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**Emergency Department Use: Why do Patients Choose the Emergency Department for Medical Care
and How Much does it Really Cost?**

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Emergency Department use: Why do patients choose the Emergency Department for medical care and how much does it really cost?

Saunya Dover

Thesis submitted to the Faculty of Graduate and Postdoctoral Studies in partial fulfillment of the requirements for the MSc in Health Systems program

**Telfer School of Management
University of Ottawa**

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Abstract

Background: It is important to understand Canadians' expectations of health care services and the costs of delivering care in the Emergency Department (ED) in order to continue to provide health care in a sustainable manner.

Objectives: To examine the reasons patients present to the ED, and to conduct a cost analysis to compare the costs of seeking care in the ED versus a primary care setting.

Methodology: We surveyed patients (n=606) triaged to the cubicles of the ED of The Ottawa Hospital, Civic Campus. The survey asked about their perceived urgency level and their patterns of health service use. Patient surveys were accompanied by physician surveys to assess each patient's level of urgency from a medical perspective. We performed bivariate analysis and logistic regression on survey variables of interest. We also conducted a cost analysis to determine the costs of providing non-urgent care in the ED.

Results: Both a presenting symptom of a musculoskeletal injury (OR=2.93, CI 1.42-6.04) and having heard of TeleHealth Ontario (OR=2.08, CI 1.08-4.03) were significantly associated with non-urgent ED use from the patient perspective. We also found that non-urgent ED visits cost an average of \$248.75, which is significantly more costly than a primary care visit.

Implications: Our results provide insights regarding patient factors influencing ED use and relative costs of non-urgent ED visits versus outpatient family doctor visits. However, additional work may be required to identify non-medical factors influencing patient motivations for seeking care in the ED.

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1. Introduction

1.1 Research Purpose

The purpose of this study is to examine the reasons patients choose the Emergency Department (ED) for their medical care and the costs associated with those visits. Specifically, this study addresses gaps in the literature concerning patient expectations of health care services, especially emergency and primary care services, and how access to health care affects use of the ED. This study also addresses the current debate in the literature concerning whether or not ED visits cost the health care system significantly more than the equivalent in visits to other care sites.

The hospital ED represents a prominent part of the Canadian health care system. Each year, over 14 million patients visit EDs across the country (1;2). Despite this importance, little is known about the patients who choose EDs for their medical care, nor the cost structures associated with ED care. The current body of literature, especially concerning costs, is generally from the United States and out of date (3-6). Both the patient population and the costs of providing emergency medical services are interconnected. On the one hand, we need to ensure that patients are receiving the best possible care in the appropriate location by the right provider. On the other hand, it is impossible to continue to provide this level of service in a sustainable manner without fully understanding the costs associated with providing care in various settings.

1.2 Background

The ways in which people interact with the health care system are changing. While the primary care practitioner (PCP) or general practitioner was once regarded as first point of access or 'gate keeper' of the health care system, that role has been shifting to other providers, including hospital EDs. This shift has been accompanied by a primary care system that is difficult to access (7-9).

1.2.1 The Changing Roles of the ED and Primary Care

Both the ED and the primary care system function as part of the larger health care system. The ED is designed to meet emergency medical needs as well as provide unscheduled care (10). On the other hand, primary care has been described as the provision of integrated, accessible health care services by clinicians who should provide both ongoing care for the majority of personal health needs while developing a meaningful relationship with their patients (11;12). Since the introduction of Medicare in the 1960s, the hospital ED has been forced to assume an increasingly larger role as a provider of primary care for a number of reasons (7;13). These reasons will be discussed in more detail in Chapter 2.

1.2.2 Quality of Care

According to the Ontario Health Quality Council (OHQC), a high quality health system should be accessible, effective, safe, patient-centred, equitable, efficient, appropriately resourced, integrated and focused on population health (9;14). However, as the system currently stands, there is much room for improvement in the majority of these categories. Access to health services, discussed in more detail in section 1.2.3, is a growing problem across the country. The health system also needs to continue to become more patient-centred, which is discussed further in section 1.2.5.

As with any publicly funded service, the efficiency of the health system and its use of resources will always be scrutinized. The OHQC has alleged that patients presenting to EDs with non-urgent conditions are putting inappropriate demand on these services (14). Health expenditures in Ontario alone have been forecast to reach \$72 billion in 2009, which represents an increase of 85% since 2000 (14;15), and the increase in spending has not been accompanied by an increase in efficiency or improved resource use. Gaining a better understanding of the reasons patients are choosing to access health services the way they do, particularly their motivations for choosing the ED for non-urgent conditions, may help guide future health care funding decisions. It is necessary for the continued sustainability of the health care system to be able to provide patients with the care they need in the most cost effective way.

1.2.3 Access to Health Care Services

Timely access to medical care has been a growing issue in the health care system since the 1980s (16). However, it was not until the mid-1990s, when the health care system in Canada was at the height of its restructuring, that hospital crowding, as a result of increasing difficulties accessing healthcare services outside of a hospital, had been highlighted as one of the most severe problems facing EDs across the country and around the world (17;18). Due to the increasing costs of health care and other economic pressures, the system has experienced many hospital closures, bed closures, and a significant shift away from primary care. Over the past decade, the number of hospital beds in Canada decreased by 40% due to the reorganization of health care funding (19). In recent years, the number of ED visits has reached record numbers of approximately 14 million in Canada per year (1).

Coupled with a shortage of family physicians¹, these issues have resulted in difficulties for Canadians in obtaining the medical care they need in a timely manner. Consequently, Canada has the highest rate of ED utilization in the general population out of any developed nation. Canadians also report using the ED in the highest proportions for services that could have been provided by a PCP (13;21).

Given the current structure of the health care system in Canada, the resources available and the shortages of hospital and long-term care beds, as well as the increasing difficulties in accessing care, the ED is beginning to assume many of the responsibilities traditionally reserved for PCPs. This has resulted in a shift of focus to patients presenting to the ED with minor illness as this group represents a high-volume, low-acuity group that has the potential to be targeted for improved ED management (22). These types of visits are considered largely preventable or avoidable, (23) since they generally do not require immediate or intensive ED care. This patient group, then, reduces ED efficiency by using already limited resources, space, equipment and personnel (23). Reducing the number of

¹ There is no explicitly described "shortage of family physicians" that we could identify. The total number of family doctors and general practitioners in Ontario has increased by about 10% from 1992 to 2002. However, due to the increase in population during the same time, the number of family doctors per 10,000 population fell slightly. Furthermore, the total number of family doctor visits has not changed since 1992, suggesting that the primary care system has been at full capacity for some time (20).

non-urgent visits to the ED will alleviate some of the unnecessary burden facing EDs as well as allow for more efficient use of other health care alternatives that already exist to handle non-urgent, unscheduled care. This will ultimately save resources that are, in effect, misused in the ED, and allow for subsequent reallocation of those resources for more efficient and efficacious use elsewhere in the system.

1.2.4 Health Service Costs

Another benefit to decreasing the number of non-urgent ED visits would be the potential reductions in health care spending associated with non-urgent ED use. The literature concerning the costs of ED visits is divided between two main schools of thought. First, there is the group that believes that the costs of the ED are largely fixed, and that the number of visits for minor illness has little to no effect on the overall ED expenditures. There are claims that emergency physicians and nurses can actually handle the increasing numbers of non-urgent visits with relative ease and at very little extra cost to the health care system (3;19). These claims may be appropriate for a short-term perspective where on-duty staff will simply 'work harder' to accommodate the increased number of patients. However, when a long-term perspective is considered there will ultimately be an increase in resources required and used, making this approach unsustainable. On the other hand, there are a small handful of studies that have looked at the costs of ED visits relative to other receiving the same care in a non-ED setting. These studies have estimated that a non-urgent ED visit costs as much as three to four times more than providing medical care in other settings (4;6;24). These studies do not draw their information from the Canadian health care system as there is a lack of information in Canada. In order to evaluate whether reducing non-urgent ED visits would actually save the health system money, the costs associated with these visits as compared to non-ED visits needs to be determined. This information will show where there may be a potential for improved efficiency and sustainability within the system.

1.2.5 Putting the Patient First

The Ontario Health Quality Council defines patient-centred care as health care that is centred around the needs and preferences of the patient where there is a partnership

between that patient and their care providers (9;14). The health care system, as it stands today, is not quite patient centred. This shortfall has been recognized by ministries of health across the country. Overall, people are not as engaged as they could be in planning their health care with their physicians (9). As an example, the Ministry of Health and Long Term Care (MOHLTC) in Ontario has made becoming a patient-centred system a top priority, which is reflected in the Integrated Health Service Plans of the respective Local Health Integration Networks (LHINs) across the province. The Champlain LHIN, for example, has stated that their main priority is to create a “person-centred health system” (8).

In order to continue to build and achieve a patient-centred health system, we need to be able to understand how and why patients are interacting with that system. Understanding the reasons patients choose the ED over other viable care alternatives for their minor medical problems will not only enhance our understanding of people’s expectations of the health care system, it will also increase our understanding of how they judge medical ‘emergencies’ as well as the difficulties we face in the development and provision of adequate primary care services (24). Reducing the frequency of visits to the ED for minor illness will also allow patients to develop a relationship with a PCP, thus resulting in improved continuity of care, as well as provide them with an increased focus on preventive strategies, as opposed to reactive medicine (25).

1.3 Research Objectives

It is important to understand both Canadians’ expectations of health services, as well as the costs of delivering care in the ED as compared to a primary care setting, in order to continue to provide the best possible care in a sustainable manner. In order to put this information into context, and move towards a health system that is truly patient centered *and* sustainable, this study focuses on both the patient perspective regarding access to care as well as the economic implications from the health care payer perspective.

1.3.1 Research Question

The principal research questions are: 1) Why do patients choose the emergency department for non-urgent medical needs; and 2) How much do these visits cost?

1.3.2 Specific Objectives

The objectives of this thesis are:

- A. To examine reasons for medically non-urgent visits to the ED from the patients' perspective; and
- B. To conduct a cost analysis to compare the costs of seeking care in the ED versus seeking similar care in a primary care setting.

2. Literature Review

The reasons patients choose the ED for their medical needs, and how these decisions may be influenced by access to other care services, are complex multi-dimensional issues. Patient motivations for seeking care have been influenced by the simultaneous development of a strong network of hospitals and EDs, and a relatively weaker network of primary care services, which will be explored in detail in section 2.2. There is a seemingly endless body of literature attempting to define the non-urgent ED user and to identify factors associated with such use. To date, there is no consensus regarding this group of patients, hence this study will explore reasons why in section 2.3. In order to fully understand the health system in Canada and to move towards a sustainable patient-centred system, the costs of emergency care must be understood. As of now, there is still a very poor understanding of the costs of providing emergency medical care in Canada, and the literature will be reviewed in section 2.4. Finally, in section 2.5 the remaining challenges and possible ways to address them will be discussed.

