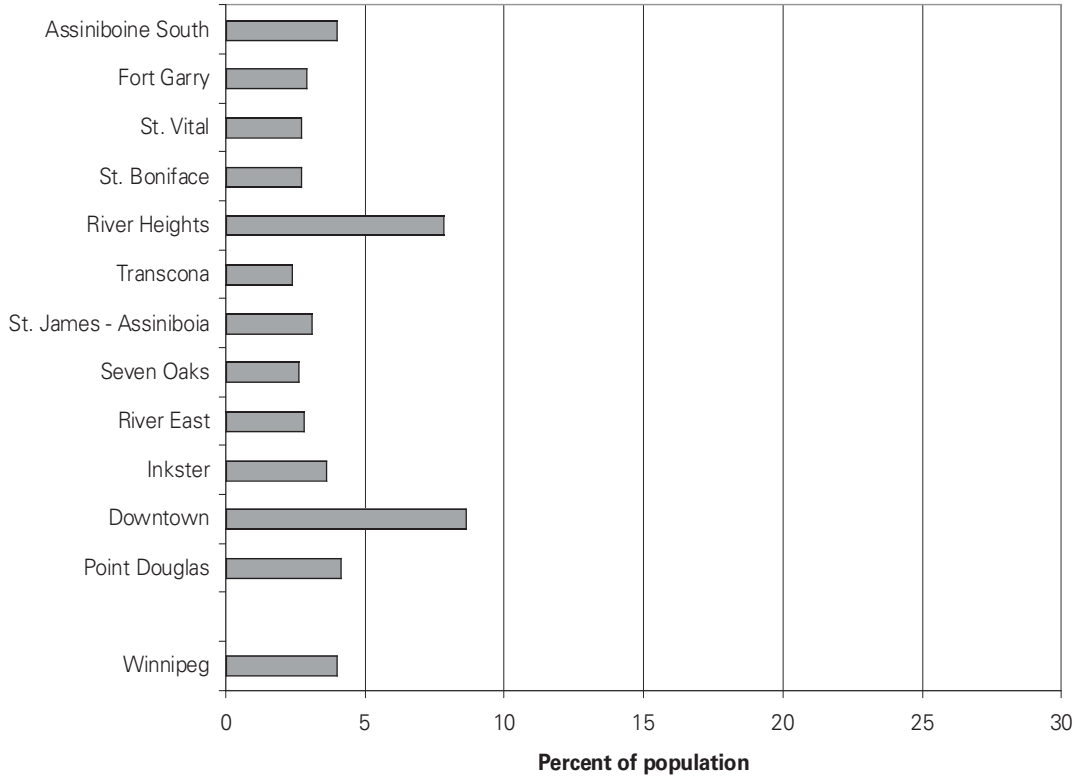
- UC use is unrelated to population SES (Figure 6.4). For example, 4.0% of people living in Assiniboine South had one or more UC visit in 2004/05, as compared to 4.1% of people living in Point Douglas. UC use in 2004/05 was highest in the River Heights and Downtown CAs. Both of these CAs are located nearby the UC at Misericordia Health Centre.

Figure 6.3: WRHA Population Use of Emergency Departments by Winnipeg Community Area, 2004/05



Source: Manitoba Centre for Health Policy, 2008

Figure 6.4: WRHA Population Use of Urgent Care by Winnipeg Community Area, 2004/05



Source: Manitoba Centre for Health Policy, 2008

CHAPTER 7: DEFINING FREQUENT ED AND UC USERS

This chapter describes how frequent ED/UC users were defined in this research.

7.1 Literature Highlights

Frequent ED users are defined generally as people with multiple ED visits (Bernstein, 2006; Hunt et al., 2006). Specific definitions of frequent ED use vary tremendously in the literature, ranging from people with 2+ (Brown and Goel, 1994), 3+ (Pines and Buford, 2006; Zuckerman and Shen, 2004), 4+ (Byrne et al., 2003; Hunt et al., 2006), 10+ (Kne et al., 1998), 12+ (Blank et al., 2005; Ovens and Chan, 2001) and 20+ (Ruger et al., 2004) ED visits in a 12–month period. Frequent ED users are also at times referred to as heavy (Blank et al., 2005; Ovens and Chan, 2001), chronic (Purdie et al., 1981), repeat (Cook et al., 2004; Jacoby and Jones, 1982), or serial (Cook et al., 2004) users.

Regardless of the definition, most researchers agree that frequent ED users have multiple and complex health needs (Hunt et al., 2006; Ovens and Chan, 2001). Researchers have consistently demonstrated that frequent ED users often have mental illnesses and tend to use many other types of health care services (Bernstein, 2006; Hansagi et al., 2001; Zuckerman and Shen, 2004). Most researchers also agree that multifaceted strategies, involving both the medical and community sectors, are required to address the complex needs of these patients (Bernstein, 2006; Hansagi et al., 2001; Olsson and Hansagi, 2001; Ovens and Chan, 2001; Zuckerman and Shen, 2004).

The relationship between frequent ED use, excessive wait times and ED overcrowding is complex. Some researchers report that ED wait times are not influenced significantly by volumes of lower complexity patients (Schull et al., 2006). Rather, ED overcrowding is thought to be influenced by higher volumes of complex care patients, and system inefficiencies in EDs as well as the broader health care system (Canadian Institute for Health Information, 2007). Collectively, this suggests that frequent ED users who are triaged as less and non urgent minimally impact ED patient flow. Further, frequent ED users are not necessarily associated with excessive health care costs. Some research, in fact, suggests the opposite—that costs per ED visit (e.g., for laboratory tests, pharmacy, and operating rooms) are substantially less for frequent versus single ED users (Ruger et al., 2004).

7.2 Defining Frequent ED/UC Users in This Research

Despite the many definitions for frequent users, most researchers agree that two general criteria can be used to guide developing frequency of use categories. First, frequent users, by their definition, should account for a substantial number of ED visits (Blank et al., 2005; Hansagi et al., 2001; Hunt et al., 2006; Ledoux and Minner, 2006; Okuyemi and Frey, 2001; Ullman et al., 1975). Second, frequent ED users have also been shown to be a heterogeneous group (Hunt et al., 2006; Ruger et al., 2004), and categories of frequent use should account for these patient differences.

Based on this information, the following strategies were used to define frequent users in this research (see Figure 7.1 and Table 7.1):

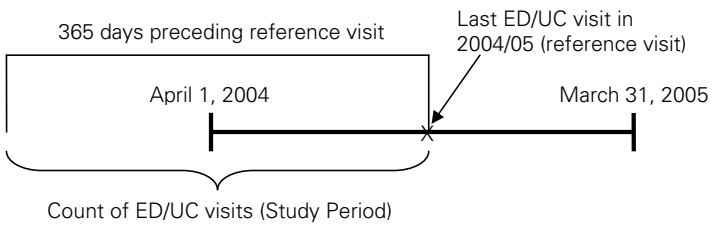
- ED/UC users and non–users were identified during the 2004/05 fiscal year. For each of these users, we identified the date of their last ED/UC visit in this fiscal year (e.g. the reference visit in Figure 7.1), and counted their number of visits in the previous 365 days. This period of time, unique to every patient, is referred to as the 'study period' in all subsequent text. The number of visits recorded during the study period was used to place ED/UC users into various frequency of use groups.

- In total, 105,687 people made 200,810 ED visits in the study period. *Single ED users* (i.e. people with no ED visits in the year preceding their reference visit in Figure 7.1) comprised 59.3% of all ED users but only 31.2% (n=62,660) of ED visits during the study period. *Intermediate* ED users (those with 2–6 visits in the study period) accounted for 38.4% (n=40,627) of all users and 55.2% (110,928) of ED visits. Frequent ED users (7+ visits) comprised only 2.3% (2,400) of all users but accounted for 13.6% (27,222) of all ED visits.

- Frequent ED users were further divided into *moderately* (7–11 visits), *very* (12–17 visits), and *highly* (18+) frequent user sub–categories. Highly frequent users comprised a negligible proportion (0.2%; n=223) of all ED users but accounted for 3.6% (7,177) of all ED visits in the study period.

- Identical frequency of use categories were developed for UC. In total, 22,973 people made 39,277 UC visits during the study period. Single users comprised 70.3% of all UC patients but made up only 41.1% of all visits. Frequent UC users comprised only 2.3% (537) of all patients but made up 16.6% (6,501) of all UC visits.

Figure 7.1: Strategy Used to Count the Number of Emergency Department and Urgent Care Visits During Each Patient's Study Period



Source: Manitoba Centre for Health Policy, 2008

Table 7.1: Distribution of Emergency Department and Urgent Care Users and Visits by Frequency of Use

	Emergency Department		Urgent Care	
	105,687 Users	200,810 Visits	22,973 Users	39,277 Visits
Single Users (1 Visit)	59.3	31.2	70.3	41.1
Intermediate Users (2-6 Visits)	38.5	55.2	27.4	42.3
Frequent Users (7+ Visits)	2.2	13.6	2.3	16.6
Moderately Frequent (7-11 Visits	1.7	7.4	1.5	7.5
Very Frequent (12-17 Visits)	0.4	2.6	0.5	3.9
Highly Frequent (18+ Visits)	0.2	3.6	0.3	5.2

Source: Manitoba Centre for Health Policy, 2008

7.3 Chapter Summary

Frequent ED and UC users have been defined as people with 7+ visits in the study period. Data in this chapter demonstrate that frequent ED and UC users comprise a small proportion of patients, but account for many visits.

CHAPTER 8: PROFILES OF EMERGENCY DEPARTMENT (ED) USERS

This chapter describes the demographic, health, health care use and visit–based profile of ED users, by their frequency of use.

8.1 Important Information to Help Interpret Chapter Results

8.1.1 Defining Risk Factors of Frequency ED Use

Four categories of risk factors were used to describe ED users. Definitions of these risk factors, and details about how they were measured, are provided in Table A1.1 of Appendix I of this report. Highlights of these risk factors are as follows:

- *Demographic information*. This refers to patients' age, sex, income quintile, and Winnipeg CA of residence. This information was assessed at the time of patients' last ED visit in 2004/05 (i.e., their reference visit in Figure 7.1). A map of the WRHA population by income quintile can be viewed on the MCHP website: http://www.umanitoba.ca/faculties/medicine/units/mchp[11].

- *Chronic physical & mental illnesses*. Patients were also identified as having specific physical and mental diseases. These diseases were measured using (past) physicians' diagnoses and also in some instances drug use patterns. These disease–specific algorithms have been validated for use with administrative data (Lix et al., 2006) and/or have been used extensively by MCHP researchers (Martens et al., 2004).

- *Concurrent health care utilization*. Health care utilization was assessed during the study period, including, for example, counts of patient hospitalization and physician visits, calls to Health Links–Info Santé for medical advice[12], and use of home care services as well as PCHs. The volume of medications dispensed to ED patients' was also assessed, by frequency of ED use.

- *Visit–based characteristics*. Visit–based characteristics used in this research include time and day of the ED visit, as well as triage code and disposition status options.

8.1.2 How to Interpret Results in this Chapter

Results in this chapter are presented separately for each risk factor. The following text provides some insight for interpreting chapter results, using patient age as an example (Table 8.1):

- Data in Table 8.1 are presented in 3 boxes:

  ➢ *BOX A* compares the age distribution of ED users and non–users. "Non–users" refers to WRHA residents who did not visit an ED in the 2004/05 fiscal year, while "users" includes all Manitoba residents with one or more ED visits during the study period.

[11]From the left–hand menu select Publications and then Deliverables to find all web–based content for this report.
[12]See Section 8.3.2 for an explanation of medical advice calls to Health Links–Info Santé.

➢ *BOX B* compares the age distribution of single, intermediate and frequent ED users during the study period.

➢ *BOX C* compares the age distribution of moderate, very and highly frequent ED users.

- Data in Table 8.1 are shown as percentages, and the values within each column total 100. This allows us to say, for example, that 15.5% of ED users versus 13.4% of (WRHA) non–users were 17–24 years old during the study period.

- Logistic regression was used in BOX A to compare the age distribution of ED users and non–users. The results from these analyses are presented, in brackets, as **odds ratios** (**ORs**).

  ➢ For readers interested in more technical language for ORs, these results mean that the odds of being 85+ years old was 2.8 times greater for ED users compared to non–users. Alternately, the odds of being 25–44 years old was 0.8 fold for ED users versus nonusers. *An OR of "1" means that ED users and non–users share similar characteristics*.

  ➢ ORs have a very practical purpose without the need for using more technical language. The numerical size of an OR can be used to identify where ED users and non–users differ the most. In BOX A of Table 8.1, ORs are largest for people 75–84 and 85+ years old, and are smallest for people 25–64 years old. This reflects the major findings in BOX A. *Using ORs in this manner helps to define the most obvious differences between ED users and non–users.*

- ORs are also provided in BOX B (comparing intermediate and frequent ED users to single users), and in BOX C (comparing very and highly to moderately frequent ED users). It is important to remember that BOX C results are based on a smaller number of patients, especially for highly frequent users. At times this latter group deviates quite substantially from the reference group (moderate users) without being statistically significant.

- ORs that are not statistically significant are denoted by the acronym "ns". This means, for example, that a similar proportion of frequent and single ED users were 25–44 years old in the study period (Table 8.1). As multiple comparisons were conducted for each risk factor, **type 1 error** was set at 1% (α<.01) when testing for statistical significance.

- Data have been suppressed when categories in a table contain between one and five patients, or visits when describing visit–based characteristics by frequency of use. (e.g., see "s" for highly frequent users 85+ years old in Table 8.1). This is a standard practice at MCHP, and is done to protect the anonymity of study participants.

- Electronic copies of each table in this chapter are provided on the MCHP website (http://www.umanitoba.ca/faculties/medicine/units/mchp).

Table 8.1: Distribution of Emergency Department Users by Patient Age

	Percent of Users (Odds Ratio)*,†								
	BOX A		BOX B			BOX C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	All Users‡	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	439,353	105,687	62,660	40,627	2,400	1,799	378	223
Age Groups								
17-24 yrs	13.4	15.5 (1.2)	16.2	14.8 (0.9)	9.3 (0.5)	8.9	11.9 (ns)	7.6 (ns)
25-44 yrs	37.4	33.1 (0.8)	34.6	30.9 (0.9)	33.1 (ns)	31.1	34.7 (ns)	46.6 (1.9)
45-64 yrs	33.2	26.3 (0.7)	27.6	24.1 (0.8)	28.2 (ns)	27.1	29.1 (ns)	35.9 (1.5)
65-74 yrs	8.2	9.3 (1.1)	8.7	10.0 (1.2)	10.6 (1.3)	11.0	12.2 (ns)	4.9 (0.4)
75-84 yrs	5.8	10.5 (1.9)	8.8	12.9 (1.5)	12.8 (1.5)	14.8	9.0 (0.6)	s
85+ yrs	2.0	5.3 (2.8)	4.1	7.2 (1.8)	6.0 (1.5)	7.0	3.2 (0.4)	s

*Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

†'ns' indicates that the percent of ED users is not significantly different (p<.01) than the reference group.

‡Includes users who live outside Winnipeg but within Manitoba.

s - data suppressed due to small numbers.

Source: Manitoba Centre for Health Policy, 2008

Given this information, the age distribution of ED users is summarized as follows:

- ED users versus non–users were more likely to be 65+ years old in the study period; people 65+years old comprised 25.1% of ED users and only 16.0% of non–users. Conversely, fewer ED users (59.4%) versus non–users (70.6%) were 25-64 years old in the study period.[13]

- The same trend exists for intermediate and frequent versus single ED users (BOX B). For example, 29.4% of frequent ED users were 65+ years old in the study period, as compared to 21.6% of single users.

- At least in terms of patient age, frequent ED users are a heterogeneous group (BOX C). For example, compared to moderate users, fewer of the highly frequent ED users were 65-74 years old in the study period, and a greater proportion of highly frequent versus moderate ED users were 25-64 years old. In other words, highly frequent ED users tended to be younger than moderately frequent users.

8.2 Chapter Results

8.2.1 Demographic Profile

The demographic profile of study participants is shown in Table 8.2 with the following highlights:

- Data for participant age have been discussed in the previous section (see Table 8.1).

[13]It stands to reason that, if more users versus non–users are older, then relatively fewer users are younger. Subsequent text in this chapter discusses one but not both scenarios.

- Approximately 50.0% of ED users were female in each frequency of use category.

- ED use is not distributed evenly by income quintile or by area of residence. For example, more ED users versus non–users lived in the lowest income areas, as did many frequent and especially highly frequent ED users. Also, 15.6% of single ED users resided in the Winnipeg core (i.e., in Point Douglas or Downtown) during the study period, as compared to 36.5% of frequent users and 56.5% of highly frequent ED users.

Table 8.2: Distribution of Emergency Department Users by Patient Demographics

	Percent of Users (Odds Ratio)*,†								
	BOX A		BOX B			BOX C			
	Overall		User Groups			Frequent Sub-groups			
	WRHA Non-users	All Users‡	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	439,353	105,687	62,660	40,627	2,400	1,799	378	223
User Sex								
Female	51.8	52.0 (ns)	50.9	53.8 (1.1)	50.8 (ns)	52.0	48.1 (ns)	45.7 (ns)
Income Quintile								
Q1 (Lowest)	18.7	26.0 (1.5)	22.9	29.6 (1.4)	46.1 (2.9)	43.2	53.4 (1.5)	57.0 (1.7)
Q2	19.1	19.7 (1.04)	19.3	20.2 (1.1)	18.5 (ns)	19.3	16.9 (ns)	14.8 (ns)
Q3	18.9	18.2 (0.95)	18.6	17.6 (0.9)	16.7 (ns)	16.6	14.6 (ns)	21.1 (ns)
Q4	20.4	17.3 (0.8)	18.6	15.8 (0.8)	9.3 (0.5)	10.1	8.7 (ns)	3.1 (ns)
Q5 (Highest)	21.9	17.3 (0.8)	19.3	14.9 (0.7)	8.0 (0.4)	9.2	5.3 (ns)	3.1 (ns)
Missing/Other	1.0	1.4 (1.5)	1.2	1.9 (1.6)	1.5 (ns)	1.6	s	s
Community Area (CA)								
Assiniboine South	5.9	3.7 (0.6)	3.9	3.5 (0.9)	2.6 (0.7)	2.9	2.4 (ns)	s
Fort Garry	10.1	7.0 (0.7)	7.4	6.6 (0.9)	3.7 (0.5)	4.1	2.9 (ns)	s
St. Vital	9.5	7.0 (0.7)	7.2	6.8 (ns)	5.0 (0.7)	5.6	4.0 (ns)	s
St. Boniface	7.7	6.0 (0.8)	6.0	5.8 (ns)	5.9 (ns)	6.0	6.6 (ns)	3.6 (ns)
River Heights	9.2	6.2 (0.7)	6.2	6.2 (ns)	5.7 (ns)	5.7	5.6 (ns)	5.8 (ns)
Transcona	4.8	4.4 (0.9)	4.4	4.5 (ns)	2.6 (0.6)	3.2	s	s
St. James - Assiniboia	9.2	7.4 (0.8)	7.6	7.3 (ns)	5.7 (0.7)	6.1	4.5 (ns)	4.9 (ns)
Seven Oaks	8.7	9.1 (1.1)	8.7	9.8 (1.1)	7.8 (ns)	8.2	7.7 (ns)	4.0 (ns)
River East	13.8	13.7 (ns)	13.3	14.5 (1.1)	12.5 (ns)	13.3	11.4 (ns)	8.5 (ns)
Inkster	4.4	4.1 (0.9)	4.0	4.2 (ns)	4.1 (ns)	3.9	4.8 (ns)	4.0 (ns)
Downtown	10.7	10.4 (0.97)	9.1	11.7 (1.3)	22.0 (2.8)	19.1	29.1 (1.7)	33.6 (2.1)
Point Douglas	5.4	7.5 (1.4)	6.5	8.7 (1.4)	14.5 (2.5)	13.9	29.1 (ns)	22.9 (1.8)
Outside Winnipeg	--	13.0 (0)	15.4	9.6 (0.6)	6.5 (0.4)	6.9	5.6 (ns)	4.0 (ns)
Missing/Other	0.6	0.5 (ns)	0.4	0.7 (2.0)	1.6 (4.6)	1.1	s	4.0 (3.7)

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of ED users is not statistically significant (p<.01) than the reference group.

‡ Includes users who live outside Winnipeg but within Manitoba.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

8.2.2 User Health Profile

We included **arthritis**, asthma, **diabetes**, **stroke** and **ischemic heart disease** as **chronic physical diseases** in our analysis. Diagnostic rates for these diseases are summarized in Table 8.3, by frequency of ED user. These results are summarized as follows:

- More ED users versus non–users were diagnosed previously with chronic physical diseases; this trend also exists for frequent as compare to single users. For example, 37.9% of frequent

users were diagnosed previously with asthma as compared to 14.5% of single ED users. Also, 53.9% of frequent ED users versus 18.8% of single users were diagnosed previously with two or more of these chronic diseases.

- Frequent users are a heterogeneous group as it relates to these physical diseases. For example, 78.0% of highly frequent users versus 59.5% of moderately frequent users were diagnosed previously with arthritis. The opposite trend is shown for people with ischemic heart disease and stroke, where diagnostic rates were actually lower for highly versus moderately frequent ED users.

Table 8.3: Distribution of Emergency Department Users by Previous Diagnosis of Select Physical Diseases

	Percent of Users (Odds Ratio)*,†								
	Box A		Box B			Box C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	All Users‡	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	439,353	105,687	62,660	40,627	2,400	1,799	378	223
Physical Diseases								
Arthritis	27.4	40.2 (1.8)	35.7	45.9 (1.5)	61.8 (2.9)	59.5	63.0 (ns)	78.0 (2.4)
Asthma	10.0	18.2 (2.0)	14.5	22.8 (1.8)	37.9 (3.6)	37.1	39.9 (ns)	40.4 (ns)
Diabetes	7.0	13.0 (2.0)	10.5	15.9 (1.6)	28.1 (3.3)	28.9	26.2 (ns)	25.1 (ns)
Ischemic Heart Disease	5.7	14.9 (2.9)	11.0	20.1 (2.0)	29.8 (3.5)	32.2	27.0 (ns)	14.8 (0.4)
Stroke	2.6	8.4 (3.4)	5.9	11.6 (2.1)	16.8 (3.2)	17.3	18.0 (ns)	10.3 (0.6)
Comorbid Physical Diseases								
0	60.5	42.3 (.05)	48.4	34.3 (0.6)	17.6 (0.2)	18.5	18.3 (ns)	9.4 (0.5)
1	29.0	32.7 (1.2)	32.8	32.7 (ns)	28.5 (0.8)	27.3	28.6 (ns)	37.7 (1.6)
2+	10.5	25.1 (2.8)	18.8	33.0 (2.1)	53.9 (5.1)	54.1	53.2 (ns)	52.9 (ns)

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users). Percentages will not total 100% as individuals can have more than 1 disease.

† 'ns' indicates that the percent of ED users is not statistically significant (p<.01) than the reference group.

‡ Includes users who live outside Winnipeg but within Manitoba.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

We included **anxiety, dementia, depression, personality disorder, schizophrenia**, and **substance abuse** as mental illnesses. Data for these illnesses are summarized in Table 8.4 by frequency of ED use:

- More ED users than non–users were diagnosed previously with mental illnesses. For example, 6.5% of ED users were diagnosed previously with dementia as compared to 1.9% of non–users, and 10.5% of users versus 4.3% of non–users had a previous diagnosis of substance abuse.

- Mental illness is especially common for frequent ED users. For example, 15.0% of frequent users were diagnosed previously with a personality disorder as compared to 1.4% of single users. Also, 9.4% of frequent users versus 1.3% of single were diagnosed previously with schizophrenia.

- Mental illness was most common among highly frequent ED users. For example, 67.3% of these users were diagnosed previously with substance abuse as compared to 33.0% of moderate users. Further, 22.9% of highly frequent users versus 6.9% of moderate users were diagnosed previously with schizophrenia. Lastly, 84.8% of highly frequent users were diagnosed previously with two or more chronic mental illnesses, as compared to 47.4% of moderately frequent users.

Table 8.4: Distribution of Emergency Department Users by Previous Diagnosis of Select Mental Illnesses

	Percent of Users (Odds Ratio)*,†							
	Box A		Box B			Box C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	All Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	439,353	105,687	62,660	40,627	2,400	1,799	378	223
Mental Illnesses								
Anxiety	7.9	13.2 (1.8)	10.5	15.9 (1.6)	36.4 (4.9)	31.7	46.8 (1.9)	57.0 (2.9)
Dementia	1.9	6.5 (3.7)	4.0	9.3 (2.5)	23.7 (7.5)	20.5	27.0 (1.4)	43.9 (3.0)
Depression	19.3	31.2 (1.9)	26.1	37.2 (1.7)	62.0 (4.6)	58.4	69.0 (1.6)	79.4 (2.7)
Personality Disorder	0.8	2.5 (3.0)	1.4	3.4 (2.5)	15.0 (12.5)	11.5	22.0 (3.5)	31.4 (2.2)
Schizophrenia	0.8	2.0 (2.6)	1.3	2.8 (2.2)	9.4 (7.9)	6.9	13.2 (2.1)	22.9 (4.0)
Substance Abuse	4.3	10.5 (2.6)	7.6	13.4 (1.9)	38.8 (7.7)	33.0	49.7 (2.0)	67.3 (4.2)
Comorbid Mental Illnesses								
0	74.4	58.9 (0.5)	65.3	51.1 (0.6)	23.8 (0.2)	27.6	17.7 (0.6)	4.0 (0.1)
1	18.1	24.1 (1.4)	22.4	26.7 (1.3)	22.5 (ns)	25.1	16.9 (0.6)	11.2 (0.4)
2+	7.5	17 (2.5)	12.2	22.2 (2.1)	53.7 (8.3)	47.4	65.3 (2.1)	84.8 (6.2)

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users). Percentages will not total 100% as individuals can have more than 1 mental illness.

† 'ns' indicates that the percent of ED users is not statistically significant (p<.01) than the reference group.

ǂ Includes users who live outside Winnipeg but within Manitoba.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

Data in Tables 8.3 and 8.4 are based on previously diagnostic rates, because, with the exception of HSC and SBGH, ED physicians do not submit diagnostic codes to Manitoba Health. However, mental illness diagnoses were counted during ED visits to HSC and SBGH, using the physician medical claims data (Table 8.5). Results from these analyses are summarized as follows:

- Data in Table 8.5 are recorded as visit–based information (i.e., how often was depression diagnosed during ED visits at SBGH or HSC?).

- The odds of being diagnosed with a personality disorder during ED visits to HSC and SBGH was much greater for frequent versus single users. Significant ORs are noted for all other mental illnesses except dementia.

- The odds of being diagnosed with some mental illnesses was especially high for highly frequent ED users. For example, substance abuse was diagnosed during 23.9% of the (SBGH and HSC) visits made by highly frequent users, compared to only 6.0% of the visits made by moderately frequent users. Personality disorders and schizophrenia were also diagnosed more often during the visits made by highly frequent versus moderately frequent users. These findings help to validate some of the results reported in Table 8.4, by demonstrating that mental illness is especially common among frequent ED users.

Table 8.5: Distribution of Emergency Department Visits at HSC and SBGH by Mental Illness Diagnosed at the Time of the Visit

	Percent of Visits (Odds Ratio) [*,†]					
	Box A			Box B		
	User Groups			Frequent Sub-groups		
	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	22,039	45,911	15,620	8,026	3,168	4,426
Mental Illness						
Anxiety	0.8	1.0 (ns)	2.3 (2.8)	2.0	2.7 (ns)	2.4 (ns)
Dementia	0.2	0.2 (ns)	0.1 (ns)	0.1	§	0 (ns)
Depression	2.1	3.1 (1.5)	3.4 (1.6)	3.7	4.0 (ns)	2.5 (0.7)
Personality Disorder	0.1	0.4 (2.6)	1.6 (10.7)	1.1	1.5 (ns)	2.6 (2.4)
Schizophrenia	0.7	1.1 (1.6)	2.4 (3.5)	2.0	2.9 (1.4)[§]	3.0 (1.5)
Substance Abuse	1.8	3.1 (1.7)	11.8 (7.2)	6.0	9.7 (1.7)	23.9 (5.0)
No Mental Illness Diagnosis	94.2	91.0 (0.6)	78.4 (0.2)	85.1	79.3 (0.7)	65.7 (0.3)

[*] Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: single users; BOX B: moderate users).

[†] 'ns' indicates that the percent of ED users is not statistically significant (p<.01) than the reference group.

[§] Due to small numbers (n<6), dementia has been included with schizophrenia

Source: Manitoba Centre for Health Policy, 2008

8.2.3 Concurrent Health Care Use Profile

During the study period, frequent ED users had 52,654 contacts with GPs, specialist physicians, UC, hospitalizations (in–patients only), and Health Links–Info Santé, for a total of 79,876 health care contacts during the study period (Table 8.6). For all of these health care services combined, frequent ED users had a median of 27 contacts during the one–year study period, while highly frequent users had a median of 51 contacts during this time. Single ED users, in comparison, had a median of six health care contacts during the study period. These data clearly demonstrate that frequent ED users have many additional contacts with the health care system.

Table 8.6: Total Health Care Contacts Made by Emergency Department Users During the Study Period

	Users (%)	Other Contacts* (%)	Total Contacts (including ED visits, %)	Median Total Contacts per user
Total N	105,687	933,019	1,133,829	
Single Users (1 Visit)	59.3	45.7	43.1	6
Intermediate Users (2-6 Visits)	38.4	48.7	49.9	12
Frequent Users (7+ Visits)	2.3	5.6	7.0	27
Moderately Frequent (7-11 Visits)	1.7	3.8	4.5	25
Very Frequent (12-17 Visits)	0.4	1.0	1.3	33
Highly Frequent (18+ Visits)	0.2	0.8	1.3	51

* Includes general practitioners, specialist physicians, Urgent Care, hospital, & Health Links-Info Santé

Source: Manitoba Centre for Health Policy, 2008

Additional analyses were conducted to investigate frequent ED patients' use of other health care services. Visits to GPs and specialist physicians as well as in–patient hospitalizations are provided in Table 8.7. Highlights of these results are as follows:

- As a general rule, frequent ED users tended to also visit other health care services frequently. For example, 16.7% of single ED users visited a GP nine or more times during the study period, as compared to 57.2% of frequent users and 64.6% of highly frequent ED users. Similar results are noted for the number of different GPs visited; 1.4% of single ED users visited six or more GPs during the study period, as compared 13.6% of frequent users and 26.9% of highly frequent ED users.

- Similar findings were reported for visits to specialist physicians and for in–patient hospitalizations. For example, 16.6% of frequent ED users versus 3.1% of single users also had nine or more visits to specialist physicians during the study period. Also, 18.3% of frequent users were hospitalized as in–patients at least once during the study period, as compared to 6.5% of single ED users.

- Unlike the data for GPs, sub–groups of frequent ED users were similar in their number of contacts with specialist physicians and in–patient hospitalizations. These latter health care services are often initiated by a physician, implying that highly frequent users may not have acute care needs requiring specialized medical attention. Issues related to patient follow–up may also be a factor.

Table 8.7: Distribution of Emergency Department Users by Frequency of Physician Visits and Hospitalizations

	Percent of Users (Odds Ratio)*,†							
	Box A		Box B			Box C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	439,353	105,687	62,660	40,627	2,400	1,799	378	223
# of Primary Care Visits								
0	24.5	13.5 (0.5)	16.5	9.3 (0.5)	4.7 (0.3)	4.5	5.3 (ns)	5.4 (ns)
1-2	28.3	20.8 (0.7)	24.0	16.7 (0.6)	8.5 (0.3)	8.8	8.2 (ns)	7.2 (ns)
3-4	19.5	17.6 (0.9)	19.2	15.7 (0.8)	10.5 (0.5)	10.9	9.0 (ns)	9.9 (ns)
5-8	18.7	24.3 (1.4)	23.5	25.7 (1.1)	19.0 (0.8)	20.0	18.3 (ns)	13.0 (0.6)
9+	9.0	23.8 (3.2)	16.7	32.7 (2.4)	57.2 (6.7)	55.9	59.3 (ns)	64.6 (1.4)
# of Different Primary Care Physicians Visited								
0	24.5	13.5 (0.5)	16.5	9.3 (0.5)	4.7 (0.3)	4.5	5.3 (ns)	5.4 (ns)
1	43.7	38.1 (0.8)	40.6	35.2 (0.8)	22.7 (0.4)	24.3	20.4 (ns)	13.5 (0.5)
2-3	27.7	37.6 (1.6)	34.9	41.6 (1.3)	40.5 (1.3)	42.7	35.7 (0.7)	30.5 (0.6)
4-5	3.5	8.3 (2.5)	6.6	10.4 (1.7)	18.5 (3.2)	17.8	18.8 (ns)	23.8 (ns)
6+	0.6	2.5 (4.5)	1.4	3.6 (2.6)	13.6 (10.9)	10.6	19.8 (2.1)	26.9 (3.1)
# of Specialist Physician Visits								
0 Specialist Visits	67.7	52.2 (0.5)	59.1	43.0 (0.5)	26.0 (0.2)	25.7	22.2 (ns)	35.0 (1.6)
1-2 Visits	20.1	24.9 (1.3)	23.5	27.0 (1.2)	26.3 (1.2)	26.1	26.7 (ns)	26.9 (ns)
3-4 Visits	6.6	10.0 (1.6)	8.4	12.3 (1.5)	14.8 (1.9)	15.2	14.6 (ns)	12.6 (ns)
5-8 Visits	3.9	7.8 (2.1)	5.8	10.3 (1.9)	16.3 (3.2)	16.7	18.3 (ns)	9.9 (0.5)
9+ Visits	1.8	5.1 (3.0)	3.1	7.4 (2.5)	16.6 (6.2)	16.3	18.3 (ns)	15.7 (ns)
# of Hospitalizations								
0	97.4	91.8 (0.3)	93.5	89.8 (0.6)	81.7 (0.3)	81.4	82.5 (ns)	82.5 (ns)
1	2.3	6.4 (2.9)	5.1	8.0 (1.6)	13.5 (2.9)	13.6	12.7 (ns)	13.9 (ns)
2+	0.2	1.8 (7.6)	1.4	2.3 (1.6)	4.8 (3.5)	5.0	4.8 (ns)	3.6 (ns)
# of Days in Hospital								
0 days	97.4	91.8 (0.3)	93.5	89.8 (0.6)	81.7 (0.3)	81.4	82.5 (ns)	82.5 (ns)
1-7 days	2.3	5.8 (2.7)	5.0	6.9 (1.4)	10.8 (2.3)	11.1	9.8 (ns)	10.8 (ns)
8+ days	0.3	2.4 (7.4)	1.6	3.3 (2.2)	7.5 (5.0)	7.5	7.7 (ns)	6.7 (ns)

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of ED users is not statistically significant (p<.01) than the reference group.