2.1 Search Strategy

2.1.1 Systematic Approach

A systematic overview of the literature was performed in the PubMed database. A librarian was consulted in order to build an effective search strategy. The following search term was used: "Health Services Misuse"[Majr] AND ("Emergency Medical Services"[Mesh:NoExp] OR "Emergency Service, Hospital"[Mesh]) AND ("Health Services Needs and Demand"[Mesh] OR "Health Services Research"[Mesh:NoExp] OR "Patient Acceptance of Health Care"[Mesh:NoExp] OR "Patient Satisfaction"[Mesh] OR "Health Services Accessibility"[Mesh]). "Health Services Misuse" was classified as a major topic since my thesis is concerned with non-urgent ED visits, which is a form of misuse of health services.

2.1.2 Search Results

The above search returned 107 results, 60 of which were excluded based on the topic as determined by the title and abstract, and 5 were excluded because they were in a language other than English or French. The 60 articles excluded based on the title and abstract dealt primarily with pediatric EDs or other aspects of health services misuse that did not have to do with non-urgent ED visits. The full text articles were retrieved for the remaining 42 results. Of those, 5 were excluded because they were editorials or correspondence with the Editor. The final literature review from PubMed yielded 37 relevant studies. Hand searching, grey literature searching and keyword searching using terms such as “emergency service,” “hospital health services misuse,” “emergency department costs” and “access to primary care,” also resulted in an additional 24 relevant studies, books and reports.

2.2 The Roles of the ED and Primary Care

2.2.1 The Rise of the ED

Over the past sixty years, the development of several key policies has served to shift the main entry point to the health care system from the PCP to the hospital ED (13). The first major change came in 1957 with the creation of the Hospital Insurance and Diagnostic Services Act (26;27). This Act provided free medical care (including laboratory and diagnostic imaging services) in hospitals and outpatient clinics but not in private medical clinics. This led to a public perception that hospitals were ‘free,’ consequently hospitals, and by extension EDs, became the location of choice to receive medical care.

The second major change came in the 1970s when the Mental Health Care system underwent a period of deinstitutionalization. The deinstitutionalization of mental health patients was often not accompanied by the development of appropriate community services and supports to (28). This resulted in hospitals being given the responsibility of caring for patients with mental illness, and patients with mental illness turning to EDs to gain access to the care they needed (13). Around the same time, another patient group

that had begun to turn to the ED as their entry point into the system was the elderly, since hospital patients were given priority placement in long-term care facilities (13).

The development of the Canada Health Act in 1984 served to reinforce the hospital and the ED as the centre point of the health care system. The Act ensured that health care would be available in all provinces and territories, but did not necessarily specify how and where those services would and should be available (13;29). This served to reinforce the idea that hospitals were the only place where all medical services could be obtained for 'free,' and the ED was again perceived to be the best way in which to access all these services.

In the 1990s, the funding structure of hospitals was reorganized in efforts to scale back health care spending (7;13). While plans existed to replace portions of hospital care with home care and primary care, the increases in homecare were small and gradual while the cuts to hospitals were large and swift (7). This resulted in patients increasingly turning to the hospital EDs as they had difficulty obtaining care from other sources.

2.2.2 The Fall of Primary Care

While the ED was gradually becoming the main point of access to the health care system, the primary care network's role was shifting as well. As mentioned earlier, the PCP was once regarded as the 'gate keeper' of the system. That role started to fade as the primary care network became increasingly difficult to access and was left to flounder in the wake of the increasingly more dominant and better funded hospitals.

Some of the same factors that increased the use of the ED as an entry point to the health care system also served to deter patients from seeing their PCP. The Hospital Insurance and Diagnostic Services Act of 1957 served to discourage the use of the PCP because laboratory and diagnostic imaging services were not legally required to be available 'free' of charge in medical clinics (27;29). Furthermore, the shortages of short-term care beds fueled by hospital budget cuts motivated patients to use the ED rather than their PCP since it was perceived to be the easiest way to get access to medical care in the hospital.

In the early 1990s, the Canadian government commissioned the Barer-Stoddart report, (30) which was supposed to make recommendations to reduce the cost of health care in Canada. They concluded that an excess of physicians was creating demand and decided that in order to reduce demand supply should be reduced. Subsequent cuts to medical schools and increased specialist training has created a shortage of family physicians, which has only made it more difficult to access primary care services (7). This, in combination with physicians choosing more specialties and less family medicine, has reinforced the ED as the entry point to the system while discouraging PCP visits.

Roberge et al. best summarized the changing roles of the ED and primary care when they concluded, "the role assigned to hospitals, and the decisions taken regarding the organization and funding of the hospital network, added to the parallel development of a weak primary health care network. Together, these factors have led to the problems now being experienced in EDs"(13) (p.33). The directions set by policy and society many years ago gave hospitals a prominent role at the centre of the health care system at the expense of primary care networks. Given the roles that the ED and PCP networks have been forced to assume, it is not surprising then that society has been conditioned to believe that if they are ill they should go to a hospital, regardless of the severity or urgency of their illness.

2.3 Non-urgent ED use

In reviewing the body of literature concerning the utilization of the ED for non-urgent medical problems, it became clear that there is a great deal of information out there, but very little consensus among researchers as to what actually constitutes a non-urgent ED visit, how often such visits occur, the problems caused by such visits and the reasons behind non-urgent visits.

2.3.1 Defining the non-urgent ED attendee

In order to investigate reasons patients may elect to visit the ED with problems that may be more suitable for primary care, the notion of the non-urgent attendee must be explicitly defined. However, only a handful of studies explicitly defined what

constituted a non-urgent ED visit. The definitions ranged from very general descriptions such as persons with non-life-threatening health problems or minor injuries caused by small accidents (31) to specific lists of explicit criteria that must be met in order to the visit to be considered non-urgent. For example, Sempere-Selva et al. (32) developed a list of explicit criteria that identify an ED visit as being non-urgent. The criteria included categories based on severity of presenting symptoms, treatment provided in the ED, diagnostic tests conducted, and patient reasons for attending. Others have defined non-urgent attendance simply as patients who attend the ED but whose presenting complaint does not require hospital treatment (33). All of these methods of defining non-urgent ED use do have one thing in common: they all rely on retrospective analysis to determine which patients were in fact in the ED for minor illness. In the current body of literature there does not appear to be an accepted method for prospectively determining which patients are using the ED for non-urgent problems and which are not.

The studies that do not explicitly define exactly what patient group they are referring to when they discuss non-urgent visits to the ED do imply what they mean by the nature of their methods of collecting data. For example, many studies excluded patients who were brought to the ED by ambulance or who were triaged to see an emergency physician immediately (34). Other studies only surveyed patients who were triaged into CTAS levels 3-5² (36;37). These methods were put in place in hopes of excluding any attendees with urgent medical problems from the studies. On the other hand, several studies sampled any and all ED patients who met basic eligibility criteria, and attempted to determine retrospectively which were in the ED for non-urgent complaints (38-40).

The descriptions of non-urgent patients vary widely across studies and are both implicit and explicit in nature. Implicit descriptions are those that rely on emergency physicians' opinions to determine retrospectively if the ED visit in question was appropriate or not. Explicit descriptions involve specific lists or variables that are tested,

² The Canadian Triage and Acuity Scale (CTAS) is a system used by ED nurses to place patients in a category with guidelines as to how long they should wait to see a physician. The CTAS scale is based on the urgency of presenting symptoms, as determined by the ED triage nurse. The CTAS scale consists of five levels: level I – resuscitation, level II – emergent, level III – urgent, level IV – less urgent and level V – non urgent (35).

which are based on literature reviews and physician input, but do not rely exclusively on the judgment of emergency physicians.

2.3.2 Frequency of non-urgent ED visits

The proportion of non-urgent ED visits has been reported to be as low as 5% of all ED visits (41) and as high as 89% of all ED visits.(42) However, most studies have found that the percentage of non-urgent ED visits lies somewhere between 20-50% (37;39;40;43;44). In Canada, it has been reported that 57% of ED visits nationwide are for non-urgent medical problems that could be handled in a non-hospital setting (45).

There is wide variation in the reported levels of non-urgent ED use among patients. In fact, no two studies report the same percentage. Several reasons have been suggested to explain these discrepancies. The idea of non-urgent attendance depends heavily on the view taken of the role of the ED (42). Discrepancies also exist between professional views and patient perceptions of the severity that a health problem needs to reach in order to be considered 'urgent,' and the expectations of care to be provided in the ED (37). Furthermore, it has been suggested that the most plausible explanation for the varying percentages of non-urgent ED use reported is that different urgency criteria do not measure the same underlying concept of non-urgent ED use (46). Since the criteria for what constitutes a non-urgent ED visit vary so much between studies, it is little wonder why the results also vary.

2.3.3 Consequences of non-urgent ED visits

The ED is traditionally meant to serve four main functions: 1) it addresses an urgent need for medical care following trauma or an acute episode of an illness; 2) it provides medical care that is available only at the hospital ED; 3) it serves as a temporary site of medical care when the regular provider is not available; and 4) it delivers care on a regular basis (24). While it is generally accepted that there will be some level of non-urgent care provided in the ED, the question remains regarding what the optimal proportion of non-urgent visits would be. As mentioned earlier, ED crowding is a major problem facing hospitals across the country and around the world. While it is now commonly recognized that hospital occupancy and a lack of empty in-patient beds are

likely the largest contributors to ED overcrowding, (47) non-urgent use of the ED is also considered to be a contributor. With rising numbers of non-urgent ED visits come a rising number of problems and issues for emergency physicians, nurses, other staff and the patients themselves.

There are many different consequences that arise when patients utilize the ED for non-urgent reasons. Lowy et al. (42) suggest that non-urgent ED visits are a problem because: the patients compete for ED resources with patients who have a greater need to acute hospital care, the type of consultations provided by emergency physicians are generally not appropriate to their problems, and that the costs of treatment in the ED may be higher than the same treatment provided in general practice. This is because emergency physicians tend to perform more investigations, prescribe more drugs, and make more referrals to outpatient departments than general practitioners (GPs) treating comparable non-acute cases. Brim(48) also suggests that the healthcare delivery model in the ED is problem-focused and episodic which is not well suited to providing any sort of ongoing primary care. It has also been noted that non-urgent ED use makes it difficult to guarantee access to necessary resources for truly emergent cases, produces negative “spill-over” effects on the quality of emergency services provided, and increases overall costs to the health care system (39). Similarly, Merritt et al. have suggested that non-urgent ED visits may result in unnecessary congestion of the ED, causing a delay in treatment of seriously ill patients, and raises quality assurance issues related to overall crowding and inefficient use of time and resources (49).