Source: Manitoba Centre for Health Policy, 2008

ED patients are also described by their use of other health services such as UC, Health Links–Info Santé, home care services, and PCHs. Findings from these analyses are provided in Table 8.8, and the following summary is provided:

- During the study period, frequent ED users often had multiple contacts with these other health care services. For example, 1.3% of single users also visited UC two or more times during the study period, versus 10.3% of frequent users and 28.7% of highly frequent users. Similarly, 1.5% of single ED users also had seven or more contacts with Health Links–Info Santé, versus 13.6% of frequent users and 20.2% of highly frequent users.

- Frequent versus single ED users were more likely to use home care services during the study period. Also, 1.8% of frequent ED users were admitted to a PCH at some point during the study period, versus 0.3% of single ED users. It is important to note that sub–groups of frequent ED users were similar in their number of contacts with home care and PCHs. These findings help to support an emerging hypothesis—among ED patients, highly frequent users

are often the heaviest users of other health care services (i.e., GP visits, contacts with UC, Health Links–Info Santé), but only when use of these additional services is patient–initiated.

- Frequency of ED use was also assessed in the year preceding the study period. As compared to 0.1% of single ED users, 22.6% of frequent users and 70.0% of highly frequent users also visited EDs frequently in this preceding year. Many frequent ED users can therefore be defined as chronic frequent patients.

Table 8.8: Distribution of Emergency Department Users by Use of Additional Health Care Services

	Percent of Users (Odds Ratio) *,†							
	Box A		Box B			Box C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	All Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	439,353	105,687	62,660	40,627	2,400	1,799	378	223
# of Concurrent Urgent Care visits								
0	96.7	93.1 (0.5)	94.7	91.4 (0.6)	79.0 (0.2)	82.9	73.3 (0.6)	56.5 (0.3)
1	2.6	5.0 (2.0)	4.0	6.1 (1.6)	10.7 (2.9)	9.6	13.5 (ns)	14.5 (ns)
2-6	0.6	1.8 (2.8)	1.2	2.3 (2.0)	8.3 (7.7)	6.4	10.6 (1.7)	19.7 (3.6)
7+	0.0	0.2 (3.5)	0.1	0.2 (2.7)	2.0 (29.7)	1.1	2.6 (ns)	9.0 (9.2)
# of Concurrent Contacts with Health Links-Info Santé for medical advice								
0	93.0	84.1 (0.4)	87.5	80.0 (0.6)	67.5 (0.3)	68.9	63.0 (0.8)	64.1 (ns)
1	1.8	1.5 (0.8)	1.5	1.4 (ns)	1.3 (ns)	1.4	s	s
2-6	4.4	11.5 (2.8)	9.5	14.1 (1.6)	17.6 (2.0)	17.3	s	s
7+	0.7	2.9 (4.3)	1.5	4.5 (3.1)	13.6 (10.4)	12.4	15.6 (1.3)	20.2 (1.7)
Concurrent home care use								
No HC use	98.1	89.4 (0.2)	94.5	82.9 (0.3)	66.3 (0.1)	64.6	70.1 (ns)	73.5 (1.5)
Single HC user - existing	1.3	5.4 (4.3)	3.5	7.9 (2.4)	13.2 (4.2)	13.9	12.4 (ns)	9.0 (ns)
Single HC user - new	0.4	3.1 (8.7)	1.2	5.4 (4.8)	12.0 (11.3)	12.6	11.1 (ns)	9.4 (ns)
Multiple HC user (2+)	0.2	2.1 (9.0)	0.8	3.7 (5.0)	8.5 (12.1)	8.9	6.3 (ns)	8.1 (ns)
Concurrent PCH Use								
Non-PCH residents	99.1	97.9 (0.4)	98.5	97.0 (0.5)	97.7 (0.6)	97.2	99.2 (ns)	98.7 (ns)
Existing PCH residents	0.7	1.3 (1.8)	1.2	1.6 (1.3)	0.6 (0.5)	0.8	s	s
New PCH residents	0.1	0.8 (5.9)	0.3	1.5 (5.5)	1.8 (6.6)	2.0	s	s
Concurrent polypharmacy (PPH) use								
No PPH use	97.9	91.9 (0.3)	95.4	87.7 (0.4)	69.8 (0.1)	71.3	65.1 (ns)	66 (ns)
PPH in 1 90 day period	0.8	2.6 (3.2)	1.4	4.0 (2.9)	8.6 (6.4)	8.4	9.3 (ns)	8.4 (ns)
PPH in 2+ 90 day periods	1.3	5.5 (4.5)	3.2	8.3 (2.7)	21.6 (8.4)	20.3	25.6 (ns)	25.6 (ns)
# of ED visits in the previous calendar year								
0	87.5	69.1 (0.3)	78	58.2 (0.4)	21.6 (0.1)	25.8	11.4 (0.4)	4.9 (0.2)
1	9.6	17.8 (2.0)	15.4	21.7 (1.5)	15.4 (ns)	18.0	10.6 (0.5)	3.1 (0.2)
2-6	2.9	12.1 (4.6)	6.5	19.0 (3.4)	40.3 (9.7)	42.8	39.4 (ns)	22.0 (0.4)
7+	0.0	1.0 (26.7)	0.1	1.1 (9.8)	22.6 (254.2)	13.4	38.6 (4.1)	70.0 (15.1)
Death after last Emergency Department visit‡								
No death within 180 days	---	95.2	96.9	93.2 (0.4)	87.0 (0.2)	86.2	87.6 (ns)	92.4 (2.0)
Death within 60 days	---	3.6	1.1	5.1 (2.2)	9.7 (4.4)	10.4	9.0 (ns)	s
Death within 61-180 days	---	1.2	0.7	1.7 (2.4)	3.3 (4.7)	3.5	3.4 (ns)	s

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of ED users is not statistically significant (p<.01) than the reference group.

‡ Data intentionally not provided for WRHA non-users.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

8.2.4 Visit–based Profile

Visit–based characteristics are provided by frequency of ED use in Table 8.9, with the following highlights:

- While the visits of single users were distributed quite evenly between ED sites, 60.4% of the visits for frequent users occurred at HSC and SBGH during the study period, and 54.3% of the visits for highly frequent users occurred at HSC. Conversely, only 6.5% of frequent users' visits and 3.4% of highly frequent users' visits occurred at VGH. The visits of more frequent ED users, therefore, occurred mainly at two sites.[14]

- Frequent and especially highly frequent users were more likely to visit EDs after normal working hours (i.e., after 5:00 PM and prior to 8:00 AM). For example, almost one–third (30.4%) of the visits for highly frequent users occurred between 5:00 PM and 10:00 PM during any day of the week, as compared to 27.1% of frequent users' visits and 23.9% of single users' visits. Also, 34.4% of highly frequent users' visits occurred between 10:00 PM and 8:00 AM during any day of the week, as compared to 30.6% of the visits for frequent users, and 24.5% of the visits for single users.

- Arrival methods, triage code, and disposition status data are especially interesting for highly frequent ED users. While these users arrived to almost half (45.3%) of their visits by ambulance or stretcher, many of their visits (51.7%) were triaged as less–or non–urgent. Also, highly frequent users left the ED during 15.9% of their visits without completing their visit (data combined for "left against medical advice, AMA" and "left not seen" in Table 8.9).

[14]Many ED users visited multiple ED sites during the study period. For example, 2.9% of intermediate users visited three or more ED sites during the study period, as compared to 25.1% of frequent users and 56.1% of highly frequent users (data not shown).

Table 8.9: Distribution of Emergency Department Visits by Visit Characteristics

		Percent of Visits (Odds Ratio)*,†					
	BOX A	BOX B			BOX C		
	Overall Users	Visit Groups			Frequent Sub-groups		
		Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderate (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
ED Site							
CGH	14.4	15.7	15.0 (0.9)	8.9 (0.5)	11.1	6.9 (0.6)	6.0 (0.5)
GGH	12.3	13.9	12.3 (0.9)	9.0 (0.6)	9.9	8.5 (0.9)	7.6 (0.8)
HSC	22.7	17.8	21.3 (1.3)	39.9 (3.1)	32.4	41.5 (1.5)	54.3 (2.5)
SBGH	19.7	18.7	20.1 (1.1)	20.5 (1.1)	21.9	22.1 (ns)	16.3 (0.7)
SOGH	17.7	17.5	18.5 (1.1)	15.1 (0.8)	16.7	14.7 (0.9)	12.3 (0.7)
VGH	13.1	16.5	12.8 (0.7)	6.5 (0.4)	8.1	6.3 (0.8)	3.4 (0.4)
TOTAL N:	200,810	62,660	110,928	27,222	14,787	5,258	7,177
Season of the Year							
Dec/Jan/Feb	24.7	24.7	24.8 (ns)	24.2 (ns)	23.8	24.8 (ns)	24.5 ((ns)
Mar/Apr/May	25.5	25.6	25.5 (ns)	25.3 (ns)	25.3	24.6 (ns)	25.6 (ns)
Jun/Jul/Aug	24.8	24.7	24.9 (ns)	24.9 (ns)	25.0	24.7 (ns)	24.8 (ns)
Sep/Oct/Nov	25.0	25.0	24.8 (ns)	25.7 (ns)	25.9	25.9 (ns)	25.1 (ns)
TOTAL N:	200,810	62,660	110,928	27,222	14,787	5,258	7,177
Day & Time							
Mon-Fri 8 am - 5 pm	35.6	35.9	36.7 (1.03)	30.2 (0.8)	33.6	28.3 (0.8)	24.7 (0.7)
Mon-Thurs 5 pm - 10 pm	14.7	15.1	14.3 (0.9)	15.7 (1.1)	14.6	16.5 (1.2)	17.3 (1.2)
Mon-Thurs 10 pm - 8 am	14.1	13.2	13.9 (1.1)	17.3 (1.4)	16.1	17.9 (1.1)	19.3 (1.3)
Sat & Sun 8 am - 5 pm	13.4	13.8	13.6 (ns)	12.1 (0.9)	12.8	12.3 (ns)	10.5 (0.8)
Fri-Sun 5 pm - 10 pm	10.6	10.7	10.3 (0.95)	11.4 (1.1)	10.7	11.0 (ns)	13.1 (1.3)
Fri-Sun 10 pm - 8 am	11.5	11.3	11.2 (ns)	13.3 (1.2)	12.2	13.9 (1.2)	15.1 (1.3)
TOTAL N:	200,810	62,660	110,928	27,222	14,787	5,258	7,177
Arrival Method							
Ambulance/Stretcher	22.3	18.0	21.8 (1.3)	34.7 (2.4)	29.3	34.3 (1.3)	45.3 (2.0)
Independent Arrival	73.4	77.7	74.1 (0.8)	60.9 (0.5)	66.0	61.0 (0.8)	51.0 (0.5)
Missing/Other	4.2	4.3	4.1 (ns)	4.4 (ns)	4.7	4.7 (ns)	3.8 (0.8)
TOTAL N‡:	161,201	50,970	88,578	21,653	11,551	4,098	6,004
Triage Code							
Resuscitation	0.9	1.0	0.9 (0.9)	0.8 (0.7)	0.9	0.7 (ns)	0.6 (0.7)
Emergent	14.7	13.8	15.1 (1.1)	15.1 (1.1)	16.9	16.2 (ns)	10.6 (0.6)
Urgent	46.1	43.7	47.6 (1.2)	45.3 (1.1)	48.8	46.9 (ns)	37.1 (0.6)
Less Urgent	32.1	35.5	30.4 (0.8)	31.0 (0.8)	27.7	29.4 (ns)	38.8 (1.7)
Non-Urgent	6.2	5.9	5.9 (ns)	7.8 (1.4)	5.7	6.7 (1.2)	12.9 (2.4)
Missing/Other	0.1	0.1	0.1 (ns)	0.1 (ns)	0.1	0 (ns)	0.1 (ns)
TOTAL N:	200,810	62,660	110,928	27,222	14,787	5,258	7,177
Visit Duration							
0-<2 Hours	21.2	24.1	20.7 (0.8)	16.4 (0.6)	16.4	15.0 (ns)	17.4 (ns)
2-<4 Hours	30.9	33.3	30.3 (0.9)	27.5 (0.8)	27.1	27.3 (ns)	28.3 (ns)
4-<6 Hours	20.4	19.9	20.3 (ns)	21.6 (1.1)	20.4	22.5 (1.1)	22.9 (1.2)
6+ Hours	27.3	22.5	28.3 (1.4)	34.2 (1.8)	35.7	35.0 (ns)	31.3 (0.8)
Missing/Other	0.3	0.3	0.3 (ns)	0.2 (ns)	0.3	0.2 (ns)	0.2 (ns)
TOTAL N‡:	165,224	51,685	90,438	23,101	12,324	4,485	6,292
Disposition Code							
Discharge Home	72.5	76.3	70.7 (0.8)	71.2 (0.8)	69.0	71.6 (1.1)	75.2 (1.4)
Admit to Inpatient Bed	17.5	15.3	19.5 (1.3)	14.4 (0.9)	19.2	13.2 (0.6)	6.0 (0.3)
Transferred	1.1	0.7	1.4 (2.1)	1.0 (1.5)	1.1	0.8 (ns)	0.7 (0.6)
Left AMA/Before Disch§	0.6	0.4	0.5 (1.4)	1.3 (3.2)	1.0	1.4 (ns)	1.8 (1.9)
Left Not Seen	6.2	5.6	5.7 (ns)	9.2 (1.7)	6.6	9.4 (1.5)	14.1 (2.3)
Missing/Other	2.2	1.8	2.2 (1.2)	2.9 (1.7)	3.1	3.6 (ns)	2.2 (0.7)
TOTAL N‡:	165,224	51,685	90,438	23,101	12,324	4,485	6,292

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of ED users is not statistically significant (p<.01) than the reference group.

‡ Not all hospitals code arrival, visit duration, and disposition code.

§ Left against medical advice/before discharge.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

8.3 Additional Analyses

8.3.1 Multivariable Analyses to Define Frequent ED Users

Results in this chapter are based on univariate analyses, where findings are provided using one variable at a time. Many of these variables are correlated (e.g., older people are more likely to have comorbid diseases, people with mental illnesses may live in certain CAs, etc). It is important to determine measures that uniquely define frequent ED users, overall and across ED sites.

Multivariable analysis was used for this purpose. Details of how this analysis was conducted, and the complete results from this analyses, are provided in Appendix II of this report. Highlights of these results are summarized as follows:

- When modeled simultaneously, all risk factors independently differentiate frequent from single ED users, and frequent (versus single) users were more likely to live in the lowest income areas, live in the core of Winnipeg (Downtown or Point Douglas), have comorbid physical and mental illness, and have multiple visits with GPs and in–patient hospitalizations. After controlling for the effect of these risk factors, the odds of being a frequent user was greater for younger people and for males. These last results are different from univariate findings, because the prevalence of many diseases was greater for older people.

- Because all risk factors differentiate frequent from single ED users, **Wald χ^2 statistics** were used to approximate the relative importance of each measure. These statistics demonstrate that comorbid mental illness is by far the strongest determinant of frequent ED use, followed to a lesser extent by comorbid physical disease, frequent GP use, and living in the Winnipeg core. Risk factors of intermediate importance include having multiple hospital separations, living in a lower income area and being male. After accounting for the influence of all other risk factors, patient age, while statistically significant, was least influential in differentiating frequent from single ED users.

- Factors that differentiate frequent from single users are similar across most ED sites. Some exceptions are noted for HSC and SBGH. For example, frequent users at SBGH and HSC were much more likely to live in the Winnipeg core, and this result was not reported for other ED sites in the WRHA. Also, while frequent users at all ED sites were more likely to have a past mental illness diagnosis, the risk of having two or more different mental illness diagnoses was especially high for frequent users at HSC. Perhaps not surprisingly, frequent versus single ED users at HSC were more likely to be younger (17-64 years old), while patient age did not differentiate frequent from single users at any other ED sites. Lastly, frequent versus single ED users at most ED sites were more likely to have muliple in-patient hospitalizations. This was not reported for frequent ED users at HSC and SBGH.