Different problems associated with non-urgent ED visits also arise depending on the perspective taken. For example, ED physicians and nurses often perceive that non-urgent patients distract their attention from more urgent cases that require acute hospital care, add to ED waiting time, and decrease the quality of care they are able to provide to all ED attendees (50). However, these sentiments are not mirrored in ED patients, as they are generally satisfied with the care they receive, whether it is provided by a GP or in the ED, even if they do have to wait many hours or even days to receive it (51). While it is important to take ED staff perceptions into account when addressing non-urgent ED visits,

it is generally the patient who will make the decision whether or not to visit the ED, and the patient who will ultimately suffer the consequences of that decision. This is why it is so important to take patient perceptions into account when determining whether or not the use of the ED was for an urgent medical reason.

2.3.4 Factors associated with non-urgent ED visits

There are many factors that are associated with non-urgent utilization of the ED. Patients often experience a high level of anxiety or perceive that their symptoms require immediate medical attention; this often includes the fear that the symptoms may worsen or that a second opinion is required (24;33;36;38;41;43;50;52;53). Patients often have difficulties accessing their PCP: the patient was not willing to wait for an appointment, there were no appointments available or the PCP simply could not be reached. The accessibility barriers presented by the PCP may be real or perceived by the patient (24;32-34;36;40;41;48;51;54;55). Often, patients are unaware of the services that their PCP provides, or is capable of providing, and will bypass their PCP on the grounds that they believe their problem can only be managed in the ED (34;51;53). In addition to not knowing what services their PCP provides, many patients are unaware of other venues they could turn to for unscheduled care, including walk-in clinics and urgent care centres (43;51;52). Patients have also stated that they prefer the services provided in the ED: that they believe the quality of care is better and have greater confidence in the emergency physicians (24;32;36;39;40;43;52-57). Other reasons that patients may choose to present to the ED with non-urgent problems include: the belief that an X-ray will be required, (33;37;39;55;56) being told to go to the ED by someone other than a health professional, (31;37) and ease of transportation or proximity to the ED (40;51;52;56).

Despite the volume of literature regarding reasons patients present to the ED for non-urgent reasons, questions as to the validity of the claims remain. Since each study used different criteria to identify the non-urgent attendees, and since each set of criteria is ultimately measuring a different concept of non-urgent, no clear cut set of factors can be identified as leading a patient to choose to attend the ED with a non-urgent medical problem. Furthermore, the patient's need for medical advice may not be inappropriate,

since a difference in perception of what is appropriate exists between ED staff and patients (53). A patient may be judged non-urgent based on many factors, including differing perceptions of the proper role of the ED, differences in the real and perceived accessibility and quality of PCP services, and differing patient beliefs as to what constitutes an urgent medical problem (42). Appropriateness and urgency from the patients' perspective need to be judged based on social terms, such as work schedules, not being able to leave children unattended, etc., as well as medical criteria (33) and most studies do not take social context into consideration when judging whether or not an ED visit is truly necessary.

2.4 Health Care Costs

There have been relatively few studies of the costs of emergency services (3-5;58). Among the evidence that does exist, there are studies that show that the costs of ED visits are both higher (4-6;24;59) and lower (3;19) than is traditionally thought or expected. While it is accepted that EDs practice a resource-intensive type of medicine, the cost saving impact of better ED demand management remains controversial (5). A series of recent studies has shown that EDs do not exhibit economies of scale,(4;5) meaning that the average cost per additional visit does not decrease as the number of visits increase. If this were the case then a reduction in use of the ED for minor illness would be desirable since each additional visit would come at a very high cost to the system. This is in contrast to the CAEP, which claims that they can handle non-urgent ED cases with relative ease and at relatively low cost to the health care system (19). Also, Williams has shown that the marginal cost of an ED visit is very low, and believes that a reduction in non-urgent ED use may only lead to very small cost savings for the system (3).

Another area of research that has implications for ED costs is access to health care services outside the hospital. For example, increased continuity of care may be associated with a reduction in use of the ED and therefore a reduction in health care costs. Studies have shown that access and attachment to a PCP reduces the overall costs for the health care system, with most of the reduction coming from a reduced number of ED encounters

(60). Discontinuity of care often results in a patient seeing more specialists and having more ED encounters, which are both more expensive than a visit to a PCP. Furthermore, going to the ED rather than seeing a PCP for minor illness has been associated with increased reutilization of health services (59). The use of EDs for minor problems was associated with increased costs to the health care system because of the tendency of patients to subsequently reutilize health care services for the same problem, as well as the increased costs associated with ED encounters in general.

If the costs of delivering care in the ED are much higher than in other settings, this implies a need to examine how best to deliver non-urgent care in the ED and to look at strategies for improving access to care outside of the hospital. It also may be necessary to address the reasons behind some patients' distorted perceptions of urgency that lead them to use the ED for minor illness.

2.5 Challenges

There are many studies that have been conducted regarding different aspects of non-urgent ED use and access to primary care services. However, despite the large number of studies, there are still many challenges concerning the management of this patient population. Table 2-1 on page 18 provides a summary of the challenges we will address with this thesis.

The first main challenge is that our understanding of the factors that are associated with non-urgent ED use, especially in a Canadian context, remains limited. This is because most studies use different methods of determining which patients are in fact non-urgent and then come up with their own unique set of factors to explain the patients' decisions. Since the factors that are associated with non-urgent ED visits are not always obtained from the patient's perspective, it is difficult to develop any sort of strategy to provide this patient group with a more appropriate source of care. In order to address this issue, this thesis will look at reasons for choosing the ED directly from the patients' perspectives. We will collect information from patients in the waiting room of an ED.

In addition to, and perhaps as a result of, the discrepancies that exist among methods to determine which users of the ED are non-urgent, there is also much discrepancy among studies in the measurement of non-urgent ED use. No two studies report the same percentage of non-urgent visits because no two studies define and measure non-urgent ED use in the same way. In order to obtain the most accurate measure of non-urgent ED use possible, both patients and their attending physicians will be asked to rate the patient's level of urgency on a scale on one to ten. This way we will be able to compare the ratings and determine if there are any factors that may be associated with why some patients may have a distorted perception of the urgency of their medical issues. By using the emergency physician opinion regarding level of urgency as the 'gold standard' we will be able to show which patients do not understand the urgency of an illness.

Finally, there is very little data that has been published regarding the costs of emergency medical services, especially in Canada. While a handful of studies have been conducted, they are mostly from an American perspective, and many are outdated. Furthermore, among the studies that do exist, there is no real consensus regarding the actual costs of ED visits. There are groups who believe that ED visits cost either more or less than is commonly believed. Some studies base their evidence solely on the perceptions of ED staff. It is important to look at these issues from the patient perspective because at the end of the day, it is this perspective alone which has the greatest influence on health service utilization. In order to show what ED visits cost in Canada, we will conduct a cost analysis of patients sent to an ambulatory care section of an ED at a hospital in Ottawa. We will also compare these costs to the costs of receiving comparable care in a non-ED setting.

Table 2-1 Summary of challenges identified and how they will be addressed

Issue	Challenges Identified	How thesis will address challenges	Research Objective Addressed
Factors associated with non-urgent ED use	There is no consensus regarding factors that may be associated with non-urgent ED use, especially in a Canadian context. Factors are also not always obtained from the patient perspective.	We will gather information regarding patients' motives for using the ED by collecting information directly from the patients in the ED.	1
Lack of consistency in what is meant by 'non-urgent'	Measuring non-urgent ED use is inconsistent and often unclear in previous studies.	We will have both the patient and their attending physician rate the patient's level of urgency on a scale of 1 to 10. These two ratings will be compared, and combined with other factors will help show why some patients may have a distorted perception of urgency.	1
Lack of ED costing studies	ED use and health care costs in the Canadian context are not well studied. There is very little information regarding the costs associated with health care use in Canada.	We will estimate how much ED visits cost at an academic urban hospital in Ottawa, ON. This information will be compared to the costs of receiving medical care in non-ED settings.	2

3. Methodology

In order to determine which factors are related to non-urgent ED use from the patient perspective, as well as the costs associated with those visits, the research protocol is divided into two parts. First, we conducted a survey of patients in an ED; second, we conducted a cost analysis of the services they received during their visit.

3.1 Research Design

The design of this study consisted of two parts: a cross-sectional survey and chart review coupled with an economic analysis. The study population of interest was patients in the emergency department at the Civic Campus of The Ottawa Hospital who were triaged to the Urgent Care area (ambulatory care). The services of interest for the economic analysis were those that were received during the patients' ED visits, such as the emergency physician consultation or drugs.

3.2 Population and Research Participants

3.2.1 Population and Sample

The population for this study was all ED patients triaged to Urgent Care (ambulatory care) at the Civic Campus of The Ottawa Hospital. The sample was a selection of consecutive patients in the Urgent Care area of the ED over a one month period in the winter of 2010, between the hours of 08h00 and 19h00.

3.2.2 Inclusion Criteria

All patients selected to participate in the study were at least 18 years of age, were able to understand either English or French, and were triaged to ambulatory care. The survey instrument was only available in English; however, the researcher is bilingual and was able to translate the survey orally for Francophone patients who wanted to participate. Patients who were triaged to other areas of the ED (i.e. trauma, observation, etc.) were excluded because it was assumed that if a patient needed a bed and corresponding medical supervision in the ED, then that patient's visit to the ED was not non-urgent. The patient groups who were excluded were patients placed on contact

precautions in isolation, patients brought in with the police, patients who were violent or required monitoring by security, and patients whom the nurses deemed should not be surveyed due to severe psychiatric issues. These patients were excluded to reduce any unnecessary risk that we may have encountered in dealing with contagious, violent, or aggressive patients.

3.2.3 Sample Size

In 2009 there were just over 62,800 visits to the ED at the Civic campus of The Ottawa Hospital by people 18 years of age and older. Based on this number, to achieve a 95% confidence level and an 80% power, we calculated the sample size required to be a minimum of 382 individual surveys.

3.3 Survey Development

3.3.1 The Patient Survey

We used a self-administered questionnaire adapted from a previously developed and validated survey from the United States (61). In order to adapt the survey to be relevant for a Canadian health care setting, we took out questions dealing with health insurance status, point-of-care costs and medication costs. We also removed questions dealing with socio-economic status for two reasons. First, given that this is exploratory research, we were not looking at the influence of socio-economic factors. Second, in Canada where access to health care services is universal, we did not expect to find as much of an impact of socio-economic factors as would have been seen in the United States. We used forced-answer and Likert-scale questions with one open-ended question pertaining to self-reported symptoms. The adaptations to the questionnaire were guided by an extensive literature review and were refined following consultations with emergency physicians. The questions were designed to measure the patients' perceived levels of urgency, their presenting symptoms, their past interactions with the health care system, their opinions regarding the quality of care in the ED and their motivations for choosing the ED for their medical problems. The new survey was pilot tested with a small

convenience sample of potential emergency room patients. Where necessary, we refined the questions to improve clarity. A copy of the patient survey can be found in Appendix A.

A self-administered questionnaire was chosen as the means for data collection for several reasons. First, it allowed the patient to remain anonymous thus increasing the likelihood of receiving honest answers. Second, patient confidentiality was maintained since the patient did not have to answer questions out loud. Third, it was a relatively inexpensive method that allowed a large sample to be collected. Finally, the standardized questions and answers facilitated categorization and analysis of the responses.

3.3.2 The Physician Survey

In addition to surveying patients, the emergency physicians were also surveyed to elicit their medical opinions regarding the level of urgency of each of their patients. We developed the physician survey with input from the Medical Director of the Emergency Department as well as the Emergency Department Research Committee. The questionnaire was designed to be as concise as possible, while still allowing all required information to be collected. It contained only two questions to elicit the physicians' medical opinions regarding the urgency of each of their patients and what, if any, services their patients needed immediate access to. We pilot tested the survey with two emergency physicians who were on duty in Urgent Care, and made revisions accordingly.

Either the Emergency Clerk or the researcher inserted the survey into each patient chart as the patient entered the Urgent Care waiting room. It was left up to the physicians when they wanted to fill out the survey; however, most opted to fill it out either following initial consultation or when they completed the chart upon discharging the patient. Either the clerk or the researcher would remove the survey from the chart before it was closed and sent to health records. The physician survey used in this study was a new survey; as such this was the first empirical validation of the tool. A copy of the physician survey can be found in Appendix B.

3.4 Data Collection

3.4.1 Sampling

Due to limitations in time and resources, it was not possible to conduct this study 24 hours a day, seven days a week. However, it was deemed important to include patients from different times during the day and week when resources available outside of the emergency room vary. In order to accomplish this goal given the resources available, a convenience sample of consecutive patients who met inclusion criteria were selected to participate in the study, with all seven days of the week approximately evenly represented in the sampling frame. This sampling frame was chosen because there was only one person collecting data, it was not feasible to conduct data collection overnight, and this time frame allowed for the desired level of variance in the availability of health care resources outside of the ED.

3.4.2 Recruitment

At the Civic campus, patients who are triaged to the Urgent Care department are sent from the main ED waiting room to a smaller waiting room in the cubicles area. Patients are then put into cubicles to be seen by an ED physician. When the patients were put into a room, the researcher went into the cubicle and gave a brief explanation of the study. The patients were asked if they would like to participate. If they agreed, the participants reviewed a detailed information sheet and provided written consent prior to administering the survey.

In order to minimize selection bias in the recruitment process, we approached as many patients as possible. Given that there was only person administering the surveys, it was not possible to approach every single patient in Urgent Care without disrupting the workflow for the physicians and nurses. Again, the only patients who were purposely not approached were those who were brought in with the police, those who were placed on contact precautions in isolation, those who were violent or required monitoring by security, and those who the nurses suggested should not be asked.

3.5 Survey Data Analysis

We analyzed the survey data using SAS 9.1. We used descriptive statistics to summarize the data. Then we disaggregated the data into four groups: (i) patients who rated themselves with a low urgency level (level 4 or less), (ii) patients who did not rate themselves with a low urgency level, (iii) patients rated with a low urgency level (level 4 or less) by their physicians, and (iv) patients not rated with a low urgency level by their physicians. These cut points were selected based on previous literature as well as in consultation with emergency physicians. We concluded that anything rated at four or less was definitely not urgent, and anything rated five or above encompassed both semi-urgent and urgent cases. For the purposes of this study we will refer to ratings of five or higher as 'urgent'. We compared the groups with chi square statistics, and entered those with significant differences between patients who rated themselves non-urgent and those who rated themselves urgent into a logistic regression to determine which factors were associated with non-urgent ED use.

3.6 Economic Analysis

3.6.1 Design of Economic Analysis

In order to determine the cost of ED visits, we conducted a straightforward cost minimization analysis (CMA). CMA is an appropriate form of analysis when the programs or procedures under consideration are expected to have the same outcomes.⁽⁶²⁾ The outcomes of receiving medical care in an ED or in a primary care setting in Ottawa should be equivalent; in both scenarios, the patient will receive appropriate care by a physician licensed by the College of Physicians and Surgeons of Ontario and be directed to receive follow-up care as necessary. We designed this section of the study to determine the costs associated with using the ED for non-urgent reasons. We conducted the analysis from the perspective of the health care payer (i.e. the Ministry of Health and Long Term Care), therefore only direct medical costs were included.

3.6.2 Underlying Assumptions

The analysis is based on the following assumptions:

- i. The only costs associated with a primary care physician visit are the fees billed to the Ontario Health Insurance Plan (OHIP) and no tests or services are provided except for the initial consultation;
- ii. While it is generally accepted that a discount rate of 5% be used in economic evaluations (63), no discount is necessary due to the short time horizon; and
- iii. The overhead, nursing and administrative costs were taken from a study of the Children's Hospital of Eastern Ontario (CHEO) (64) and were used as a general estimate for the costs at The Ottawa Hospital since no estimates were available for TOH.

3.6.3 Data Collection and Costing

We conducted a chart review to obtain the resources used for each patient encounter in the ED. The chart abstraction tool can be found in Appendix C. Cost data for the economic analysis came from a variety of sources (Table 3-1). The costs of the emergency physician and specialist consultations were collected from chapter A of the Ontario Schedule of Benefits for Physician Services under the Health Insurance Act (65). The fees for diagnostic radiology and ultrasound services were collected from chapters D and G respectively of the Schedule of Benefits for Physician Services (65). The fees for the laboratory tests were collected from the Laboratory Services Schedule of Benefits (66). The costs for drugs administered were collected from the 41st edition Ontario Drug Benefit Formulary (67). Costs for the drugs that are not covered under the Ontario Drug Benefit were obtained from a pharmacist at the pharmacy in The Ottawa Hospital, Civic Campus. Other costs, such as those of blood transfusions (68) and overhead (64), were estimated from previous studies and inflated to 2010 dollars using the Bank of Canada inflation calculator (69). A comprehensive list of resource and cost information can be found in Appendix D.

3.6.4 Data Analysis

The costing data spreadsheet was linked with the survey data by unique study ID. This resulted in a cost associated with each patient-rated and physician-rated level of

urgency. We performed bivariate analyses on the costs of non-urgent visits compared to urgent visits, broken down by both patient and physician urgency ratings. We then compared the costs of non-urgent ED visits, from both the patient and physician perspective, to the cost of seeing a family physician.

Table 3-1 Sources for cost analysis

Resource	Cost Source
ED Overhead (facilities, supplies, nursing costs, administrative costs)	Gaboury <i>et al</i> (64), inflated to 2010 dollars using Bank of Canada Inflation Calculator (69)
Physician Consultation Fees	Ontario Schedule of Benefits for Physician Services under the Health Insurance Act (65)
Diagnostic Radiology	Ontario Schedule of Benefits for Physician Services under the Health Insurance Act (65)
Diagnostic Ultrasound	Ontario Schedule of Benefits for Physician Services under the Health Insurance Act (65)
Laboratory Services and Tests	Laboratory Services Schedule of Benefits (66)
Drugs	Ontario Drug Benefit Formulary (67)
Drugs not in formulary	The Ottawa Hospital Civic Campus Pharmacy
Blood Transfusions	Amin <i>et al</i> (68), inflated to 2010 dollars using Bank of Canada Inflation Calculator
Electrocardiograms (ECGs)	Ontario Schedule of Benefits for Physician Services under the Health Insurance Act (65)

3.7 Research Protocol Summary

Upon receipt of ethical approval from both The Ottawa Hospital Research Ethics Board (OHREB) and the University of Ottawa Research Ethics Board (UOREB), the research protocol for the study was as follows:

- a) We obtained permission from The Ottawa Hospital Emergency Department Research Committee to conduct the study in the Emergency Department of the Civic Campus. The committee provided input regarding the contents of the surveys, the information forms and the consent forms.
- b) We obtained consent and buy-in from the Emergency Physicians. We presented information sheets at an emergency physician staff meeting, and collected signed consent forms following the meeting. Those physicians who were not at the meeting were contacted to have them sign and return a consent form prior to the beginning of data collection. Physicians who did not respond were asked to sign a consent form at the beginning of their first shift during the data collection period. The consent forms were valid for the duration of the study.
- c) We conducted a pilot test in Urgent Care to ensure the data collection methods would not interfere with patient flow for the physicians, residents, students and nurses.
- d) Upon arrival to the ED for data collection, the physicians, nurses and clerks on duty were approached and the study and data collection processes were explained.
- e) As patients were triaged to the Urgent Care department of the ED, either the ED Clerk or the researcher placed a physician survey into each patient's chart.
- f) While the patients were waiting to see the physicians, we approached them and asked if they would be interested in participating in a study about their use of the ED and access to care.
- g) If the patients said yes, we would sit down with them and go through the information sheet. Written consent was obtained from each patient prior to beginning the survey once any questions that may have arisen were answered.

- h) The patients were provided with the questionnaire, clipboard and pen. The questionnaire was self-administered but we remained in the general area while the patients were filling out the survey. If the patients did not want to fill out the survey themselves but still wanted to participate, we asked them the questions and recorded their answers.
- i) We stored signed consent forms and completed questionnaires in separate envelopes and kept them in a secure location near the nursing station.
- j) The data collection period went from 22 January 2010 to 17 February 2010 with 20 active days of data collection.
- k) Following the questionnaire, we collected information from the patients' charts off of the vOacis system at TOH for the economic evaluation. This information included diagnosis and services used while being treated in the ED. In addition to the patient data, we also collected costing information from relevant sources as described in section 3.6.2.
- l) We coded the information from the questionnaires and entered it into an Access database.
- m) We cleaned and analyzed the data using SAS 9.1.
- n) We entered the data for the economic analysis into a Microsoft Excel spreadsheet where we assigned the costs.
- o) We conducted the economic analysis using Microsoft Excel and SAS 9.1.

4. Results

The main outcomes of this thesis are to determine a) which factors are associated with non-urgent ED use, and b) the costs associated with non-urgent ED use. As previously outlined, we conducted a survey of ED patients and a cost analysis of the resources used during their visits. We will present the results from the survey in sections 4.1-4.8 and the results of the cost analysis in section 4.9.

4.1 Response Rate

We approached a total of 798 patients during the study period. 606 patients agreed to participate, resulting in a 76% response rate. The patients who declined to participate generally gave one of three reasons: they did not feel up to filling out a survey (n=114), they did not have their reading glasses and did not want the survey questions read to them (n=43), or they had injured their writing hand/arm and did not want the survey questions read to them (n=35). The response rate for the physician surveys was 73% of the patient surveys (n=440).

4.2 Demographic Characteristics

Fifty-seven percent (n=344) participants were female. Seventeen percent (n=100) of participants were between the ages of 18 and 24, 21.8% (n=129) were between 25 and 34, 15.7% (n=112) were between 35 and 44, 19.0% (n=114) were between 45 and 54, 12.6% (n=82) were between 55 and 64, 5.2% (n=31) were between 65-74, and 5.3% (n=32) were aged 75 or older. Values from the 2006 City of Ottawa Census are included, and show that our sample of ED patients was approximately representative of the general population in Ottawa (70).