8.3.2 Follow–up Data on Health Links–Info Santé

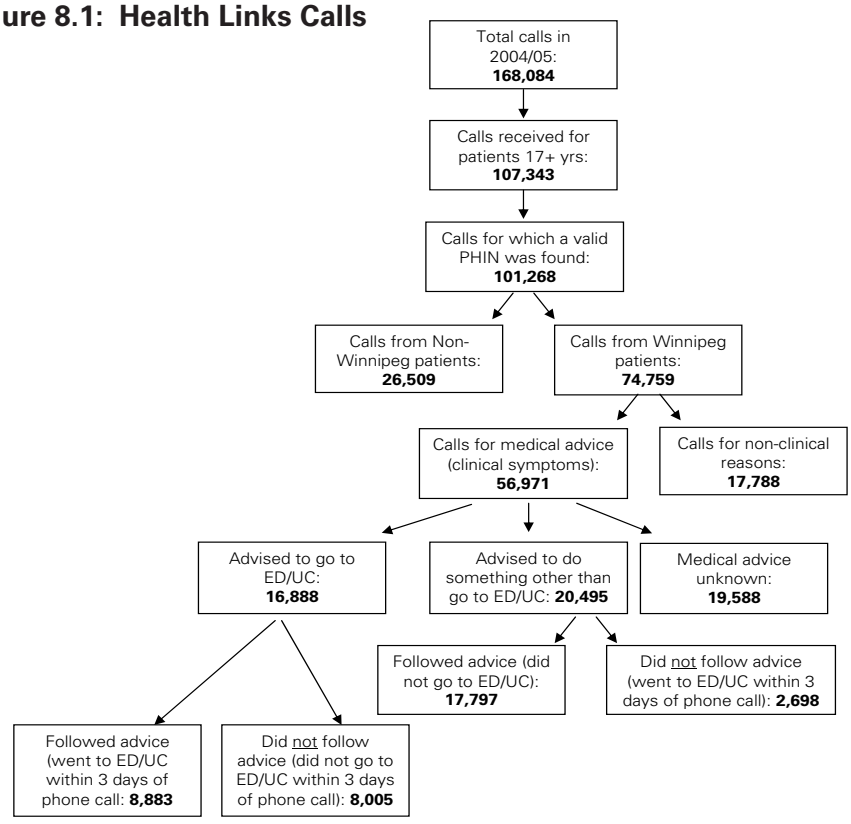
In addition to describing frequent users, we were interested in describing ED/UC use resulting from calls to Health Links–Info Santé. A schematic of the calls to Health Links–Info Santé is provided in Figure 8.1. Highlights from this analysis are summarized as follows:

- In the 2004/05 fiscal year, people in Manitoba made 168,084 calls to Health Links–Info Santé; 107,343 of these calls were for people 17+ years old. Scrambled but identifying patient–level information was available for the majority of these latter calls (101,268), which means that they can linked to other administrative files housed in the Repository. In total, 73.5% (74,759) of these 'linkable' calls were made by Winnipeg residents.

- Callers to Health Links–Info Santé generally request information (e.g., "where is the nearest walk–in clinic?") or seek medical advice (e.g., "I have been vomiting for several hours. What should I do?"). Of the total calls made by Winnipeg adult residents, 76.2% (56,971) were for medical advice. Incomplete data are available for 34.4% (19,588) of these medical advice calls. For these visits, we cannot determine the type of advice that was given by Health Links–Info Santé nursing staff.

- Patients were advised to go to ED/UC during 16,888 medical advice calls. People followed this advice 52.5% of the time, and visited an ED/UC within three days. This means that people did not follow the advice of Health Links–Info Santé staff (i.e., did not go to ED/UC when they were told to) during 47.4% of these calls.

Figure 8.1: Health Links Calls



Source: Manitoba Centre for Health Policy, 2008

- Patients were advised to do something other than visit EDs/UC during 20,495 medical advice calls to Health Links–Info Santé. People followed this advice for 86.8% of these calls and did not visit an ED/UC within three days. This means that people did not follow the advice of Health Links–Info Santé staff (i.e., visited an ED/UC when they were told to do something else) during only 12.7% of these calls.

8.4 Chapter Summary

Most researchers agree that frequent ED users have complex health problems including mental illnesses. These individuals often belong to socially disadvantaged groups and also use a disproportionate volume of other health care services (Bernstein, 2006; Hansagi et al., 2001; Hunt et al., 2006; Ovens and Chan, 2001; Zuckerman and Shen, 2004).

Univariate results of the current research support these general findings. Compared to single users, many frequent ED users were older, impoverished, and lived in Winnipeg's core area. Also compared to single users, a disproportionate number of frequent ED users had comorbid chronic physical diseases, and many of them had mental illnesses such as personality disorders, schizophrenia and substance abuse. Frequent users also had many contacts with other health care providers, and were often chronic frequent ED patients.

Highly frequent ED users are also described in this chapter. Their profile is, in many instances, an exaggerated version of frequent users. For example, the vast majority of highly frequent ED users had comorbid mental illnesses, and many of these patients had a previous diagnosis with substance abuse, schizophrenia, or dementia. Although many of these patients also had frequent contacts with GPs, they were not more likely to visit specialist physicians or to be hospitalized. Further, many of these patients were younger, impoverished, and lived in the Winnipeg core area. A disproportionate number of highly frequent ED users arrived at their visits by ambulance, only to be triaged as less–or non–urgent, or to leave without being seen.

Multivariable analyses demonstrate that, of all risk factors, mental illness is the strongest determinant of frequent ED use, followed to a lesser extent by physical disease, having many GP visits, and living in the Winnipeg core. In most instances, this frequent user profile is the same for all ED sites. Some exceptions exist for frequent users at HSC and SBGH, where, for example, patients were more likely to live in the Winnipeg core. Also, the prevalence of mental illness was especially high for frequent users at these sites versus at all other EDs in the WRHA. Decision–makers can use this latter information to help optimize patient care.

CHAPTER 9: PROFILES OF URGENT CARE (UC) USERS

This chapter describes the unique demographic, health–related and visit–based profile of UC users, by frequency of use category.

9.1 Important Information to Help Interpret Chapter Results

Important methodological details about this chapter are summarized as follows:

- Frequent UC users are described using risk factors similar to those used for EDs. Differences in these risk factors are highlighted in Appendix 1.

- All results in this chapter are presented in the same manner as was done in Chapter 8. UC users are compared to WRHA non–users in *BOX A*, intermediate and frequent UC users are compared to single users in *BOX B*, and sub–categories of frequent users are compared in *BOX C*. ORs help identify the most obvious significant differences between frequency of use categories.

- Because UC users are fewer in number, differences between frequency of use groups are at times quite substantial yet non–significant ("ns"), particularly for sub–groups of frequent users. Some of these more substantial differences are highlighted in this chapter.

- Electronic copies of each table in this chapter are provided on the MCHP website.

9.2 Chapter Results

9.2.1 Demographic Profile

The demographic profile of UC users is provided in Table 9.1 with the following highlights:

- The vast majority (85.3%) of all UC users in the study period were younger than 65 years, and this age distribution was similar by frequency of use. As one exception, while results are non-significant, 7.9% of highly frequent users were 85+ years old, as compared to 2.3% of moderately frequent users.

- Compared to single users, frequent UC users were more often male—for example, 55.2% of single users versus 48.0% of frequent users were female. While non–significant, this trend was also evident for highly frequent users, and 42.1% of these individuals were female.

- During the study period, 36.5% of frequent versus 24.0% of single UC users resided in the lowest Winnipeg income areas. No differences in income quintile were found for frequent user sub–groups.

- Frequent UC users tend to live in the River Heights and Downtown CAs, which are adjacent to the Misericordia Health Care Centre. During the study period, 33.1% of single users versus 52.9% of frequent UC users lived in these two CAs.

Table 9.1: Distribution of Urgent Care Users by Patient Demographics

			Percent of Users (Odds Ratio)*,†					
	BOX A		BOX B			BOX C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	506,185	22,973	16,144	6,292	537	351	110	76
Age Group								
17-24 yrs	13.5	17.2 (1.3)	17.6	16.8 (ns)	10.6 (0.6)	10.8	9.1 (ns)	11.8 (ns)
25-44 yrs	36.7	40.2 (1.2)	39.6	41.9 (1.1)	38.7 (ns)	41.9	34.5 (ns)	30.3 (ns)
45-65 yrs	32.4	27.9 (0.8)	27.8	27.7 (ns)	32.4 (ns)	30.8	35.5 (ns)	35.5 (ns)
65-74 yrs	8.4	6.4 (0.7)	6.5	6.0 (ns)	8.8 (ns)	8.8	10.9 (ns)	s
75-84 yrs	6.5	5.9 (0.9)	6.0	5.4 (ns)	6.5 (ns)	5.4	s	s
85+ yrs	2.5	2.4 (ns)	2.4	2.3 (ns)	3.0 (ns)	2.3	s	7.9 (ns)
Gender								
Female	51.8	55.2 (1.1)	55.2	55.9 (ns)	48.0 (0.8)	49.0	49.1 (ns)	42.1 (ns)
Income Quintile								
Q1 (Lowest)	19.7	26.6 (1.5)	24.0	32.6 (1.5)	36.5 (1.8)	36.8	35.5 (ns)	36.8 (ns)
Q2	19.2	21.3 (1.1)	20.9	22.2 (ns)	23.1 (ns)	22.8	25.5 (ns)	21.1 (ns)
Q3	18.9	17.9 (0.9)	18.4	17.0 (0.9)	12.8 (0.7)	12.0	16.4 (ns)	11.8 (ns)
Q4	20.1	14.8 (0.7)	15.8	12.5 (0.8)	10.1 (0.6)	9.7	9.1 (ns)	13.2 (ns)
Q5 (Highest)	20.9	19 (0.9)	20.5	15.3 (0.7)	16.8 (ns)	17.7	13.6 (ns)	17.1 (ns)
Missing/Other	1.2	0.5 (0.4)	0.4	0.5 (ns)	0.7 (ns)	s	0	0
Winnipeg Community Areas								
Assiniboine South	5.6	5.2 (0.9)	5.5	4.5 (0.8)	4.5 (ns)	5.4	s	s
Fort Garry	9.9	6.4 (0.6)	6.8	5.5 (0.8)	5.6 (ns)	4.8	5.5 (ns)	9.2 (ns)
St. Vital	9.4	5.7 (0.6)	6.4	4.1 (0.6)	3.9 (ns)	4.3	s	s
St. Boniface	7.7	4.6 (0.6)	5.0	3.5 (0.7)	4.7 (ns)	6.0	s	s
River Heights	8.5	15.9 (2.0)	15.3	17.3 (1.2)	19.6 (1.3)	18.8	21.8 (ns)	19.7 (ns)
Transcona	5.0	2.6 (0.5)	2.9	2.1 (0.7)	s	0.6	0.0	s
St. James - Assiniboia	9.2	6.4 (0.7)	6.8	5.7 (0.8)	4.8 (ns)	4.8	5.5 (ns)	s
Seven Oaks	9.1	5.4 (0.6)	5.8	4.6 (0.8)	3.5 (ns)	3.4	s	s
River East	14.4	9.0 (0.6)	9.6	7.9 (0.8)	5.8 (0.6)	4.8	8.2 (ns)	s
Inkster	4.5	3.6 (0.8)	3.6	3.5 (ns)	2.8 (ns)	2.3	s	s
Downtown	10.3	21.1 (2.3)	17.8	28.4 (1.8)	33.3 (2.3)	33.3	30 (ns)	38.2 (ns)
Point Douglas	5.9	5.6 (0.9)	5.3	6.2 (1.2)	5.4 (ns)	5.4	7.3 (ns)	s
Outside Winnipeg	0.0	8.2 (0.0)	9.0	6.6 (0.7)	4.5 (0.5)	4.6	6.4 (ns)	s
Missing/Other	0.6	0.3 (0.5)	0.2	0.4 (ns)	s	1.4	s	0.0

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of UC users is not statistically significant (p<.01) than the reference group.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

9.2.2 User Health Profile

Diagnostic rates for select physical and mental diseases are provided in Tables 9.2 and 9.3, by frequency of UC use. Highlights of these data are as follows:

- During the study period, frequent UC users were more likely to have a previous diagnosis of physical diseases such as asthma and arthritis (Table 9.2). For example, 29.4% of non–UC users had been diagnosed previously with arthritis, as compared to 36.9% of all UC users and 49.9% of frequent users. Also, 12.8% of non–UC users had been diagnosed previously with two or more of these physical diseases, as compared to 17.2% of all UC users and 28.3% of frequent users.

- While comparisons are non-significant among frequent user sub–groups, it is worth noting that many highly frequent users had a past diagnosis with asthma (34.2%), ischemic heart disease (15.8%), and **comorbid chronic physical diseases** (36.8%).

Table 9.2: Distribution of Urgent Care Department Users by Previous Diagnosis of Select Physical Diseases

	Percent of Users (Odds Ratio)*,†							
	BOX A		BOX B			BOX C**		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	506,185	22,973	16,144	6,292	537	351	110	76
Physical Diseases								
Arthritis	29.4	36.9 (1.4)	35.1	40.3 (1.3)	49.9 (1.8)	47.0	59.1 (ns)	50.0 (ns)
Asthma	11.2	17.2 (1.7)	15.9	20.1 (1.3)	23.8 (1.7)	22.2	21.8 (ns)	34.2 (ns)
Diabetes	7.9	9.1 (1.2)	8.4	10.3 (1.3)	16.2 (2.1)	15.7	17.3	17.1 (ns)
Ischemic Heart Disease	7.2	7.2 (ns)	6.9	7.9 (1.2)	9.9 (1.5)	8.5	10.0 (ns)	15.8 (ns)
Stroke	3.5	3.9 (1.1)	3.6	4.3 (ns)	6.1 (1.7)	5.4	8.2 (ns)	s
# Comorbid Physical Diseases								
0	57.7	48.7 (0.7)	51	44.2 (0.8)	33 (0.5)	35.3	30 (ns)	26.3 (ns)
1	29.5	34.1 (1.2)	33.3	35.7 (1.1)	38.7 (1.3)	39	39.1 (ns)	36.8 (ns)
2+	12.8	17.2 (1.4)	15.7	20.1 (1.4)	28.3 (2.1)	25.6	30.9 (ns)	36.8 (ns)

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users). Percentages will not total 100% as individuals can have more than 1 health condition.

† 'ns' indicates that the recorded of UC users is not statistically significant (p<.01) than the reference group.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

- Similar results are reported for mental illnesses (Table 9.3). For example, 6.7% of frequent UC users had been diagnosed previously with schizophrenia, as compared to 1.4% of single users. Similarly, 7.8% of frequent users versus 2.5% of single UC users had been diagnosed previously with dementia, and a greater proportion of frequent users (18.8%) versus single (7.9%) users had been diagnosed previously with substance abuse.

Table 9.3: Distribution of Urgent Care Users by Previous Diagnosis of Select Mental Diseases

	Percent of Users (Odds Ratio)*,†							
	BOX A		BOX B			BOX C		
	Overall		User Groups			Frequent Sub-groups		
	Non-users	All Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	506,185	22,973	16,144	6,292	537	351	110	76
Mental Diseases								
Anxiety Group	8.7	14.2 (1.7)	12.2	18.8 (1.7)	22.7 (2.1)	21.7	26.4 (ns)	22.4 (ns)
Dementia	2.6	3.1 (1.2)	2.5	4.0 (1.6)	7.8 (3.3)	6.6	7.3 (ns)	14.5 (ns)
Depression	21.1	31.9 (1.8)	29.0	38.4 (1.5)	43.0 (1.9)	43.6	44.5 (ns)	38.2 (ns)
Personality Disorders	1.0	3.1 (3.1)	2.3	4.8 (2.1)	7.8 (3.6)	6.8	7.3 (ns)	13.2 (ns)
Schizophrenia	1.0	2.0 (2.0)	1.4	3.1 (2.2)	6.7 (5.1)	7.1	3.6 (ns)	9.2 (ns)
Substance Abuse	5.1	9.3 (1.9)	7.9	12.0 (1.6)	18.8 (2.7)	19.1	15.5 (ns)	22.4 (ns)
# Comorbid Mental Illnesses								
0	72.0	60.3 (0.6)	63.6	53.2 (0.7)	47.3 (0.5)	47.6	45.5 (ns)	48.7 (ns)
1	19.0	23.7 (1.3)	23.0	25.4 (1.1)	22.9 (ns)	22.2	26.4 (ns)	21.1 (ns)
2+	9.0	16 (1.9)	13.4	21.4 (1.8)	29.8 (2.7)	30.2	28.2 (ns)	30.3 (ns)

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users). Percentages will not total 100% as individuals can have more than 1 mental illness.

† 'ns' indicates that the percent of UC users is not statistically significant (p<.01) than the reference group.

s - data suppressed due to small numbers

Source: Manitoba Centre for Health Policy, 2008

9.2.3 Concurrent Health Care Use Profile

Frequent UC users had a total of 17,247 contacts with GPs, specialist physicians, EDs, hospitalizations (in–patients only), and Health Links–Info Santé, with a median of 23 contacts in the one–year study period (Table 9.4). While negligible in number (76 patients), highly frequent UC users had 3,569 contacts with the health care system, with a median of 40 contacts during this time. Further details of these health care contacts are provided in the following text.