The majority of participants (n=514, 84.8%) were from the Ottawa area. Five percent (n=30) were from the Gatineau-Hull region of Quebec, 2.5% (n=15) were from the rest of Ontario, and 1.3% (n=8) were from the rest of Canada. Six percent (n=39) of the participants did not report their postal code. We used data from the 2006 City of Ottawa

Census to show that our sample of patients in the ED is approximately representative of the general population in Ottawa, Ontario (Table 4-1).

4.3 Perceived Urgency

Perceived urgency levels were collected from both the patients' and the emergency physicians' perspectives. Figures 4-1 and 4-2 show the breakdown of patient and physician rated urgency levels, respectively. As discussed in section 3.5, any rating of four or less out of ten was considered to be non-urgent and for the purposes of this study, all ratings of five or higher were referred to as 'urgent'. Twenty-seven percent (n=161) of patients gave themselves an urgency score of four or less, while the physician gave 41% (n=182) of their patients a score of four or less (p=0.0435).

Table 4-2 shows the level of agreement between patient and physician urgency ratings. There were only 53 cases where both the patient and physician agreed that the visit was non-urgent. There were also 188 cases where both the patient and the physician agreed that the visit was urgent. However, there were 129 cases where the patient thought the visit was urgent where the physician rated the visit non-urgent. There were also 70 cases where the patient rated the visit non-urgent and the physician rated the visit urgent. Since we had a lower response rate amongst the emergency physicians, we did not have a physician-rated urgency rating for every patient rating. Consequently, the numbers in Table 4-2 may not add up to 100%. Overall, patients and physicians disagreed on whether the ED visit was non-urgent or not in over 45% of the cases.

Since the objective of this thesis was to determine which factors are associated with non-urgent ED use from the patients' perspective, the remainder of the survey results discussed in this section will use the patient-rated urgency level breakdown. A complete analysis of the physician scores can be found in Appendix E.

Table 4-1 Demographic characteristics broken down by both patient and physician urgency ratings

Characteristic	All (%) [†]	Patient-Rating		Physician-Rating		p value*	Ottawa (%) [§]
		Non-urgent (%) [†]	Urgent (%) [†]	Non-urgent (%) [†]	Urgent (%) [†]		
N	606 (100.0)	161 (26.6)**	445 (73.4)**	182 (41.4)**	258 (58.6)**	n/a	636,628 (100.0)
Gender						0.7449	
Male	261 (43.1)	76 (47.2)	185 (41.7)	80 (44.2)	110 (42.6)		303,785 (47.7)
Female	344 (56.9)	85 (52.8)	259 (58.3)	101 (55.8)	148 (57.4)		332,838 (52.3)
Age						0.1230	
18-24	100 (16.7)	37 (23.3)	63 (14.3)	34 (19.0)	41 (16.0)		80,328 (12.6)
25-34	129 (21.5)	31 (19.5)	98 (22.2)	49 (27.4)	47 (18.4)		108,980 (17.1)
35-44	112 (15.7)	25 (15.7)	87 (19.7)	23 (12.8)	58 (22.7)		129,575 (20.4)
45-54	114 (19.0)	33 (20.7)	81 (18.4)	32 (17.9)	47 (18.4)		126,810 (19.9)
55-64	82 (12.6)	20 (12.6)	62 (14.1)	22 (12.3)	34 (13.3)		90,055 (14.1)
65-74	31 (5.2)	7 (4.4)	24 (5.4)	8 (4.5)	13 (5.0)		51,952 (8.2)
75+	32 (5.3)	6 (3.8)	26 (5.9)	11 (6.1)	16 (6.2)		48,925 (7.8)
Location						0.0472**	
Ottawa Area	501 (84.8)	138 (85.7)	363 (84.4)	157 (86.3)	220 (85.6)		n/a
Quebec	31 (5.3)	6 (3.7)	25 (5.8)	4 (2.2)	16 (6.2)		n/a
Ontario	15 (2.5)	7 (4.4)	8 (1.9)	5 (2.8)	4 (1.6)		n/a
Canada	8 (1.4)	2 (1.2)	6 (1.4)	1 (0.6)	6 (2.3)		n/a

* Column percentage unless otherwise indicated; ** Row percentage

* p value calculated using chi-square analysis unless otherwise indicated; ** p value calculated using fisher's exact test

§ 2006 City of Ottawa Census Data (70)

NB: Columns and/or rows may not add to 100% due to missing values

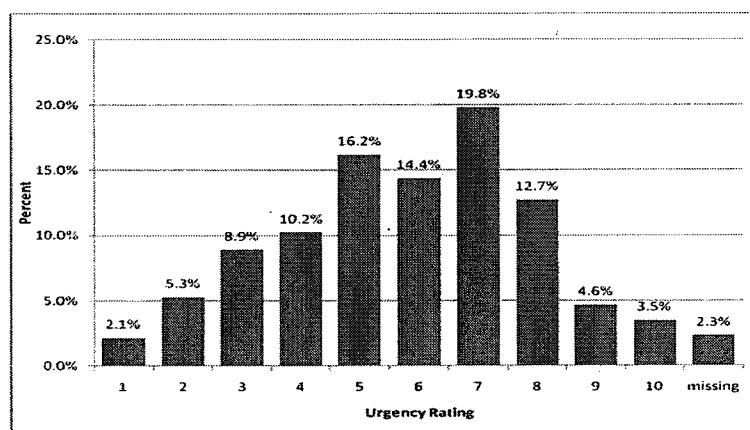


Figure 4-1 Breakdown of patient-rated urgency levels

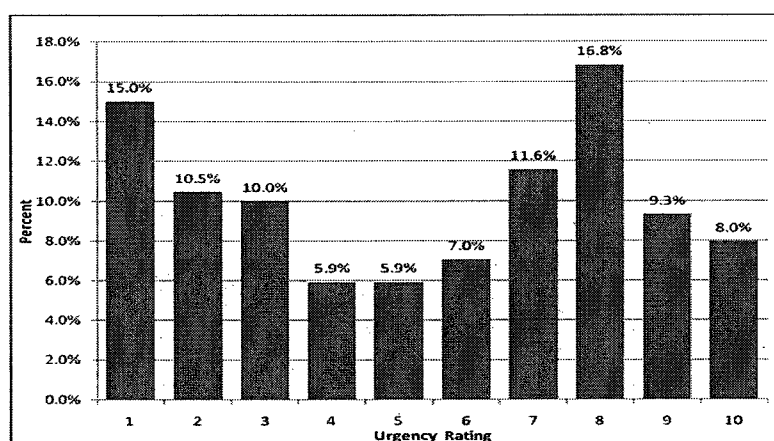


Figure 4-2 Breakdown of physician-rated urgency levels

Table 4-2 Agreement between patient and physician urgency ratings – total sample

		Physician Rating		
		Non-urgent	Urgent	Total
Patient Rating	Non-urgent	53	70	123
	Urgent	129	188	317
	Total	182	258	440

4.4 Symptoms and Duration

On the survey, we asked patients to describe in their own words what their symptoms were (Table 4-3). We then classified those symptoms into broad categories with the help of two physicians working independently. The major categories that emerged from the classification were chest pain, abdominal pain, head injuries, musculoskeletal

Table 4-3 Presenting symptoms and symptom duration broken down by patient-rated urgency

Characteristic	All	Non-urgent (%) ⁺	Urgent (%) ⁺	p value*
Presenting Symptoms				0.0105
Musculoskeletal Injury	160	55 (34.4)	105 (65.6)	
Other	148	34 (23.0)	114 (77.0)	
Chest Pain	66	11 (16.7)	55 (83.3)	
Infections / Flu-like symptoms	53	11 (20.8)	42 (79.3)	
Soft Tissue Injury	53	18 (34.0)	35 (66.0)	
Abdominal Pain	52	10 (19.2)	42 (80.8)	
Blood / Vascular	34	11 (32.4)	23 (67.7)	
Head Injury	20	4 (20.0)	16 (80.0)	
Primary Care / Administrative	9	4 (44.4)	5 (55.6)	
Symptom Duration				0.0004
< 24 hours	149	57 (38.3)	92 (61.7)	
1 - 7 days	247	65 (26.3)	182 (73.7)	
> 7 days	169	29 (17.2)	140 (82.8)	

⁺ Row percentages add to 100% with the exception of rounding error
^{*} p value calculated using chi-square analysis

injuries, soft tissue injuries, primary care / administrative needs, blood / vascular problems, infections or flu like symptoms, and mental health problems. Anything that did not fit into one of those categories was classified as 'other.'

The most common presenting symptom was a musculoskeletal problem, with 26.9% of patients (n=160) reporting some sort of potential break, sprain or strain as their reason for coming to the ED. The 'other' type of symptoms was the next most common, with 21.7% (n=129) of patients falling into this category. Next was chest pain at 10.9% (n=66) followed by infections/flu like symptoms at 8.9% (n=53), soft tissue injuries, such as lacerations or burns, at 8.9% (n=53), abdominal pain at 8.7% (n=52), blood or vascular symptoms at 5.7% (n=34), head injuries at 3.4% (n=20), mental health problems at 3.2% (n=19) and primary care or administrative requests at 1.5% (n=9). There was a statistically significant difference between the symptoms reported by patients who rated their symptoms non-urgent versus those who rated their symptoms as urgent (p=0.0105).

When asked about the length of time they had had their symptoms, 25% (n=149) of patients stated they had their symptoms for less than twenty-four hours before coming to the ED. Forty-one percent (n=247) of patients had their symptoms between one and seven days and 28.3% (n=169) had their symptoms for more than seven days before

Table 4-4 Presenting symptoms broken down by symptom duration and patient-rated urgency level

Presenting Symptom	All ⁺	Symptom Duration					
		< 24 hours (%) [*]		1-7 days (%) [*]		> 7 days (%) [*]	
		Non-Urgent	Urgent	Non-Urgent	Urgent	Non-Urgent	Urgent
Chest Pain	63	4 (6.3)	10 (15.9)	3 (4.8)	22 (35.0)	4 (6.3)	20 (31.7)
Abdominal Pain	51	1 (2.0)	7 (13.7)	7 (13.7)	19 (37.3)	2 (3.9)	15 (29.4)
Head Injury	17	0 (0.0)	7 (41.2)	3 (17.6)	4 (23.5)	0 (0.0)	3 (17.6)
Musculoskeletal Injury	150	23 (15.3)	25 (16.7)	21 (14.0)	44 (29.3)	9 (6.0)	28 (18.7)
Soft Tissue Injury	48	10 (20.8)	14 (29.2)	5 (10.4)	9 (18.8)	1 (2.1)	9 (18.8)
Infections / Flu-like symptoms	52	1 (1.9)	5 (9.6)	7 (13.5)	30 (57.7)	2 (3.8)	7 (13.5)
Blood / Vascular	30	4 (13.3)	2 (6.7)	3 (10.0)	13 (43.3)	2 (6.7)	6 (20.0)
Primary Care / Administrative	9	0 (0.0)	0 (0.0)	1 (11.1)	0 (0.0)	3 (33.3)	5 (55.6)
Other	138	13 (9.4)	21 (15.2)	13 (9.4)	39 (28.3)	6 (4.3)	46 (33.3)

⁺ Some values missing

^{*} Row percentages add to 100% with the exception of rounding error

coming to the ED. The differences in symptom duration between the non-urgent and urgent patients was significant at the $p=0.0004$ level.

Table 4-4 shows the presenting symptoms broken down by both patient-rated urgency scores and symptom duration. We found that patients who had their symptoms for the shortest amount of time, regardless of what those symptoms were, were more likely to rate their problem as non-urgent. Conversely, the longer the patients had their symptoms, the more likely they were to rate their problem as urgent.

4.5 Usual Source of Medical Care and Recent Medical Care Contact

Table 4-5 shows the patients' usual sources of medical care and medical care contact they have had in the past twelve months. Almost 80% ($n=479$) of patients reported that they have a family doctor. There was no statistical difference in family doctor status between non-urgent and urgent patients ($p=0.6940$). Of these, only 25% ($n=148$) attempted to make an appointment with their family doctor before coming to the ED. The difference between the non-urgent and the urgent groups was statistically significant ($p=0.0268$). Sixty percent ($n=363$) of participants reported that their primary source of care was their family doctor. Twenty-seven percent ($n=160$) of patients reported that their primary source of care was a walk in clinic, and 8.9% ($n=53$) identified the ED as their primary source of care. There was no statistical difference between non-urgent and urgent patients with regards to their primary source of care ($p=0.4982$).

Over half (52.6%, $n=317$) of the patients surveyed reported to be in the ED for the first time in the past twelve months. Twenty-five percent ($n=155$) reported to have had one prior ED visit in the past twelve months, 10.5% ($n=63$) reported to have two prior ED visits. Eleven percent ($n=68$) of participants reported three or more ED visits within the past 12 months. The difference between reported ED visits for non-urgent and urgent patients was not significant ($p=0.0756$).

Of the patients who reported having a family doctor, 12.4% ($n=59$) have not had a visit in the past twelve months. Seventeen percent ($n=83$) reported seeing their family doctor once, 19% ($n=92$) reported two visits, 14% ($n=68$) three visits, 12% ($n=58$) reported

Table 4-5 Usual source of medical care and recent medical care contact broken down by patient-rated urgency scores

Characteristic	All [§]	Non-urgent (%) ⁺	Urgent (%) ⁺	p value*
Family Doctor				0.6940
Yes	479	129 (26.9)	350 (73.1)	
No	127	32 (25.2)	95 (74.8)	
Attempt to make appointment with family doctor before coming to ED				0.0268
Yes	148	27 (18.2)	121 (81.8)	
No	348	105 (30.2)	243 (69.8)	
I don't have a family doctor	98	24 (24.5)	74 (75.5)	
Usual care source				0.4982
Emergency Room	53	15 (28.3)	38 (71.7)	
Family Doctor	363	92 (25.3)	271 (74.7)	
Walk In Clinic	160	47 (29.4)	113 (70.6)	
Other	20	3 (15.0)	17 (85.0)	
Number of ED visits in past twelve months				0.0756
0	317	88 (27.8)	229 (72.2)	
1	155	47 (30.3)	108 (69.7)	
2	63	14 (22.2)	49 (77.8)	
3 or more	68	10 (14.7)	58 (85.3)	
Number of family doctor visits in past twelve months				0.0425
0	59	16 (27.1)	43 (72.9)	
1	83	32 (38.6)	51 (61.5)	
2	92	28 (30.4)	64 (69.6)	
3	68	14 (20.6)	54 (79.4)	
4	58	15 (25.9)	43 (74.1)	
5 or more	116	22 (19.0)	94 (81.0)	
Does family doctor participate in an after hours visit group				0.7075
Yes	101	30 (29.7)	71 (70.3)	
No	95	24 (25.3)	71 (74.7)	
I don't know	276	71 (25.7)	205 (74.3)	
Has family doctor discussed additional services they can provide				0.4159
Yes	136	35 (25.7)	101 (74.3)	
No	249	72 (28.9)	177 (71.1)	
I don't know	83	18 (21.7)	65 (78.3)	
Heard of TeleHealth Ontario				0.0933
Yes	350	102 (29.1)	248 (70.9)	
No	256	59 (23.0)	197 (77.0)	
Contact TeleHealth Ontario prior to ED visit				0.6777
Yes	38	9 (23.7)	29 (76.3)	
No	568	152 (26.8)	416 (73.2)	

[§] Some values missing

⁺ Row percentages add to 100% with the exception of rounding errors

* p value calculated using chi-square analysis

four visits, and almost 25% (n=112) reported five or more visits in the past twelve months. The difference between non-urgent and urgent patients was significant (p=0.0425).

The patients who reported having a family doctor were also asked about their knowledge of the services their family doctors offer. Over 58% (n=276) of patients did not know if their family doctor participates in an after hours visit group. Twenty-one percent (n=101) said their family doctor does participate in an after hours visit group and 20% (n=95) said their family doctor does not. Over 53% (n=249) of patients claimed that their family doctor had never talked to them about any additional services they are able to provide (i.e. sutures, x-ray facilities, etc.); twenty-nine percent (n=136) of patients said yes and 17.7% (n=83) did not know. There were no statistically significant differences between the non-urgent and urgent patient groups for either knowing if their family doctor participates in an after hours visit group (p=0.7075) or if their family doctor had discussed medical services they can provide (p=0.4159).

In addition to their family doctor and ED use, participants were also asked about any experiences with the free phone service available in Ontario called TeleHealth Ontario. Fifty-seven percent (n=350) had heard of TeleHealth, but only 6% (n=38) contacted the service prior to coming to the ED. The differences between the non-urgent and urgent groups were not significant for either having heard of TeleHealth (p=0.0933) or having contacted TeleHealth (p=0.6777).

4.6 Transportation and Time of Day

The most common method for patients to arrive at the ED was to have someone else drive them (45.7%, n=277). Twenty-one percent of patients (n=127) drove themselves to the ED, while 12.9% (n=78) took the bus, 11.1% (n=67) took a taxi, 5% (n=30) arrived by ambulance, and 4.5% (n=27) arrived by another mode of transportation, such as walking or being brought by porter from another area of the hospital. Mode of transportation did not differ between the non-urgent and urgent patient groups (p=0.1137).

Patients were asked if there was a particular time of day that they preferred to receive their medical care. Forty-six percent (n=274) reported that they seek medical care

as soon as they feel sick, no matter what the time. Eleven percent (n=64) of patients prefer to receive their medical care in the mornings, 9.4% (n=55) in the afternoons, 7.5% (n=44) in the evenings, and 4.5% (n=29) on weekends. About six percent (n=39) seek medical care by appointment with a health care professional and 3.6% (n=21) reported that they rarely or never seek medical care (Table 4-6).

Table 4-6 Transportation to the ED and time of day preferred to seek medical care broken down by patient-rated urgency

Characteristic	All [§]	Non-urgent (%) [†]	Urgent (%) [†]	p value*
Method of transportation to the ED				0.1137
In a car: I drove myself	127	34 (26.8)	93 (73.2)	
In a car: Someone else drove me	277	75 (27.1)	202 (72.9)	
Bus	78	15 (19.2)	63 (80.8)	
Taxi	67	16 (23.9)	51 (76.1)	
Ambulance	30	8 (26.7)	22 (73.3)	
Other	27	13 (48.2)	14 (51.9)	
Preferred time to seek medical care				0.4492
In the evenings	44	12 (27.3)	32 (72.7)	
In the mornings	64	17 (26.6)	47 (73.4)	
In the afternoons	55	21 (38.2)	34 (61.8)	
On weekends	29	5 (17.2)	24 (82.8)	
As soon as I feel sick no matter what the time	274	67 (24.5)	207 (75.6)	
By appointment	39	10 (25.6)	29 (74.4)	
Rarely / never	21	7 (33.3)	14 (66.7)	
Other	61	19 (31.2)	42 (68.9)	

[§] Some values missing
[†] Row percentages add to 100% with the exception of rounding errors
* p value calculated using chi-square analysis

4.7 Reasons for Coming to the ED

Table 4-7 shows reasons for seeking care in the ED and compares the responses of non-urgent and urgent patients. Just under half of the participants were either referred to the ED by a health care professional or had a friend or family member suggest a visit was necessary (48.7%, n=262). The other 51.3% (n=276) decided to come to the ED on their own. There were no differences between the non-urgent and urgent patient groups (p=0.4788). However, when we made the categories a little broader, dividing up the referring party into three groups only (health care professional, other person or self) the

Table 4-7 : Reasons for using the ED for medical care broken down by patient-rated urgency

Characteristic	All [§]	Non-urgent (%) [†]	Urgent (%) [†]	p value*
Who referred / suggested an ED visit				0.4788
Family Member	54	17 (31.5)	37 (68.5)	
Family Doctor	61	12 (19.7)	49 (80.3)	
Friend	31	9 (29.0)	22 (71.0)	
TeleHealth Nurse	29	4 (13.8)	25 (86.2)	
No one, I chose to come myself	276	81 (29.4)	195 (70.7)	
Employer / Coworker	17	17 (23.5)	13 (76.5)	
Paramedic	11	4 (36.4)	7 (63.6)	
Other	59	14 (23.7)	45 (76.3)	
Who referred / suggested an ED visit				0.0980
Health Care Professional	122	36 (29.5)	86 (70.5)	
Other person	140	28 (20.0)	112 (80.0)	
Self	276	81 (29.4)	195 (70.7)	
Services Wanted**				0.0117
No Services / I don't know	65	25 (38.5)	40 (61.5)	
A procedure	29	13 (44.8)	16 (55.2)	
Blood test	27	10 (37.0)	17 (63.0)	
X-ray / Diagnostic Imaging	275	70 (25.5)	205 (74.6)	
Specialist	87	30 (23.0)	67 (77.0)	
IV / Medication	30	4 (13.3)	26 (86.7)	
Other	76	15 (19.7)	61 (80.3)	
Did you search symptoms on the Internet before coming to the ED				0.3271
Yes, and it led me to the ED	52	11 (21.2)	41 (78.9)	
Yes, and I decided to come to the ED on my own	443	128 (28.9)	315 (71.1)	
No	75	15 (20.0)	60 (80.0)	
I don't have a computer	30	6 (20.0)	24 (80.0)	
Waiting time in the ED compared to usual medical care source				0.5631
Better	77	23 (29.9)	54 (70.1)	
Same	124	29 (23.4)	95 (76.6)	
Worse	326	89 (27.3)	237 (72.7)	
Quality of care in the ED compared to usual medical care source				0.5161
Better	164	46 (28.1)	118 (72.0)	
Same	296	72 (24.3)	224 (75.7)	
Worse	35	11 (31.4)	24 (68.8)	
Personal attention from ED staff compared to usual medical care source				0.1859
Better	108	24 (22.2)	84 (77.8)	
Same	312	90 (28.9)	222 (71.2)	
Worse	74	15 (20.3)	59 (79.7)	
Ease of being seen in ED without appointment compared to usual medical care source				0.4872
Better	191	52 (27.2)	139 (72.8)	
Same	223	62 (27.8)	161 (72.2)	
Worse	93	20 (21.5)	73 (18.5)	