Table 9.4: Total Health Care Contacts Made by Urgent Care Users During the Study Period

	Users (%)	Other Contacts* (%)	Total Contacts (including UC visits, %)	Median Total Contacts Per User
Total N	22,973	209,243	248,520	
Single Users (1 Visit)	70.3	61.1	57.9	7
Intermediate Users (2-6 Visits)	27.4	33.8	35.1	10
Frequent Users (7+ Visits)	2.3	5.1	6.9	23
Moderately Frequent (7-11 Visits)	1.5	3.3	3.9	19
Very Frequent (12-17 Visits)	0.5	1.1	1.6	26
Highly Frequent (18+ Visits)	0.3	0.7	1.4	40

* Includes general practitioners, specialist physicians, emergency departments, hospital, & Health Links-Info Santé

Source: Manitoba Centre for Health Policy, 2008

Frequent UC users often had multiple contacts with physicians and hospitals during the study period (Table 9.5), as well as other health care services (Table 9.6). Highlights of these findings are summarized as follows:

- In total, 16.4% of single UC users versus 35.4% of frequent users visited a GP nine or more times during the study period. Similarly, 10.1% of single UC users also had five or more specialist physician visits during the study period, as compared to 22.2% of frequent UC users. Lastly, 7.1% of single versus 15.5% of frequent UC users were hospitalized one or more times during the study period. For each of these outcomes, comparisons between frequent user sub–groups are non–significant. However, many more highly frequent (51.2%) versus moderately frequent (31.3%) UC users had three or more visits to specialist physicians.

Table 9.5: Distribution of Urgent Care Users by Frequency of Physician Visits and Hospitalizations

	Percent of Users (Odds Ratio)*,†							
	BOX A		BOX B			BOX C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	All Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	506,185	22,973	16,144	6,292	537	351	110	76
# of Primary Care Visits								
0	22.6	14.6 (0.6)	15.7	12.0 (0.7)	10.6 (0.6)	10.0	13.6 (ns)	9.2 (ns)
1-2	27.0	23.7 (0.8)	25.1	20.9 (0.8)	17.1 (0.6)	17.9	16.4 (ns)	14.5 (ns)
3-4	19.2	19.3 (ns)	19.9	18.2 (0.9)	13.0 (0.6)	12.5	12.7 (ns)	15.8 (ns)
5-8	19.7	23.6 (1.3)	23.0	25.1 (1.1)	23.8 (ns)	25.4	16.4 (ns)	27.6 (ns)
9+	11.5	18.8 (1.8)	16.4	23.7 (1.6)	35.4 (2.8)	34.2	40.9 (ns)	32.9 (ns)
# of Different Primary Care Physicians Visited								
0	22.6	14.6 (0.6)	15.7	12.0 (0.7)	10.6 (0.6)	10.0	13.6 (ns)	9.2 (ns)
1	43.2	35.9 (0.7)	37.1	33.1 (0.8)	29.1 (0.7)	29.9	24.5 (ns)	31.6 (ns)
2-3	29.3	37.2 (1.4)	36.7	38.2 (ns)	38.2 (ns)	35.6	38.2 (ns)	50.0 (ns)
4-5	4.2	9.3 (2.3)	8.2	11.5 (1.5)	14.3 (1.9)	15.4	16.4 (ns)	s
6+	0.8	3.2 (4.1)	2.3	5.1 (2.3)	7.8 (3.7)	9.1	7.3 (ns)	s
# of Specialist Physician Visits								
0	64.9	54.2 (0.6)	56.9	48.8 (0.7)	36.7 (0.4)	38.5	38.2 (ns)	26.3 (ns)
1-2	21.0	24.8 (1.2)	24.1	26.5 (1.1)	28.3 (ns)	30.2	26.4 (ns)	22.4 (ns)
3-4	7.2	9.4 (1.3)	8.9	10.5 (1.2)	12.8 (1.5)	11.4	12.7 (ns)	19.7 (ns)
5-8	4.5	7.0 (1.6)	6.4	8.2 (1.3)	10.1 (1.6)	9.1	11.8 (ns)	11.8 (ns)
9+	2.3	4.5 (2.0)	3.7	6.0 (1.7)	12.1 (3.6)	10.8	10.9 (ns)	19.7 (ns)
# of Hospitalizations								
0	94.1	92.0 (0.7)	92.8	90.6 (0.7)	84.5 (0.4)	84.9	84.5 (ns)	82.9 (ns)
1	4.7	6.0 (1.3)	5.4	7.2 (1.4)	9.5 (1.8)	9.4	9.1 (ns)	s
2+	1.2	2.0 (1.7)	1.7	2.2 (ns)	6.0 (3.6)	5.7	6.4 (ns)	s
# of Days in Hospital								
0	93.9	92.0 (0.8)	92.8	90.6 (0.7)	84.5 (0.4)	84.9	84.5 (ns)	82.9 (ns)
1-7	4.0	5.2 (1.3)	4.8	6.1 (1.3)	6.5 (ns)	6.3	6.4 (ns)	7.9 (ns)
8+	2.1	2.7 (1.3)	2.3	3.3 (1.4)	8.9 (4.1)	8.8	9.1 (ns)	9.2 (ns)

*Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of UC users is not statistically significant (p<.01) than the reference group.

s - data suppressed due to small numbers.

Source: Manitoba Centre for Health Policy, 2008

- Similar findings are reported for other types of health care services (Table 9.6). For example, 27.6% of frequent UC users versus 9.0% of single users also visited EDs on two or more occasions during the study period. Further, while results are non–significant, 9.5% of frequent users versus 3.0% of single UC users placed seven or more calls to Health Links–Info Santé during this time. Also, 4.2% of single UC users were home care clients at some point during the study period, as compared to 13.2% of frequent users and 27.6% of highly frequent users. Lastly, 8.9% of frequent UC users, and 19.7% of highly frequent users could be defined as chronic patients, with 7+ UC visits in consecutive years.

9.2.4 Visit-based Profile

Visit–based characteristics are provided by frequency of UC use in Table 9.7. Results are summarized as follows:

- Approximately one–quarter of UC visits were recorded in each season of the study period. Also, 58.1% of all UC visits occurred between the hours of 8:00 AM and 5:00 PM, while 17.7% of UC visits occurred from 10:00 PM to 8:00 AM. These patterns of results are similar across frequency of use groups.

- Frequent UC users have some distinct visit–based characteristics. For example, very few of the visits for single users were scheduled in advance, as compared to 67.1% of the visits for frequent UC users, and 79.2% of the visits for highly frequent users. Also, wait times were inversely related to frequency of UC use; 54.2% of single users' visits had wait times less than two hours, as compared to 72.9% of the visits for frequent users, and 77.9% of visits for highly frequent users. Lastly, very few of the visits for frequent users ended without patients being seen ("left not seen" in Table 9.6). This trend was especially noticeable for highly frequent UC users, where patients left without being seen during only 2.0% of visits.

Table 9.6: Distribution of Urgent Care Users by Use of Additional Health Care Services

			Percent of Users (Odds Ratio)*,†					
	BOX A		BOX B			BOX C		
	Overall		User Groups			Frequent Sub-groups		
	WRHA Non-users	All Users	Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderately (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	506,185	22,973	16,144	6,292	537	351	110	76
# of Concurrent Emergency Department Visits								
0	83.9	71.6 (0.5)	75.1	64.3 (0.6)	53.1 (0.4)	54.4	50.9 (ns)	50.0 (ns)
1	11.3	16.9 (1.6)	15.9	19.1 (1.2)	19.4 (ns)	17.7	23.6 (ns)	21.1 (ns)
2-6	4.6	10.2 (2.3)	8.3	14.3 (1.8)	17.7 (2.4)	17.7	17.3 (ns)	18.4 (ns)
7+	0.2	1.4 (6.9)	0.7	2.4 (3.7)	9.9 (16.4)	10.3	8.2 (ns)	10.5 (ns)
# of Concurrent Contacts with Health Links-Info Santé for Medical Advice								
0	91.8	77.0 (0.3)	79.1	72.3 (0.7)	70.9 (0.7)	69.5	77.3 (ns)	68.4 (ns)
1	2.0	2.0 (ns)	2.0	2.1 (ns)	1.9 (ns)	2.6	0 (ns)	s
2-6	5.2	16.6 (3.7)	16.0	18.3	17.7	17.1	16.4 (ns)	22.4 (ns)
7+	1.0	4.3	3.0	7.3 (1.2)	9.5 (ns)	10.8	6.4 (ns)	s
Concurrent Home Care Use								
No HC use	96.6	95.2 (0.7)	95.9	94.2 (0.7)	86.8 (0.3)	90.9	83.6 (ns)	72.4 (0.3)
Single HC User-existing**	2.0	2.5 (1.3)	2.3	2.8 (ns)	5.2 (2.4)	3.7	s	13.2 (3.9)
Single HC user - new**	0.8	1.5 (1.8)	1.2	2.0 (1.7)	5.8 (5.1)	3.7	8.2 (ns)	11.8 (3.5)
Multiple HC user (2+)	0.6	0.8 (1.4)	0.7	1.0 (1.6)	2.2 (3.6)	1.7	s	s
Concurrent Polypharmacy (PPH) Use								
No PPH use	96.9	95.7 (0.7)	96.5	94.4 (0.6)	89.1 (0.3)	91.1	88.1 (ns)	81.1 (0.4)
PPH in 1 90 day period	1.1	1.5 (1.3)	1.2	2 (1.6)	4.3 (3.7)	3.4	s	8.1 (ns)
PPH in 2+ 90 day periods	2.0	2.8 (1.4)	2.3	3.7 (1.6)	6.6 (3.0)	5.4	s	10.8 (ns)
# of Urgent Care Visits in the Previous Calendar Year								
0	96.6	82.4 (0.2)	87.0	72.6 (0.4)	60.5 (0.2)	60.1	64.5 (ns)	56.6 (ns)
1	2.8	11.2 (4.5)	9.6	15.4 (1.7)	12.3 (ns)	12.5	14.5 (ns)	7.9 (ns)
2-6	0.6	5.7 (10.2)	3.3	11.0 (3.7)	18.2 (6.6)	20.2	13.6 (ns)	15.8 (ns)
7+	0.0	0.6 (13.8)	0.2	1.0 (5.1)	8.9 (47.9)	7.1	7.3 (ns)	19.7 (3.2)

* Odds ratios are reported for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of UC users is not statistically significant (p<.01) than the reference group.

** Existing HC user (record open prior to study period); New HC user (record open during study period)

s - data suppressed due to small numbers

Note: PCH use has been removed from this table as fewer than 1% of users in all categories were either existing or new PCH residents.
Note: Mortality within 180 days of last UC visit was removed since it did not occur for 99% of users in all categories. As one exception, 3.9% of highly frequent users died within 180 days of their last UC visit.

Source: Manitoba Centre for Health Policy, 2008

Table 9.7: Distribution of Urgent Care Visits by Visit Characteristics

	Percent of Visits (Odds Ratio)*,†					
	BOX A	BOX B			BOX C		
	Overall Users	Visit Groups			Frequent Sub-groups		
		Single (1 visit)	Intermediate (2-6 visits)	Frequent (7+ visits)	Moderate (7-11 visits)	Very (12-17 visits)	Highly (18+ visits)
TOTAL N:	39,277	16,144	16,632	6,501	2,936	1,528	2,037
Season of the Year							
Dec/Jan/Feb	24.9	24.6	25.1 (ns)	25.1 (ns)	24.9	25.5 (ns)	25.2 (ns)
Mar/Apr/May	25.5	25.6	25.5 (ns)	25.3 (ns)	25.6	26.2 (ns)	24.2 (ns)
Jun/Jul/Aug	25.2	25.6	24.7 (ns)	25.7 (ns)	25.9	26.6 (ns)	24.7 (ns)
Sep/Oct/Nov	24.3	24.2	24.7 (ns)	23.9 (ns)	23.5	21.7 (ns)	25.9 (ns)
Time of Day							
Mon-Fri 8 am - 5 pm	42.1	41.4	42.0 (ns)	43.9 (1.1)	43.1	44.3 (ns)	44.7 (ns)
Mon-Thurs 5 pm - 10 pm	14.5	14.9	13.6 (0.9)	15.5 (ns)	15.5	15.6 (ns)	15.3 (ns)
Mon-Thurs 10 pm - 8 am	10.0	9.2	11.1 (1.2)	9.2 (ns)	10.1	8.4 (ns)	8.4 (ns)
Sat & Sun 8 am - 5 pm	16.0	16.5	15.6 (ns)	15.8 (ns)	14.7	15.2 (ns)	17.8 (1.3)
Fri-Sun 5 pm - 10 pm	9.8	10.7	9.3 (0.9)	9.2 (0.9)	9.8	10.1 (ns)	7.6 (0.8)
Fri-Sun 10 pm - 8 am	7.7	7.4	8.4 (1.2)	6.5 (ns)	6.8	6.4 (ns)	6.2 (ns)
Triage Code							
Resuscitation	s	s	s	s	s	s	s
Emergent	2.5	3.0	2.6 (ns)	s	s	s	1.1 (ns)
Urgent	26.0	32.9	25.6 (0.7)	9.6 (0.2)	13.1	6.7 (0.5)	6.8 (0.5)
Less Urgent	45.9	55.8	47.1 (0.7)	17.9 (0.2)	24.7	15.2 (0.6)	10.1 (0.3)
Non-Urgent	7.0	7.4	7.5 (ns)	4.5 (0.6)	5.3	s	2.7 (0.5)
Scheduled	18.6	0.7	17.1 (29.2)	67.1 (289.1)	55.8	72.6 (2.1)	79.2 (3.0)
Missing/Other	s	0.1	0.1 (ns)	s	s	0.0	s
Wait Time††							
0-2 hours	59.8	54.2	64.0 (1.5)	72.9 (2.3)	71.8	70.1 (ns)	77.9 (1.4)
2-4 hours	29.0	33.0	26.5 (.07)	18.3 (0.5)	18.5	20.3 (ns)	15.7 (ns)
4-6 hours	9.0	10.7	7.4 (0.7)	6.1 (0.5)	7.4	5.6 (ns)	3.9 (0.5)
6+ hours	1.6	1.8	1.4 (ns)	1.5 (ns)	1.3	s	s
Missing/Other	0.5	0.3	0.7 (2.7)	1.2 (4.5)	1.0	s	s
Care Time††							
0-2 hours	84.6	84.9	84 (ns)	85.9 (ns)	84.5	88.0 (ns)	87.0 (ns)
2-4 hours	10.8	10.9	10.9 (ns)	10.0 (ns)	11.1	8.3 (ns)	9.1 (ns)
4-6 hours	2.6	2.5	3.0 (ns)	1.7 (ns)	1.8	1.2 (ns)	2.1 (ns)
6+ hours	1.9	1.7	2.1 (ns)	2.4 (ns)	2.6	2.5 (ns)	1.7 (ns)
Missing/Other	0.0	s	s	s	0.0	0.0	0.0
Disposition Code							
Discharge Home	91.5	89.3	91.9 (1.4)	96.0 (2.9)	94.9	96.7 (1.6)	97.0 (1.7)
Transferred	2.2	2.9	2.1 (0.7)	0.8 (0.3)	1.1	0.7 (ns)	0.6 (ns)
Left AMA/Before Disch	0.4	s	0.5 (ns)	0.3 (ns)	0.4	0 (ns)	s
Left Not Seen	5.8	7.4	5.4 (0.7)	2.8 (0.4)	3.5	2.5 (ns)	2.0 (0.6)
Missing/Other	0.1	s	0.1 (ns)	0.1 (22.4)	s	s	s

* Odds ratios are recorded for user groups that are significantly different (p<.01) than the reference group (BOX A: non-users; BOX B: single users; BOX C: moderate users).

† 'ns' indicates that the percent of UC visits is not statistically significant (p<.01) than the reference group.

†† Wait and Care times exclude records with missing MD assessment date and time

s - data suppressed due to small numbers

Note: Arrival method data excluded from table because 100% of UC users arrived independently

Source: Manitoba Centre for Health Policy, 2008

9.3 Chapter Summary

Frequent UC and ED users share some similar characteristics, at least in terms of disease and their use of additional health care services. For example, as compared to single users, frequent ED and UC users were both more likely to have been diagnosed in the past with co-morbid mental and physical diseases. Similarly, compared to single users, frequent UC and ED users had many more contacts with the health care system, including GP and specialist physician visits, hospitalizations, and use of additional health care services such as home care and Health Links-Info Santé.

Frequent UC and ED users also have some very distinct differences. For example, most UC users were similar in age while highly frequent ED users tended to be younger. Further, more frequent UC users lived nearby the Misericordia UC Centre, while frequent and especially highly frequent ED users tended to live in the Winnipeg core. Also, while a disproportionate number of frequent and especially highly frequent ED users left their visits without being seen, this did not happen with frequent UC users. Lastly, while many visits of frequent ED users occurred after normal working hours (i.e., between 5:00 PM and 8:00 AM), the majority of visits for frequent UC users occurred during the day.