Table 4-7 Continued

Characteristic	All [§]	Non-urgent (%) [†]	Urgent (%) [†]	p value*
Know of another place besides the ED to get medical care at same time on same day				0.9447
Strongly Disagree	244	63 (25.8)	181 (74.2)	
Disagree	189	50 (26.5)	139 (73.5)	
Neither Agree nor Disagree	69	21 (30.4)	48 (69.6)	
Agree	55	15 (27.3)	40 (72.7)	
Strongly Agree	30	9 (30.0)	21 (70.0)	
Came to ED because had to wait too long to get appointment with family doctor				0.9761
Strongly Disagree	268	75 (28.0)	193 (72.0)	
Disagree	131	36 (27.5)	95 (72.5)	
Neither Agree nor Disagree	72	18 (25.0)	54 (75.0)	
Agree	55	16 (29.1)	39 (70.9)	
Strongly Agree	48	12 (25.0)	36 (75.0)	
ED is the easiest place to get to for medical care				0.6953
Strongly Disagree	127	35 (27.6)	92 (72.4)	
Disagree	124	31 (25.0)	93 (75.0)	
Neither Agree nor Disagree	137	33 (24.1)	104 (75.9)	
Agree	131	36 (27.5)	95 (72.5)	
Strongly Agree	66	22 (33.3)	44 (66.7)	
Believe that condition is urgent and will worsen in next 24 hours without medical attention				<0.0001
Strongly Disagree	30	16 (53.3)	14 (46.7)	
Disagree	39	22 (56.4)	17 (43.6)	
Neither Agree nor Disagree	128	50 (39.1)	78 (60.9)	
Agree	230	53 (23.0)	177 (77.0)	
Strongly Agree	156	16 (10.3)	140 (89.7)	
Believe that condition can only be treated in the ED				<0.0001
Strongly Disagree	28	14 (50.0)	14 (50.0)	
Disagree	69	29 (42.0)	40 (58.0)	
Neither Agree nor Disagree	122	35 (28.7)	87 (71.3)	
Agree	206	56 (27.2)	150 (72.8)	
Strongly Agree	158	23 (14.6)	135 (85.4)	

[§] Some values missing

[†] Row percentages add to 100% with the exception of rounding errors

* p value calculated using chi-square analysis

** may have more values than N since more than one answer could be chosen

difference between the non-urgent and urgent patient group started to approach significance with a p-value of 0.0980. Eighty-nine percent (n=494) came to the ED with a desired medical service in mind, the most common being an x-ray or some other type of diagnostic imaging (46.7%, n=245). Only 11% of patients (n=65) did not know what services they may need during their visit. The responses of the non-urgent group were

significantly different from those of the urgent group ($p=0.0117$). The majority of patients (82%, $n=495$) searched their symptoms on the Internet before coming to the ED. Thirteen percent ($n=75$) did not and 5% ($n=30$) do not have a computer at home. This trend did not differ between non-urgent and urgent patient groups ($p=0.3271$).

When asked to compare the ED with their usual source of care, 14.6% ($n=77$) thought the waiting time was better, 33.1% ($n=164$) thought the quality of care was better, 21.9% ($n=108$) thought the personal attention from the staff was better, and 37.7% ($n=191$) thought the ease of being seen without an appointment was better. However, there were no differences between the non-urgent and the urgent patient groups for any of these questions ($p=0.5631$, 0.5161, 0.1859 and 0.4872 respectively).

When asked if they knew of another place they could have gone for medical care, 41.6% ($n=268$) of patients strongly disagreed and 22.8% ($n=131$) disagreed, meaning they did not know of another place where they could have gone for medical care at that time. When asked if they came to the ED because they had to wait too long to get an appointment with their family doctor, 8.4% ($n=48$) of patients strongly agreed and 9.6% ($n=55$) of patients agreed. When asked if the ED was the easiest place to get to for medical care, 11.3% ($n=66$) of patients strongly agreed and 22.3% ($n=131$) agreed. None of the differences between the non-urgent and the urgent patient groups were significantly difference for these three factors ($p=0.9447$, 0.9761, 0.6953 respectively).

A total of 62% of patients ($n=364$) either agreed or strongly agreed that their condition could only be treated in the ED. This belief was more common in patients who were urgent (66% combined) than non-urgent (49% combined, $p<0.0001$). In addition, 66% ($n=386$) of patients either agreed or strongly agreed that their condition was urgent and would worsen in the next 24 hours without medical attention. Again, this belief was more common in the urgent group (74.4% combined) than in the non-urgent group (44%, $p<0.0001$).

4.8 Factors Associated with Non-Urgent ED Use

We entered all factors for which there was a difference between the non-urgent and urgent patient groups, where $p \leq 0.200$ into a logistic regression model. Table 4-8 shows the results of the logistic regression. The results for the logistic regression conducted with the physician ratings can be found in Appendix E.

Table 4-8 Factors associated with non-urgent ED visits from the patients' perspective

Explanatory Variable	Odds Ratio	95% CI	
Age			
75+*	1.00		
65-75	1.33	0.25	6.98
55-64	0.82	0.18	3.68
45-54	1.07	0.25	4.60
35-44	1.06	0.26	4.30
25-34	1.25	0.30	5.18
18-24	2.28	0.54	9.65
Symptoms: Chest Pain			
No*	1.00		
Yes	1.02	0.37	2.82
Symptoms: Musculoskeletal Injury			
No*	1.00		
Yes	2.93	1.42	6.04
Symptom Duration			
1-7 days*	1.00		
< 24 hours	0.98	0.48	2.02
> 7 days	1.04	0.51	2.13
ED visits in the past twelve months			
0*	1.00		
1	1.40	0.71	2.75
2	0.98	0.36	2.71
3 or more	0.48	0.16	1.44
Transportation to ED			
Drove self*	1.00		
Someone else drove	1.10	0.48	2.50
Bus	0.59	0.17	2.01
Taxi	0.91	0.27	3.09
Ambulance	2.38	0.48	11.76
Other	3.38	0.66	17.19
Family doctor visits in the past twelve months			
0*	1.00		
1	1.93	0.68	5.48
2	1.32	0.47	3.73
3	0.55	0.15	1.98
4	1.04	0.33	3.23
5 or more	1.03	0.34	3.14

Table 4-8 Continued

Explanatory Variable	Odds Ratio	95% CI	
Heard of TeleHealth Ontario			
No*	1.00		
Yes	2.08	1.08	4.03
Personal attention from staff compared to usual medical care source			
Worse*	1.00		
Same	1.68	0.72	3.90
Better	1.00	0.36	2.78
Services wanted			
None / Don't know*	1.00		
Procedure	0.75	0.17	3.43
Blood test	1.24	0.28	5.45
X-ray / Diagnostic Imaging	0.47	0.17	1.25
Specialist	0.52	0.16	1.65
IV / Medication	0.48	0.07	3.20
Other	0.43	0.12	1.58
Who referred to the ED			
Health Care Professional*	1.00		
Other Person	0.55	0.25	1.25
Self	0.66	0.32	1.34
Attempt to contact family doctor before coming to the ED			
No*	1.00		
Yes	0.82	0.38	1.76
No Family Doctor	2.09	0.28	15.63
* Reference Category			

Having a musculoskeletal problem increased the odds of a patient giving themselves a non-urgent rating by a factor of 2.93 (1.42-6.04). Having heard of TeleHealth Ontario was also associated with an increased likelihood of a patient giving themselves a non-urgent rating, with an odds ratio (OR) of 2.08 (1.08-4.03). Odds ratios were used because they provide an estimate, with corresponding confidence intervals, of the relationship between two binary variables. Odds ratios also enable us to take potential confounding factors into consideration when conducting logistic regression. A variable can be 'adjusted' for all other variables in the model (71).

4.9 Costs of ED Visits

We conducted chart reviews of 394 patients who completed the survey, and collected costing data for each of those visits. Table 4-9 shows the breakdown of the

Table 4-9 Demographic characteristics for cost analysis sub-sample

Characteristic	All (%) ⁺	Patient-Rating		Physician-Rating	
		Non-urgent (%) ⁺	Urgent (%) ⁺	Non-urgent (%) ⁺	Urgent (%) ⁺
N	394 (100.0)	112 (28.4) ^{**}	282 (71.6) ^{**}	157 (42.1) ^{**}	216 (57.9) ^{**}
Gender					
Male	175 (44.4)	54 (48.2)	121 (42.9)	71 (45.2)	92 (42.6)
Female	219 (55.6)	58 (51.8)	161 (57.1)	86 (54.8)	124 (57.4)
Age					
18-24	71 (18.3)	27 (24.6)	44 (15.8)	30 (19.5)	35 (16.3)
25-34	89 (22.9)	25 (22.7)	64 (22.9)	44 (28.6)	40 (18.7)
35-44	70 (18.0)	17 (15.5)	53 (19.0)	19 (12.3)	50 (23.4)
45-54	72 (18.5)	23 (20.9)	49 (17.6)	29 (18.8)	38 (17.8)
55-64	49 (12.6)	12 (10.9)	37 (13.3)	16 (10.4)	29 (13.5)
65-74	16 (4.1)	2 (1.8)	14 (5.0)	6 (3.9)	10 (4.7)
75+	22 (5.7)	4 (3.6)	18 (6.5)	10 (6.5)	12 (5.6)
Family Doctor					
Yes	299 (75.9)	86 (76.9)	213 (75.5)	116 (73.9)	168 (77.8)
No	95 (24.1)	26 (23.2)	69 (24.5)	41 (26.1)	48 (22.2)
Presenting Symptom					
Chest Pain	45 (11.6)	9 (8.2)	36 (13.0)	14 (9.0)	28 (13.3)
Abdominal Pain	34 (8.8)	6 (5.4)	28 (10.1)	13 (8.3)	20 (9.5)
Head Injury	15 (3.9)	2 (1.8)	13 (4.7)	5 (3.2)	10 (4.7)
Musculoskeletal Injury	103 (26.6)	37 (33.6)	66 (23.8)	44 (28.2)	52 (24.6)
Soft Tissue Injury	41 (10.6)	16 (14.6)	25 (9.0)	19 (12.2)	19 (9.0)
Infection / Flu-like symptoms	34 (8.8)	8 (7.3)	26 (9.4)	15 (9.6)	19 (9.0)
Blood / Vascular	20 (5.2)	8 (7.3)	12 (4.3)	9 (4.5)	13 (6.2)
Mental Health	10 (2.6)	0	10 (3.6)	6 (3.9)	4 (1.9)
Other	85 (21.9)	24 (21.8)	61 (22.0)	33 (12.2)	46 (21.8)
Symptom Duration					
< 24 hours	108 (27.8)	42 (37.8)	66 (23.7)	34 (21.9)	69 (32.4)
1-7 days	151 (38.8)	44 (39.6)	107 (38.5)	55 (35.5)	87 (40.9)
> 7 days	109 (28.0)	18 (16.2)	91 (32.7)	59 (38.06)	44 (20.7)

⁺ Column percentage unless otherwise indicated; ^{**} Row percentage

NB: Columns and/or rows may not add to 100% due to missing values

patients who were included in the cost analysis, which is a representative subsample of the survey sample. Table 4-10 shows a summary of the costs per item.