Many of the discrepancies between frequent ED and UC users are likely related to scheduled visits. These visits were excluded from EDs due to data quality issues, but made up about 6.0% of all ED visits. Comparatively, scheduled visits made up about 17.0% of all UC visits, and many of the visits made by frequent and highly frequent UC users were scheduled in advance. These results suggest that UC may be fulfilling a much needed role in Winnipeg, by providing follow-up and ongoing care to people in need. Regardless, many of the issues for frequent ED versus UC users seem to be different.

CHAPTER 10: OVERVIEW AND DISCUSSION OF SECTION II

One of the goals of this research has been to describe the demographic, health, health care use, and visit–based profile of frequent ED/UC users. These patient characteristics are summarized in the following three statements:

1. *Frequent ED users have unique health and health care use characteristics*. Frequent and especially highly frequent ED users were found to live in areas of lower income, and to have an especially high prevalence of mental illness. Also, concurrent to their ED use, frequent users had many additional contacts with the health care system, and often had frequent ED visits in consecutive years. Many of the visits of frequent ED users occurred in the evening and at night. Despite arriving by ambulance, highly frequent users were often triaged as having less- or non–urgent needs, and these patients often left their visits without being seen. These findings support the conclusion that frequent ED users tend to have complex health and health-related needs.

2. *Mental illness is by far the strongest determinant of frequent ED use, followed to a lesser extent by physical disease, having many GP visits, and living in the Winnipeg core*. In most instances, these frequent users characteristics were consistent across all ED sites. As an exception, frequent users were somewhat different at HSC and SBGH. For example, frequent users at SBGH and HSC were much more likely to live in the Winnipeg core, and this result was not reported for other ED sites in the WRHA. Also, while frequent users at all ED sites were more likely to have a past mental illness diagnosis, the risk of having two or more different mental illness diagnoses was especially high for frequent users at HSC. Further, frequent versus single ED users at HSC were more likely to be younger (17-64 years old), while patient age did not differentiate frequent from single users at any other ED sites. Lastly, frequent versus single ED users at most ED sites were more likely to have muliple in-patient hospitalizations. This was not reported for frequent ED users at HSC and SBGH.

3. *Frequent ED and UC users are different in many regards*. Like ED patients, mental illness is common among frequent UC users, and UC frequent users also had many additional contacts with the health care system. However, the majority of frequent UC users' visits were scheduled in advance at a physician's request. Also, these visits tended to occur during normal working hours, and frequent UC users seldom left their visits without being seen. Collectively, these results suggest that UC is fulfilling a much needed role in Winnipeg, by providing follow–up and ongoing care to people in need. Regardless, many of the issues for frequent ED versus UC users are different.

This research provides an initial or "first look" at ED utilization in the WRHA. Examples of policy–relevant follow-up research are provided in the following text:

- While a range of health care services are available to people living in Winnipeg, 40.0% of ED visits are triaged as less urgent or non–urgent. Research should be conducted to describe these individuals (e.g., where they live, what their health needs are, when they arrive at EDs, etc), and also to understand how a lack of primary care resources and/or care continuity influences ED use for these patients. This type of information is invaluable to describe ED utilization in the larger context of the health care system.

- Alternate care strategies for frequent ED users may be costly, and at present there is no evidence to estimate the potential cost savings that could arise from these strategies. This research demonstrates that a small number of patients have many contacts with the health care system. Economic analyses should be conducted to estimate the potential cost savings associated with improving patient health, and hence possibly reducing this number of health care contacts.

- In this report we have identified a sub–group of frequent ED users who arrive by ambulance only to either be triaged as less or non–urgent, or to leave without being seen. Profiling this particular sub-group of frequent users may help to adapt current emergency medical services response protocols.

- Out of necessity, this research has excluded data from the Children's ED at HSC. Research conducted on these data will help to define pertinent emergency health care issues for children.

This research assesses the quality of ED/UC data in the WRHA, and describes the unique profile of frequent versus single ED/UC users. Responses to each of our research questions have been discussed separately, and recommendations are provided for making data improvements and for conducting future research. Ongoing research will benefit tremendously from these data improvements, particularly as it relates to standardizing data collection strategies, and by providing accurate measures of wait times as well as physician diagnoses. These and additional data improvements are essential to conduct ongoing policy–relevant ED research in Winnipeg.

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GLOSSARY

Acronyms used in this report:

ADT—Admission, discharge and transfer
CA—Winnipeg Community Area
CGH—Concordia General Hospital
CIHI—Canadian Institute for Health Information
CTAS—Canadian Emergency Department Triage & Acuity Scale
DPIN—Drug Programs Information Network
E triage—Electronic triage system
ED—Emergency Department
GGH—Grace General Hospital
GP—General Practitioner
HSC—Health Sciences Centre
ICD—International Classification of Disease
MCHP—Manitoba Centre for Health Policy
NACRS—National Ambulatory Care Reporting System
OR—Odds ratio
PCH—Personal Care Home
SBGH—St. Boniface General Hospital
SEFI—Socioeconomic Factor Index
SES—Socioeconomic status
SOGH—Seven Oaks General Hospital
UC—Urgent Care Centre
VGH—Victoria General Hospital
WRHA—Winnipeg Regional Health Authority

Administrative Data

Information collected "usually by government, for some administrative purpose (e.g., keeping track of the population eligible for certain benefits, paying doctors or hospitals), but not primarily for research or surveillance purposes" (Spasoff, 1999). MCHP research uses administrative data from hospital discharge summaries, physician billing claims, claims for prescription drugs, and other health related data. Using these data, researchers can study the utilization of health resources over time and the variations in rates within and across the provinces.

Admission, Discharge, Transfer (ADT) dataset (ED/UC)

Contains information about the patient and the visit, for example, basic patient demographics (e.g., age, sex, postal code), status of patient at admission (i.e., **triage code**), when the visit was made (date and time), and what happened to the patient at the end of the visit (i.e., **disposition**).

Ambulatory Care
Almost all contacts with physicians: office visits, walk-in clinics, home visits, personal care home (nursing home) visits, visits to outpatient departments, some emergency room visits, and in northern/remote nursing stations. Services provided to patients while admitted to hospital, and most visits for prenatal care are excluded.

Anxiety Disorders
A group of psychiatric conditions involving excessive anxiety (i.e. excessive feelings of apprehension or fear). In this study we included anxiety states, phobic disorders, and obsessive-compulsive disorders (see Table A1.1 for codes used to define this condition).

Arthritis
Inflammation of one or more joints which causes pain or impaired function (see Table A1.1 for codes used to define this condition).

Asthma
A disease in which inflammation of the airways causes airflow into and out of the lungs to be restricted (see Table A1.1 for codes used to define this condition).

Canadian Classification of Health Interventions
A companion classification system to **International Classification of Diseases**, version 10, with Canadian Enhancements (ICD-10-CA) for coding procedures in Canada.

Canadian Emergency Department Triage & Acuity Scale (CTAS)
A five-level system used within an emergency department (ED) or urgent care (UC) facility to assess patients according to the urgency of their condition. Patients are classified as Resuscitation (Level I), Emergent (Level II), Urgent (Level III), Less Urgent (Level IV), or Non-Urgent (Level V).

Canadian Institute for Health Information (CIHI)
"An independent, not-for-profit organization that provides essential data and analysis on Canada's health system and the health of Canadians".
(CIHI website: http://secure.cihi.ca/cihiweb/splash.html).

Comorbid Chronic Physical Diseases
Two or more medical conditions that exist simultaneously in a patient

Concurrent Criterion Validity
The extent to which a newly derived measurement correlates with a 'gold standard' (i.e., generally accepted as accurate) value, measured at the same point in time. For example, hospital inpatient admissions recorded in the hospital abstract files are generally accepted as 'gold standard' measures. Hospital admissions recorded in the newly obtained ED database were compared to these gold standard measures, for each patient during the study period. This comparison helps to determine the accuracy (criterion validity) of the newly obtained ED data.

Construct Validity
Tests of construct validity assess the extent to which a measure corresponds with an acceptable theory or assumption (Last, 2001). For example, it seems reasonable to expect that a greater number of emergent ED patients should arrive by ambulance or stretcher, as compared to non-urgent ED patients. Construct validity is determined by measuring the extent that these predetermined patterns of ED use actually exist.

Chronic Physical Diseases
Conditions that are generally incurable, are often caused by a complex interaction of factors, and usually have a prolonged clinical course.

Dementia
A group of illnesses that lead to the progressive loss of brain functions such as memory, behavior, learning, and communication (see Table A1.1 for codes used to define this condition).

Depression
A mood disorder characterized by feelings of sadness, anger, frustration, and a lack of interest in activities that persist to the point that they interfere with daily life for an extended period of time (see Table A1.1 for codes used to define this condition).

Diabetes
A chronic condition in which the pancreas no longer produces enough insulin (TypeI Diabetes) or when cells stop responding to the insulin that is produced (Type II Diabetes), so that glucose in the blood cannot be absorbed into the cells of the body. The most common endocrine disorder, Diabetes Mellitus affects many organs and body functions, especially those involved in metabolism, and can cause serious health complications including renal failure, heart disease, stroke, and blindness (see Table A1.1 for codes used to define this condition).

Disposition Status
The status of the patient recorded at the conclusion of an ED or UC facility visit. Disposition status options included in this report are: discharged home, expired, admitted to an inpatient bed, transferred to another site, left against medical advice or before discharge, and left without being seen.

Dissemination Area
A small, relatively stable geographic unit composed of one or more blocks. It is the smallest standard geographic area for which all census data are disseminated. Dissemination Areas cover all the territory of Canada.

Drug Programs Information Network (DPIN) Database
Database containing prescription drug claims from the Drug Programs Information Network, an electronic, on-line, point-of-sale prescription drug database. Initiated in 1994, it connects Manitoba

Health and Healthy Living and all pharmacies in Manitoba to a central database maintained by Manitoba Health and Healthy Living. Information about pharmaceutical dispensations is captured in real time for all Manitoba residents (including Registered First Nations), regardless of insurance coverage or final payer. DPIN facilitates payment administration for eligible drug costs, incorporating functions such as real-time adjudication, and collects high-quality data on all prescriptions issued to Manitobans, such as drug, dosage, and prescription date. Note that the prescription's indication (the physician's prescribing intent) is not collected and must be inferred from other data.

Electronic Triage (E triage) System

A computerized system used to help **triage** (or prioritize) patients when they arrive in an ED. E triage uses information about the patient's condition to assign each patient a score from one (resuscitation) to five (non-urgent) based on the **Canadian Triage and Acuity Scale** (**CTAS**) classification system.

Fee-for-Service

A method of payment whereby physicians bill for each service rendered, according to a pre-arranged schedule of fees and services. Physicians who are paid on a fee-for-service basis file a claim for each service rendered and are responsible for their operating costs.

Fiscal Year

For most businesses, health care institutions included, the fiscal year is defined as starting April 1 and ending the following year at March 31. For example, the 2005/06 fiscal year would be April 1, 2005 to March 31, 2006, inclusive.

General Practitioner (GP)

A physician who operates a general or family practice, and is not certified in another specialty in Manitoba.

Health Links – Info Santé

A free-of-charge, 24-hour telephone information service that provides answers to healthcare questions for residents of Manitoba. The service is maintained by the Winnipeg Regional Health Authority (WRHA) and is staffed by registered nurses. (Health Links - Info Santé website: http://www.misericordia.mb.ca/Programs/HealthLinks.html)

Home Care

Health services provided to residents within their own homes. The Manitoba Home Care Program, established in 1974, is the oldest comprehensive, province-wide, universal home care program in Canada. Home Care is provided to Manitobans of all ages assessed as having inadequate informal resources to return home from hospital or to remain at home in the community. The types of services provided through the Manitoba Home Care program include: personal care assistance, home support, health care, family relief, respite care and supplies and equipment.

Hospital Discharge Abstract
A computerized record containing information taken from a person's medical chart that is created at the time the person is discharged from an acute care hospital. Also called "Discharge Abstract", "Hospital Abstract" or "Hospital Separation Abstract". The Hospital Abstract User Manual contains the appropriate coding rules and processing details.

Hospitalizations
Admission to a hospital as inpatient (i.e., with at least one overnight stay)

International Classification of Disease (ICD)
A classification system of diseases, health conditions and procedures developed by the World Health Organization (WHO), which represents the international standard for the labeling and numeric coding of diseases and health related problems. Within this system, all diseases / conditions are assigned numbers in hierarchical order. There are several versions of the ICD coding system, including ICD-8, ICD-9, ICD-9-CM (Clinical Modifications), ICD-O (Oncology), ICD-10 and ICD-10-CA (Canadian Enhancements).

Ischemic Heart Disease
Heart problems caused by narrowed heart arteries. When arteries are narrowed, less blood and oxygen reaches the heart muscle. Also called coronary artery disease and coronary heart disease. (see Table A1.1 for codes used to define this condition).

Logistic Regression
A method of data analysis concerned with describing the relationship between one or more explanatory variables and a response variable, where the response variable is either binary or dichotomous

Multivariable Statistical Analysis
Various statistical analysis techniques in which several independent or explanatory variables are used to predict a single outcome measure. The effect of each independent variable on the outcome measure is provided uniquely from the influence of all other independent variables.

National Ambulatory Care Reporting System (NACRS)
The CIHI's standardized abstracting system. It collects client visit data for hospital-based **ambulatory care** at the point of service in the facility. (NACRS website: http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=services_nacrs_e)

Null Hypothesis
The statistical hypothesis that a variable is not associated with another variable or set of variables, or that two population distributions do not differ from one another. In other words, it means that the observed results of a study or test are no different from might have occurred as a result of chance alone (Last, 2001).

Nurse Practitioners

Registered nurses with advanced training that allows them to provide a full range of primary health-care services to patients. "They work in partnership with physicians and other health care professionals to provide care in a variety of health care settings." (Nurse Practitioner Association of Manitoba, 2006)

Odds

The ratio of the probability of an event to that of nonoccurrence. For example, in the population of ED users 85+ years old in this study, 143 people were frequent users and 2,542 were single users. The odds of being a frequent versus single ED user for people 85+ year old is therefore 143:2,542 or 0.056.

Odds Ratio (OR)

The outcome provided for several statistical techniques including logistic regression is defined as the ratio of two **odds** (Last, 2001). This can be explained using the following example:

	Single ED users	Frequent ER users
Population 17-84 years old	60,118	2,257
Population 85+ years old	2,542	143

The OR of being a frequent user for 85+ years olds is: 143/2,542 ÷ 2,257/60,118 = 1.50. This result is interpreted to mean that the odds of being a frequent user is 1.50 times greater for people 85+ years old, as compared to younger people.

Personal Care Homes (PCHs)

Residential facilities for predominantly older persons with chronic illness or disability, also known as nursing homes. They may be proprietary (for profit) or non-proprietary. Non-proprietary PCHs may further be classified as secular or ethno-cultural (associated with a particular religious faith or language other than English) as well as either freestanding or juxtaposed with an acute care facility.

Personality Disorder

A class of mental illnesses characterized by chronic behavioral and relationship patterns that often cause serious personal and social difficulties, as well as a general impairment of functioning (see Table A1.1 for codes used to define this condition).

Physician Claims

Claims that are submitted to the provincial government by individual physicians for services they provide. **Fee-for-service** physicians receive payment based on these claims, while those submitted by physicians on alternate payment plans (e.g., salary or contract) are for administrative purposes only. The physician claims data file is part of the **Population Health Research Data Repository**.

Population Health Research Data Repository (Repository)

A comprehensive collection of administrative, registry, survey and other databases primarily comprising residents of Manitoba housed at the Manitoba Centre for Health Policy (MCHP). It was developed to describe and explain patterns of health care and profiles of health and illness, facilitating inter-sectoral research in areas such as health care, education, and social services. The administrative health database, for example, holds records for virtually all contacts with the provincial health care system, the Manitoba Health Services Insurance Plan (including physicians, hospitals, personal care homes, home care, and pharmaceutical prescriptions) of all registered individuals. MCHP acts as a steward of the information in the Repository for agencies such as Manitoba Health and Healthy
Living.

Primary Care

Health care, generally provided by family physicians and nurses, including assessment, diagnosis and treatment of common illnesses.

Schizophrenia

A long-term mental illness that affects how a person thinks, feels and acts. Symptoms of the illness include auditory hallucinations, delusions, difficulty in expressing emotions, or disorganized speech and thought (see Table A1.1 for codes used to define this condition).

Shadow Billings

Claims (billings) submitted to the provincial government by physicians on alternate payment plans (e.g., on contract or salaried) for services they provide. Unlike physician claims submitted by fee-for-service physicians for payment, these claims are provided for administrative purposes only (i.e., as a record of services provided).

Socioeconomic Factor Index (SEFI)

A score based on census data that reflects non-medical social determinants of health and includes factors such as age, single parent status, female labour force participation, unemployment and education. SEFI is calculated at the geographic level of the **Dissemination Area** (**DA**) and is then assigned to residents based on their postal codes. SEFI scores less than zero indicate more favourable socioeconomic conditions, while SEFI scores greater than zero indicate less ideal socioeconomic conditions.

Socioeconomic Status (SES)

Characteristics of the economic, social and physical environments in which individuals live and work, as well as their demographic and genetic characteristics. In this study, the **Socioeconomic Factor Index** (**SEFI**) was used to measure SES.

Specialist Physicians
Physicians whose practices are limited to a specific area of medicine in which they have undergone additional training.

Stroke
A sudden death of brain cells due to a lack of oxygen when the blood flow to the brain is impaired by blockage or rupture of an artery to the brain (see Table A1.1 for codes used to define this condition).

Substance Abuse
The excess use of and reliance on a drug, alcohol, or other chemical that leads to severe negative effects on the individual's health and well-being or to the welfare of others. (see Table A1.1 for codes used to define this condition).

Triage
The process of selecting and prioritizing patients (e.g., in an emergency department) based on the urgency of their need for care. Commencing 2004/05, patients arriving at a WRHA emergency department or urgent care were triaged using the **Canadian Emergency Department Triage & Acuity Scale** (CTAS).

Type I Error
Being misled by the sample evidence into rejecting the **null hypothesis** (that there are no significant differences between variables or between population distributions) when it is in fact true.

Urgent Care Centre (UC)
A 24–hour walk-in healthcare program at the Misericordia Health Centre in Winnipeg that specializes in handling non life-threatening medical emergencies. (Urgent Care Centre website: http://www.misericordia.mb.ca/Programs/UrgentCC.html)

Wald Chi-Squared (χ^2) Statistic
Used in logistic regression, the wald statistic is used to determine the degree of statistical significance between an independent variable and the outcome measure. In statistical terms, it is the square of the ratio between variable coefficient and the standard error of this coefficient.

Winnipeg Community Areas (CA)
The 12 planning districts within the **Winnipeg Regional Health Authority** (**WRHA**), including East and West St. Paul: St. James-Assiniboia, Assiniboine South, Fort Garry, St. Vital, St. Boniface, Transcona, River East, Seven Oaks, Inkster, Point Douglas, Downtown, and River Heights.

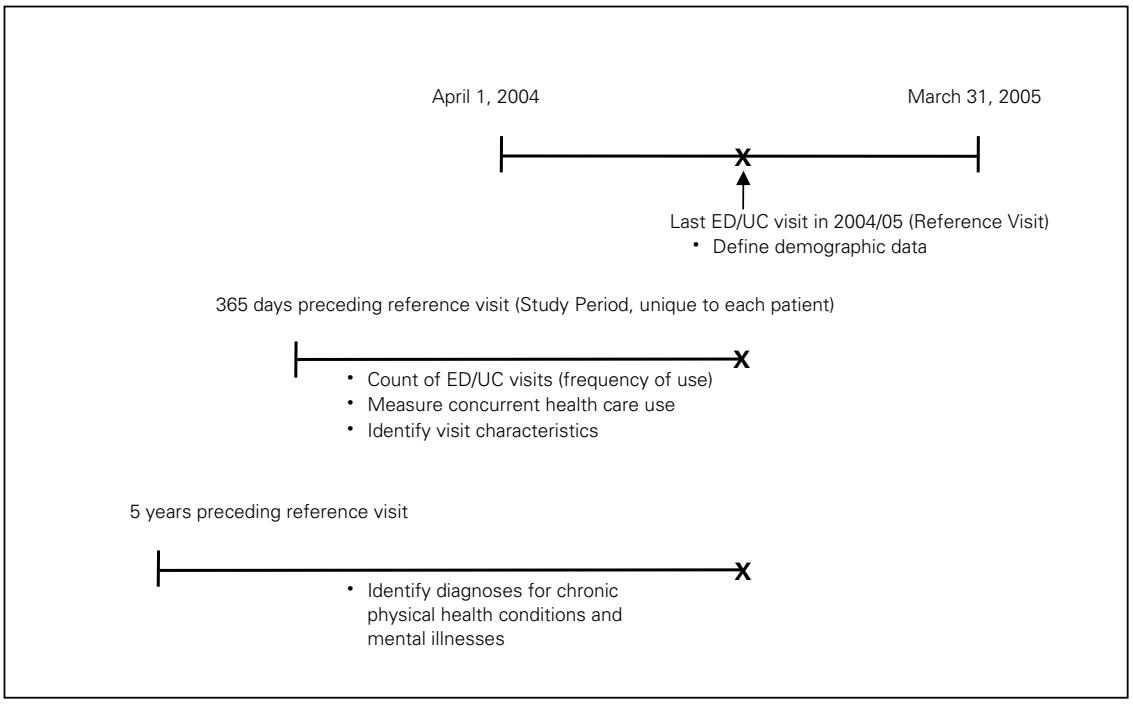
Winnipeg Regional Health Authority (WRHA)

Formed in February 2000 through the amalgamation of the Winnipeg Community and Long Term Care Authority and the Winnipeg Hospital Authority. The WRHA is responsible for coordinating health services based on the needs of people in Winnipeg , including hospital, community health, home care and long term care services. Since it comprises about half the population of Manitoba, the WRHA has created 12 planning districts called the **Winnipeg Community Areas** (**CAs**).

APPENDIX 1: DEFINITIONS OF FREQUENT USER RISK FACTORS

Additional detail is provided in this Appendix, to define risk factors that were used to profile ED and UC users. The timing for when these risk factors were measured is provided in Figure A1.1. Specific definitions of risk factors are provided in Table A1.1.

Figure A1.1: Strategy Used to Measure Demographic, Concurrent Health Care Use, Patient Health, and Visit-Based Risk Factors



Source: Manitoba Centre for Health Policy, 2008

Table A1.1: Definitions of Risk Factors Used to Describe Emergency Department and Urgent Care Users

Independent Variable	Definition
Demographics	
Age	Determined at the time of the reference visit*, or March 31, 2005 for non-users.
Sex	Female, male.
Income Quintile	Income quintiles were developed using the 2001 Census data, at the dissemination area level. Categories range from Quintile 1 (lowest) to Quintile 5 (highest).
Winnipeg Community Area (CA)	Based on patients' postal code at the time of the reference visit*. Categories: i) Assiniboine South, ii) Downtown, iii) Fort Garry, iv) Inkster, v) Point Douglas, vi) River East, vii) River Heights, viii) Seven Oaks, ix) St. Vital, x) St. Boniface, xi) St. James-Assiniboia, xii) Transcona, xiii) Outside Winnipeg (Manitoba residents only), xiv) Other/unknown (e.g., People living in Winnipeg that cannot be assigned to a CA, postal codes that cannot be assigned to a CA, etc).
Concurrent Health Care Use	
# of general practitioner (GP) visits	Ambulatory GP visits only; excludes GPs seen during an ED/UC visit.
# of different GPs seen	Ambulatory GP visits only; excludes GPs seen during an ED/UC visit.
# of specialist physician visits	Ambulatory specialist physician visits only; excludes specialists seen during an ED/UC visit.
# of hospitalizations	Hospital in-patients only; excludes hospitalizations within 2 days of an ED/UC visit.
# days in hospital	In-patients only; total # of days spent in a WRHA hospital during the study period; excludes hospitalizations within 2 days of an ED/UC visit.
Home care (HC) clients	Categories: i) Non-users (no HC use during the study period), ii) Single HC users- existing (clients with 1 HC episode during the study period, with an open date prior to the study period), iii) Single HC users- new (clients with 1 HC episode during the study period, with the open date occurring during the study period), iv) Multiple HC users (clients with more than one HC episode during the study period, irrespective of open dates).
Personal care home (PCH) residents	Excludes respite PCH residents. Categories: i) Non-residents during the study period, ii) PCH - new (residents admitted to a PCH during the study period, iii) PCH - existing (residents admitted to a PCH prior to the study period).
# of concurrent UC visits	For ED users only; # of UC visits (including scheduled UC visits) during the study period.
# of concurrent ED visits	For UC users only; # of ED visits during the study period.
# of contacts with Health Links Info Santé	Requests for medical advice made for or by ED/UC user only; excludes calls for other advice or for which services were not received
# of ED visits in the previous 365 days	For ED users only; # of ED visits 365 days preceding the first visit in the study period (or April 1, 2004 for non-users).
# of UC visits in the previous 365 days	For UC users only; # of UC visits 365 days preceding the first visit in the study period (or April 1, 2004 for non-users).
Polypharmacy (PPH) use	# of 90-day intervals in the study period where the patient met the criteria for PPH use (6+ classes of drugs dispensed excluding over-the-counter medications). Drug classes were counted at the 4th level of the Anatomical Therapeutic Chemical (ATC) Drug Classification System. "Use" of a drug was counted if 2+ prescriptions of the drug were dispensed (covering at least a 30 days supply) within the 90-day period. Excludes ER/UC users with at least one continuous hospital stay of 60+ days in the 365-day period before their last ER/UC visit in 2004/05. Categories: i) PPH in 0 90-day intervals; ii) PPH in 1 90-day interval; iii) PPH in 2+ 90-day intervals.
Mortality	% of patients who died 0-60 days, 61-180 days, and 181+ days following their reference visit*.
Patient Health	
Asthma	1+ hospitalization or 2+ physician claims or 2+ prescriptions, for up to 5 years prior to the reference visit*. ICD-9-CM code used: 493. Specific drugs (DINs) are available from the primary author of this report.

Table A1.1: Continued

Arthritis	1+ hospitalizations or 2+ physician claims for up to 5 years prior to the reference visit*. ICD-9-CM codes used: 274, 446, 710-721, 725-729, 739.
Diabetes	1+hospitalization or 1+physician claim or 1+prescription, for up to 5 years prior to the reference data*. ICD-9-CM codes used: 250, ICD-10-CM codes: E10, E11, E12, E13, and E14. Specific drugs (DINs) are available from the primary author of this report.
Ischemic heart disease	1+ hospitalization or 1+ physician claim for up to 5 years prior to the reference visit*. ICD-9-CM codes used: 410 to 414.
Physical disease co-morbidity	Refers to patients diagnosed with 2 or more of asthma, arthritis, diabetes, ischemic heart disease and stroke, as per disease-specific definitions.
Anxiety	The presence of 1+ ICD-9-CM codes (300.0, anxiety states; 300.2, phobic disorders; 300.3, obsessive-compulsive disorders) in the hospital abstract or Mental Health Management Information System (MHMIS) file, or the presence of ICD-9-CM code 300 for at least three physician visits, each assessed for 5 years preceding the reference visit*.
Dementia	The presence of 1+ ICD-9-CM codes (290-292,organic psychotic conditions; 294, other organic psychotic conditions; 331, cerebral degenerations; 797,senility) in either the hospital abstract or physician claim file, for 5 years preceding the reference visit*.
Depression	For 5 years preceding the reference visit*. From the hospital abstract or MHMIS file: The presence of 1+ ICD-9-CM codes (296.2-296.8, affective psychoses; 300.4, neurotic depression; 309, adjustment reaction; 311, depressive disorder) or the presence of ICD-9-CM code 300 (neurotic disorders) plus a prescription for an antidepressant or mood stabilizer (specific drugs available from the author of this report). From the physician visit or claims file: Any of ICD-9-CM codes 296, 309, or 311, or the presence of ICD-9-CM code 300 plus a prescription for an antidepressant or mood stabilizer (specific drugs available from the main author of this report).
Personality disorder	The presence of ICD-9-CM code 301 (personality disorders) in the hospital abstract or physician claims file, for 5 years preceding the reference visit*.
Schizophrenia	The presence of ICD-9-CM code 295 (schizophrenic disorders) in either the hospital abstract or physician claims file, for 5 years preceding the reference visit*.
Substance abuse	The presence of 1+ ICD-9-CM code (291, alcoholic psychoses; 292, drug psychoses; 303, alcohol dependence; 304, drug dependence; 305, nondependent abuse of drugs) in the hospital abstract or physician claims file, for 5 years preceding the reference visit*.
Mental illness co-morbidity	Refers to patients diagnosed with 2 or more of anxiety, dementia, depression, personality disorder, schizophrenia, and substance abuse, as per disease-specific definitions.
Visit-based Characteristics	
ED site	% of visits at each ED site
Season	% of visits in Spring (March, April, May), Summer (June, July, August), Fall (September, October, November) and Winter (December, January, February)
Day of week / time of day	Categories: i) Mon-Fri 8am-5pm; ii) Mon-Thurs 5pm-10pm iii) Mon-Thurs 10pm-8am; iv) Sat & Sun 8am-5pm; v) Fri-Sun 5pm-10pm; vi) Fri-Sun 10pm-8am
Arrival method	Categories: i) Dependent (arrival by ambulance or stretcher), ii) Independent (all other arrival options).
Triage code	Categories: i) Non-urgent, ii) Less urgent, iii) Urgent, iv) Emergent, v) Resuscitation.
Visit duration	From triage time to disposition time, in hours. For EDs, excludes patients admitted to a hospital as an in-patient.
Wait time & care time	For UC users only; Wait time - from triage to the initiation of patient care; Care time - from the initiation of patient care to discharge.
Disposition status	Categories: i) Discharged home, ii) Admitted to a hospital, iii) Left without being seen or against medical advice (AMA), iv) Died, v) Transferred to another site.

* See Figure A1.1

Source: Manitoba Centre for Health Policy, 2008

APPENDIX II: USING MULTIVARIABLE ANALYSIS TO FURTHER DEFINE FREQUENT ED USERS

Results in Chapter 8 are based on univariate analyses, where comparisons are made using one variable at a time. Many of these variables are related (e.g., older people are more likely to have comorbid diseases, people with mental illnesses may live in certain CAs, etc), and it is important to understand how each risk factor uniquely differentiates frequent from single ED users. In addition, univariate ED results assume that frequent user profiles are similar at all ED sites.

Multivariable analysis uses several risk factors (e.g., patient age, health status, place of residence, etc) simultaneously, to determine variables that uniquely define frequent users. Given the univariate UC results in Chapter 9 (i.e., that many frequent UC users have scheduled visits), these additional analyses were conducted on ED users only.

A2.1 Important Information to Help Interpret Multivariable Results

Highlights of the multivariable analysis strategy are provided below:

- This analysis is confined to user-based risk factors. ED site (a visit-based variable) was included to assess between-site differences in frequent user profiles. For the purposes of this analysis, ED site was converted to a user-based variable, by attributing each user to one ED site.[15]

- The outcome for this analysis is dichotomous (i.e., frequent versus single ED users), and results are summarized using the OR. A list of the variables included in this analysis is provided in Table A2.1.

- In multivariable analysis, the OR is adjusted for a given variable (e.g., patient age) based on the relationship between this variable and all other risk factors in the model and their influence on the study outcome. This means that the adjusted OR for patient age is independent of all other risk factors in the model, and that results for patient age should not be attributed to, for example, older people having been diagnosed with more diseases. Similarly, the OR for Winnipeg CAs should be independent of "between-CA" differences in diagnostic rates of mental illness.

[15] Frequent ED users tend to visit multiple sites (see Chapter 8). A "60% rule" was used first to attribute a user's visits to one site (i.e., if 60+% of a user's visits occurred at one site, all visits for this user were attributed to this site). Using this rule, all but 463 of 2,400 frequent ED users could be attributed to one ED site. A "clear majority" rule was then implemented to allocate remaining users (i.e., all of a user's visits were attributed to the site where the greatest number of this user's visits occurred). Using these two rules, all but 85 frequent ED users were allocated to one ED site. Analyses in this appendix are therefore based on 2,315 frequent users (and 62,660 single ED users).

- All models were conducted in sequential steps (Table A2.1). Demographic variables (patient age, sex, income quintile and CA) were entered in Step 1. In Step 2, demographic variables were re-entered along with measures of patients' physical and mental diseases. In Step 3, all demographic and health-related variables were entered with measures of additional health care use (GP visits and hospital separations).

ED site was entered during Step 4 of logistic modeling, as an interaction term with each main effect risk factor (e.g., patient age, sex, etc). This strategy determines the extent that frequent user profiles differ by ED site.

Table A2.1: Description of Risk Factors for Multiple Logistic Regression Analyses

Risk Factor	Variable Categories	Reference Group	Regression Step
Age	17-24, 25-64, 65+	65+	1
Sex	Male, Female	Female	1
Income Quintile	Q1/NF (lowest & Not Found*), Q2/3, Q4/5 (highest)	Q4/5	1
Winnipeg CA	Point Douglas/Downtown, All other CAs	Other CAs	1
Physical Disease Diagnosis	Diagnosis with 0, 1, 2+ diseases	0 diseases	2
Mental Illness Diagnsosis	Diagnosis with 0, 1, 2+ mental illnesses	0 illnesses	2
GP Visits	0-4, 5-8, 9+ visits	0-4 visits	3
Hospitalizations	0, 1, 2+ hospitalizations	0 hospitalizations	3
Emergency Department Site	Each site as its own category	Health Sciences Centre (HSC)	4

* Not found - people with postal codes that cannot be linked to the 2001 Census household income data. This includes people who are living in institutions (nursing homes, jail), and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

A2.2 Results

A2.2.1 Main Effect Results

Results from Steps 1 through 3 are provided in Table A2.2. Highlights of these results are summarized as follows:

- The findings from Step 1 are similar to univariate results, and demonstrate that the odds of being a frequent user was greater for older people,[16] for those living in lower income areas,

[16] In Step 1 of Table A2.2, the odds of being a frequent user is less for younger versus older people, or, greater for older people.

and for people living in the Winnipeg core (Point Douglas and Downtown CAs). These ORs are all independent of each other. For example, after controlling for patients' age, sex, and income quintile, the odds of being a frequent user was still 2.1 fold greater for patients living in Downtown or Point Douglas CAs. *This means that a disproportionate number of frequent versus single users reside in these CAs, even after controlling for between-CA differences in patient age, sex and income level.*

- The results from Step 2 of the analysis have numerous implications. First, with the inclusion of physical and mental diseases, ORs for participant age actually reverse (i.e., become greater than "1"). After accounting for patients' disease, the odds of being a frequent user was actually greater for younger patients. *In other words, after accounting for chronic diseases, younger patients tended to visit EDs more frequently than older patients.*

- The OR for Winnipeg CAs remained unchanged in Steps 1 and 2. After controlling for both demographic- and health-related risk factors, the odds of being a frequent ED user was still greater for people who lived in the Point Douglas or Downtown CAs. *Separate from their demographic and health-related characteristics, residents of these CAs therefore have some additional unique attributes that influenced their frequency of ED use.*

- After controlling for patient illness, the odds of being a frequent user also became greater for males versus females. *After accounting for chronic diseases, males tended to visit EDs more frequently than females.*

- Similar findings are reported during Step 3 of the regression analyses, where the odds of being a frequent user was greater for younger people, for males, for those in lower income areas, and for those who lived in the Winnipeg core. Independent of all of these characteristics, the odds of being a frequent ED user was still greater for patients with 9+ concurrent GP visits, and also for those with concurrent multiple hospitalizations.

From these results, it is challenging to define risk factors that most strongly differentiate frequent from single ED users. Wald χ^2 statistics were therefore used to approximate the relative importance of each risk factor in the final (Step 3) model.[17] Results from these Wald χ^2 statistics are summarized as follows (Table A2.2):

- Comorbid mental illness was by far the strongest determinant of frequent ED use, followed to a lesser extent by co-morbid physical disease, frequent GP use, and living in the Winnipeg core. Risk factors of intermediate importance include having multiple hospital separations, living in a lower income area and being male. After accounting for the influence of all other risk factors, patient age, while statistically significant, was least influential in differentiating frequent from single ED users.

[17] Wald statistics for non-parametric tests are similar to the concept of explained variance in linear regression, in that larger Wald values imply larger effect sizes (i.e., importance) for individual variables.

Table A2.2: Multivariable Results Comparing Frequent and Single ED Users

	Risk Factors	Step 1	Step 2	Step 3	Step 3 Wald Chi-Squared Values
Step 1	**Patient age**				
	17-24 years	0.4	1.3	1.5	14.3
	25-64 years	0.7	ns	ns	4.0
	Patient sex				
	Male	ns	1.4	1.6	93.2
	Income quintile				
	Q1 (lowest)	2.9	2.1	2.0	103.7
	Q2, Q3	1.7	1.5	1.5	36.3
	Winnipeg CA				
	Point Douglas / Downtown	2.1	1.9	2.0	153.0
Step 2	**Physical disease diagnosis**				
	1	--	2.0	1.7	60.1
	2+	--	5.9	4.0	395.6
	Mental illness diagnosis				
	1	--	2.3	2.1	125.0
	2+	--	8.5	6.5	1,043.9
Step 3	**Primary care physician visits**				
	9+	--	--	2.5	310.0
	Hospitalizations				
	1	--	--	2.3	58.2
	2+	--	--	2.4	145.8

Source: Manitoba Centre for Health Policy, 2008

A2.2.2 Interaction Terms

Interaction terms were added during Step 4 of modeling, to compare the profile of frequent users across ED sites. These analyses were actually conducted as eight sub-steps. In sub-step i, all variables were entered into the model and an interaction term was created between each ED site and patient age. Similar analyses were conducted in sub-steps ii through viii, with each step building an interaction term between ED site and one user-based variable (patient sex, CA, etc). Results of these analyses are presented in Tables A2.3 through A2.10. The following text explains how each table should be interpreted:

- Within each table, there are main effect and interaction term results. In Table A2.3, for example, main effect results are included for all variables except participant age. Interaction terms in this table determines if the effect of age on frequency of use varies by ED site. Interaction terms are meant to be the focus of each table, and main effect results are provided only for completeness.

- The following strategies were used to denote significant interaction terms in each table.

  ➢ If the interaction term was non-significant (α<.01), an OR was included as a main effect result only. This occurs, for example, in Table A2.4. Frequent users were more likely to be male at each ED site.

  ➢ If the interaction term was significant, the acronym "N/A" (not applicable) was included under the main effect column, indicating that results were different for at least some ED sites. In these instances, ED site-specific results are provided. Footnotes are provided in each table to help interpret differences between ED sites.

Interaction term results are summarized as follows:

- In some instances the profile of frequent ED users is different at HSC, and, to a lesser extent at SBGH. For example, patient age differentiates frequent from single ED users at HSC only (Table A2.3). Also, at SBGH and especially at HSC, the odds of being a frequent user was much greater for people who lived in the Winnipeg core (Point Douglas and Downtown CAs). This result is not reported at any other ED site (Table A2.6). Conversely, people living in the lowest income areas were more likely to be frequent users at all ED sites except VGH. The vast majority of residents proximal to VGH (i.e., residents of Fort Garry and St. Vital) live in mid to high income areas.

- Comorbid mental disease influenced frequency of ED use at all sites, but especially at HSC (Tables A2.8). For example, the odds of being a frequent versus single user was 5.2 fold greater for people with 2+ mental illnesses at the GGH, as compared to an OR of 9.7 at HSC.

- After adjusting for other variables, the odds of being a frequent user was greater for patients with 9+ GP visits at each ED site (Table A2.9). Also, frequent users were more likely to have multiple hospitalizations at all ED sites except at SBGH and HSC (Table A1.10). This finding implies that frequent ED users at HSC and SBGH may have less severe medical illnesses, as compared to frequent users at other ED sites. This latter result also builds upon some conclusions reached during univariate analyses. Frequent users at SBGH and HSC only used additional health care services (GP visits) if contact with these services was initiated by the patient.

- Wald χ^2 statistics were also calculated for all interaction term models (data not shown). Even after considering interaction terms to account for ED site-specific differences, mental illness was still by far the strongest determinant of frequent ED use, followed to a lesser extent by physical illness and having multiple GP visits. Site-specific data (i.e., interaction terms) were much less important for describing frequent ED users (with smaller Wald χ^2 statistics).

Possible exceptions include interaction terms for patient age (i.e., frequent users were younger at HSC only), CA (only frequent users at SBGH and HSC lived in the Winnipeg core) and hospitalization (frequent users were hospitalized more often at all ED sites except SBGH and HSC). Decision-makers can use these latter findings to refine ED-site specific interventions.

Table A2.3: Multivariable Analyses Including Interaction Terms: Patient Age by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	N/A	2.2	**ns**	**ns**	**ns**	**ns**	**ns**
25-64	N/A	1.9	**ns**	**ns**	**ns**	**ns**	**ns**
Participant sex							
Male	1.5	--	--	--	--	--	--
Income quintile							
Q1/NF (lowest)	1.8	--	--	--	--	--	--
Q2, Q3	1.4	--	--	--	--	--	--
Winnipeg CA							
Point Douglas / Downtown	1.7	--	--	--	--	--	--
Physical disease							
1 disease	1.7	--	--	--	--	--	--
2+ diseases	4.0	--	--	--	--	--	--
Mental illness							
1 disease	2.0	--	--	--	--	--	--
2+ diseases	6.3	--	--	--	--	--	--
GP visits							
9+ visits	2.4	--	--	--	--	--	--
Hospital separations							
1 separation	2.1	--	--	--	--	--	--
2+ separations	2.0	--	--	--	--	--	--

N/A	The main effect result should not be used, as this result varies by ED site.
ns	Non significant
Bolded values	The effect of patient age is statistically different at this site, as compared to the Health Sciences Centre (HSC) (p<.01).
--	ORs are not provided; interaction term results are provided separately for each risk factor.
NF	Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

Table A2.4: Multivariable Analyses Including Interaction Terms: Patient Sex by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	1.3	--	--	--	--	--	--
25-64	ns	--	--	--	--	--	--
Participant sex							
Male	1.5	At each ED site, frequent users were more likely to be male.					
Income quintile							
Q1/NF (lowest)	1.8	--	--	--	--	--	--
Q2, Q3	1.4	--	--	--	--	--	--
Winnipeg CA							
Point Douglas / Downtown	1.7	--	--	--	--	--	--
Physical disease							
1 disease	1.7	--	--	--	--	--	--
2+ diseases	4.0	--	--	--	--	--	--
Mental illness							
1 disease	2.1	--	--	--	--	--	--
2+ diseases	6.4	--	--	--	--	--	--
GP visits							
9+ visits	2.5	--	--	--	--	--	--
Hospital separations							
1 separation	2.1	--	--	--	--	--	--
2+ separations	1.9	--	--	--	--	--	--

ns — Non significant

-- — ORs are not provided; interaction term results are provided separately for each risk factor.

NF — Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

Table A2.5: Multivariable Analyses Including Interaction Terms: Income Quintile by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	1.3	--	--	--	--	--	--
25-64	ns	--	--	--	--	--	--
Participant sex							
Male	1.5	--	--	--	--	--	--
Income quintile							
Q1/NF (lowest)	N/A	2.5	2.1	1.6	1.9	1.9	**ns**
Q2, Q3	N/A	1.9	ns	ns	1.5	ns	**ns**
Winnipeg CA							
Point Douglas / Downtown	1.7	--	--	--	--	--	--
Physical disease							
1 disease	1.7	--	--	--	--	--	--
2+ diseases	3.9	--	--	--	--	--	--
Mental illness							
1 disease	2.1	--	--	--	--	--	--
2+ diseases	6.5	--	--	--	--	--	--
GP visits							
9+ visits	2.5	--	--	--	--	--	--
Hospital separations							
1 separation	2.1	--	--	--	--	--	--
2+ separations	1.9	--	--	--	--	--	--

N/A	The main effect result should not be used, as this result varies by ED site.
ns	Non significant
Bolded values	The effect of income quintile is statistically different at this site, as compared to the Health Sciences Centre (HSC) ($p<.01$).
--	ORs are not provided; interaction term results are provided separately for each risk factor.
NF	Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

Table A2.6: Multivariable Analyses Including Interaction Terms: Winnipeg CA by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	1.3	--	--	--	--	--	--
25-64	ns	--	--	--	--	--	--
Participant sex							
Male	1.5	--	--	--	--	--	--
Income quintile							
Q1/NF (lowest)	1.9	--	--	--	--	--	--
Q2, Q3	1.4	--	--	--	--	--	--
Winnipeg CA							
Point Douglas / Downtown	N/A	2.6	**ns**	**ns**	**1.5**	**ns**	**ns**
Physical disease							
1 disease	1.7	--	--	--	--	--	--
2+ diseases	3.9	--	--	--	--	--	--
Mental illness							
1 disease	2.1	--	--	--	--	--	--
2+ diseases	6.4	--	--	--	--	--	--
GP visits							
9+ visits	2.4	--	--	--	--	--	--
Hospital separations							
1 separation	2.2	--	--	--	--	--	--
2+ separations	2.1	--	--	--	--	--	--

N/A	The main effect result should not be used, as this result varies by ED site.
ns	Non significant
Bolded values	The effect of Winnipeg CA is statistically different at this site, as compared to the Health Sciences Centre (HSC) (p<.01).
--	ORs are not provided; interaction term results are provided separately for each risk factor.
NF	Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

Table A2.7: Multivariable Analyses Including Interaction Terms: Physical Disease by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	1.3	--	--	--	--	--	--
25-64	ns	--	--	--	--	--	--
Participant sex							
Male	1.5	--	--	--	--	--	--
Income quintile							
Q1/NF (lowest)	1.8	--	--	--	--	--	--
Q2, Q3	1.4	--	--	--	--	--	--
Winnipeg CA							
Point Douglas / Downtown	1.7	--	--	--	--	--	--
		--	--	--	--	--	--
Physical disease							
1 disease	1.7	The effect of having one disease is similar at each ED site.					
2+ diseases	N/A	3.2	**6.1**	3.8	4.3	3.7	5.2
Mental illness							
1 disease	2.0	--	--	--	--	--	--
2+ diseases	6.4	--	--	--	--	--	--
GP visits							
9+ visits	2.5	--	--	--	--	--	--
Hospital separations							
1 separation	2.1	--	--	--	--	--	--
2+ separations	2.0	--	--	--	--	--	--

N/A	The main effect result should not be used, as this result varies by ED site.
ns	Non significant
Bolded values	The effect of having multiple diagnoses is statistically different at this site, as compared to the Health Sciences Centre (HSC) ($p<.01$).
--	ORs are not provided; interaction term results are provided separately for each risk factor.
NF	Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

Table A2.8: Multivariable Analyses Including Interaction Terms: Mental Illness by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	ns	--	--	--	--	--	--
25-64	ns	--	--	--	--	--	--
Participant sex							
Male	1.5	--	--	--	--	--	--
Income quintile							
Q1/NF (lowest)	1.9	--	--	--	--	--	--
Q2, Q3	1.4	--	--	--	--	--	--
Winnipeg CA							
Point Douglas /	1.7	--	--	--	--	--	--
Downtown		--	--	--	--	--	--
Physical disease							
1 disease	1.7	--	--	--	--	--	--
2+ diseases	4.0	--	--	--	--	--	--
Mental illness							
1 disease	N/A	3.0	2.0	1.7	**1.6**	2.0	1.7
2+ diseases	N/A	9.8	**5.9**	**5.2**	**6.0**	**4.8**	**4.5**
GP visits							
9+ visits	2.5	--	--	--	--	--	--
Hospital separations							
1 separation	2.1	--	--	--	--	--	--
2+ separations	1.9	--	--	--	--	--	--

N/A	The main effect result should not be used, as this result varies by ED site.
ns	Non significant
Bolded values	The effect of having multiple diagnoses is statistically different at this site, as compared to the Health Sciences Centre (HSC) ($p<.01$).
--	ORs are not provided; interaction term results are provided separately for each risk factor.
NF	Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

Table A2.9: Multivariable Analyses Including Interaction Terms: GP Visits by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	1.3	--	--	--	--	--	--
25-64	ns	--	--	--	--	--	--
Participant sex							
Male	1.5	--	--	--	--	--	--
Income quintile							
Q1/NF (lowest)	1.8	--	--	--	--	--	--
Q2, Q3	1.4	--	--	--	--	--	--
Winnipeg CA							
Point Douglas /	1.7	--	--	--	--	--	--
Downtown		--	--	--	--	--	--
Physical disease							
1 disease	1.7	--	--	--	--	--	--
2+ diseases	4.0	--	--	--	--	--	--
Mental illness							
1 disease	2.0	--	--	--	--	--	--
2+ diseases	6.4	--	--	--	--	--	--
GP visits							
9+ visits	N/A	2.0	**3.5**	2.3	2.4	**2.8**	**3.7**
Hospital separations							
1 separation	2.1	--	--	--	--	--	--
2+ separations	1.9	--	--	--	--	--	--

N/A	The main effect result should not be used, as this result varies by ED site.
ns	Non significant
Bolded values	The effect of multiple GP visits is statistically different at this site, as compared to the Health Sciences Centre (HSC) (p<.01).
--	ORs are not provided; interaction term results are provided separately for each risk factor.
NF	Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

Table A2.10: Multivariable Analyses Including Interaction Terms: Hospital Visits by ED Site

Risk Factor	Odds Ratio for Main Effect	Interaction Terms (HSC Reference Group)					
		HSC	CGH	GGH	SBGH	SOGH	VGH
Participant age							
17-24	1.3	--	--	--	--	--	--
25-64	ns	--	--	--	--	--	--
Participant sex							
Male	1.5	--	--	--	--	--	--
Income quintile							
Q1/NF (lowest)	1.8	--	--	--	--	--	--
Q2, Q3	1.4	--	--	--	--	--	--
Winnipeg CA							
Point Douglas /	1.7	--	--	--	--	--	--
Downtown		--	--	--	--	--	--
Physical disease							
1 disease	1.7	--	--	--	--	--	--
2+ diseases	3.9	--	--	--	--	--	--
Mental illness							
1 disease	2.1	--	--	--	--	--	--
2+ diseases	6.4	--	--	--	--	--	--
GP visits							
9+ visits	2.5	--	--	--	--	--	--
Hospital separations							
1 separation	N/A	1.5	**3.3**	**2.8**	2.0	**2.9**	**4.0**
2+ separations	N/A	ns	**3.5***	**4.5**	ns	**6.5**	**5.3**

*	Interaction term p value = 0.04.
N/A	The main effect result should not be used, as this result varies by ED site.
ns	Non significant
Bolded values	The effect of hospital separations is statistically different at this site, as compared to the Health Sciences Centre (HSC) (p<.01).
--	ORs are not provided; interaction term results are provided separately for each risk factor.
NF	Not found patients - i.e. people with postal codes that cannot be linked to the 2001 Census Data. This includes people who are living in institutions (nursing homes, jail) and public trustee residents.

Source: Manitoba Centre for Health Policy, 2008

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