Table 4-11 shows the proportion of patients who received each of the services, broken down by both patient and physician rated urgency ratings. All but one patient (99.7%, n=393) received an emergency physician consultation. Thirty-one patients (7.9%) received a specialist consultation. Thirty-seven percent (n=145) of patients received an X-ray, while 8.9% (n=35) received a CT scan, 1.3% (n=5) received an MRI and 8.1% (n=32) received an ultra sound. Just over 26% (n=103) patients received some sort of drug during their ED visit, and 33.5% (n=132) had blood tests. Seventeen percent (n=68) had an ECG and 3.0% (n=12) had an eye exam.

Table 4-10 Summary of cost per resource item

Resource Item	Cost (\$CAD)
ED overhead (facilities, supplies, administrative, nursing costs)	107.66
Physician Consultations	
Emergency	97.60
Specialist (range)	50.00-176.25
Family Practice	62.65
Diagnostic Radiology	
All x-rays (range)	16.75-41.85
Chest x-ray	33.75
Wrist x-ray	22.05
All computed tomography (CT) scans (range)	45.55-114.00
CT Abdomen	91.15
CT Head	45.55
Magnetic Resonance Imaging (MRI)	
Head	73.05
Limited Spine (1 segment)	62.65
Diagnostic Ultra Sound	
All ultra sound (range)	17.40-74.20
Abdominal - complete	74.20
Pelvis	74.20
Laboratory Services	
All laboratory tests (range)	1.034-77.55
Patient documentation & specimen fee	7.76
Complete blood count (CBC)	8.27
Electrolytes (each)	2.59
Drugs	
All drugs (range)	0.0114-335.06
Electrocardiogram (ECG)	16.50
Slit lamp procedure (eye exam)	200.00

Table 4-11 Number and proportion of patients who received each service broken down by patient and physician rated urgency scores

Resource	All (%)*	Patient Rating		Physician Rating	
		Non-urgent (%) [†] (n= 112)	Urgent (%) [†] (n=271)	Non-urgent (%) [†] (n=157)	Urgent (%) [†] (n=216)
Overhead	394 (100)	112 (100)	271 (100)	157 (100)	216 (100)
Emergency Physician Consultation	393 (99.7)	112 (100)	270 (99.6)	157 (100)	215 (99.5)
Specialist Consultation	31 (7.9)	6 (5.4)	25 (9.2)	2 (1.3)	27 (12.5)
X-ray	145 (36.8)	51 (45.5)	91 (33.6)	42 (26.8)	98 (45.4)
CT Scan	35 (8.9)	5 (4.5)	28 (10.3)	4 (2.5)	28 (13.0)
MRI	5 (1.3)	2 (1.8)	3 (1.1)	1 (0.6)	4 (1.9)
Ultra Sound	32 (8.1)	5 (4.5)	27 (10.0)	7 (4.5)	22 (10.2)
Drugs	103 (26.1)	23 (20.5)	79 (29.2)	21 (13.4)	77 (35.6)
Laboratory Services	132 (33.5)	21 (18.8)	108 (39.9)	34 (21.7)	92 (42.6)
ECG	68 (17.3)	14 (12.5)	54 (19.9)	21 (13.4)	44 (20.4)
Eye Exam	12 (3.0)	4 (3.6)	8 (3.0)	4 (2.5)	8 (3.7)

* Some values missing

[†] Percentage of total individuals in each group

Table 4-12 Mean cost per visit broken down by patient and physician rated urgency score

Cost (mean, \$CAD)	Patient Rating				Physician Rating			
	Non-urgent	Urgent	p value*	p value [†]	Non-urgent	Urgent	p value*	p value [†]
Total	248.75	275.12	0.0028	0.0375	237.20	289.58	<0.0001	<0.0001
Physician Services	102.48	107.99	0.078	0.2685	99.00	111.90	<0.0001	0.0002
Diagnostic Imaging	18.11	24.00	0.0976	0.4201	13.29	28.59	<0.0001	<0.0001
Drugs	1.80	2.79	0.5004	0.0596	1.17	3.32	0.2068	<0.0001
Laboratory Services	9.49	23.84	0.0005	0.0002	8.78	27.34	<0.0001	<0.0001
Other Services	9.21	8.83	0.9233**	0.2648	7.3	10.77	0.3381	0.0821

* student's t-test, unequal variance unless otherwise indicated; ** student's t-test, equal variance

[†] Wilcoxon-Mann-Whitney test

Table 4-12 shows the mean cost per visit, broken down by both patient and physician urgency ratings. Both parametric and non-parametric analyses were performed. Parametric approximation was appropriate due to the large sample size, but cost data tends to be highly skewed so non-parametric analysis was performed as well. The mean

total cost per non-urgent visit using the patient-rated urgency scores was \$248.75, compared to the urgent mean total cost of \$275.12. These mean costs were significantly different ($p=0.0375$).

Using the physician rating breakdown, the mean total cost for a non-urgent ED visit was \$237.20, compared to the urgent mean total cost of \$289.58. These means were also significantly different ($p<0.0001$). In general, the differences between the costs of the services provided differed significantly using the physician urgency ratings, but were not significant using the patient urgency ratings. There were only two exceptions to this. The first was the laboratory services, where the mean cost using the patient ratings was \$9.49 for the non-urgent visits and \$23.84 for the urgent visits ($p=0.0002$). The second was the other services, which included ECGs and eye exams, where the mean cost using the physician ratings was \$7.30 for the non-urgent visits and \$10.77 for the urgent visits ($p=0.0821$).

Table 4-13 shows the level of agreement between the patient and physician ratings of urgency, with table 4-14 showing the mean ED visit costs associated with each of the four categories. There were 45 cases in which both the patient and physician agreed that the visit was non-urgent, and the associated mean total cost of the visit was predictably the lowest at \$223.94. There were 156 cases where both the patient and physician agreed that the visit was urgent, and these cases had the highest mean cost at \$297.51. There were 112 cases where the physician rated the visit as non-urgent but the patient rated the visit as urgent; the mean total cost of those visits was \$242.53. Finally, there were 60 cases where the patient rated the visit as non-urgent but the physician rated it as urgent. The mean total cost of those cases was \$268.96. The overall agreement between patient and physician urgency ratings was very low with kappa score $\kappa = 0.0093$.

Table 4-13 Agreement between patient and physician urgency ratings – cost analysis sub-sample

		Physician Rating		
		Non-urgent	Urgent	Total
Patient Rating	Non-urgent	45	60	105
	Urgent	112	156	268
	Total	157	216	373

Kappa score = 0.0093

Table 4-14 Mean cost per level of agreement between patient and physician urgency scores

Patient Rating	Physician Rating	Mean (\$CAD)	SE
Non-urgent	Non-urgent	223.94	5.10
Urgent	Non-urgent	242.53	6.15
Non-urgent	Urgent	268.96	10.73
Urgent	Urgent	297.51	8.98

Table 4-15 shows the differences in cost for a non-urgent ED visit compared to a visit to a family doctor, broken down by both patient and physician urgency ratings. The mean cost for a non-urgent ED visit using the patient urgency rating was \$248.75 while a visit to a family doctor costs \$62.65. The family physician consultation fee does not include the costs of any tests or additional investigations that the family doctor may perform. Therefore, the differences we present are those of the total ED costs and the family physician consultation. The difference between a family physician consultation and the total ED costs is \$186.10 which means that the family doctor would have to order tests in the range of 9 chest x-rays or 6 complete standard blood tests to make their visit more expensive than a visit to the ED. The mean cost for a non-urgent ED visit using the physician urgency rating was \$237.20. Since the visit to the family doctor remains the same at \$62.65, the difference in this case is \$174.55, the equivalent of 8 chest x-rays or 5 complete standard blood tests.

Table 4-15 Comparison of costs of non-urgent ED visits with family doctor visits

	Family Doctor Visit (\$CAD)	Non-urgent ED Visit (\$CAD)	Difference (\$CAD)	Examples of services needed to make family doctor visit more costly
Patient-rated	62.65	248.75	186.10	- 9 chest x-rays (\$198) - 6 standard blood tests (\$204)
Physician-rated	62.65	237.20	174.55	- 8 chest x-rays (\$176) - 5 standard blood tests (\$170)

5. Discussion

Our results provide insights regarding patient factors influencing ED use and relative costs of non-urgent ED visits versus outpatient family doctor visits.

In our sample, 27% of patients gave themselves a non-urgent score, while the physicians gave 41% of their patients a non-urgent score. Almost 80% of patients reported having a family doctor. Of these, about 60% reported that their family doctor was their primary source of care and only 25% attempted to make an appointment with their family doctor before coming to the ED. There were many reasons patients reported for choosing to come to the ED. Over half the patients surveyed decided to come on their own, without the input of a health care professional. Almost 90% of patients reported having a desired service in mind. The majority of patients, over 82%, searched their symptoms on the Internet before coming to the ED.

In addition, we found the following factors to be significantly associated with non-urgent ED visits: “a presenting complaint of a musculoskeletal injury” and “having heard of TeleHealth Ontario”. Although we found several factors associated with non-urgent ED use on univariate analysis, including: arriving to the ED by ambulance, having had one visit with a family doctor in the previous year, coming to the ED with a desire to get an X-ray or other diagnostic imaging, and not having a family doctor, these were not significant in our multivariable model. We also found differences between the patients and physicians perception of visit urgency.

Finally, the mean cost for a non-urgent ED visit was between \$237.20 and \$248.75, as defined by the physician’s and patient’s perception, respectively. The difference in cost of a non-urgent ED visit and a visit to a family doctor was between \$174.55 and \$186.10, depending on perspective (physician and patient, respectively).

5.1 Factors Associated with Non-urgent ED use from the patient perspective

We found two factors to be significantly associated with a patient’s perception of a non-urgent rating for their ED visit. These were ‘a presenting symptom of a

musculoskeletal injury' and 'having heard of TeleHealth Ontario'. The first factor, musculoskeletal (MSK) symptoms, is likely the result of patients knowing their problem is not urgent while at the same time knowing it needs to be taken care of at some point. It may be difficult for a patient to determine if their injury is a fracture or not, so people go to the ED to get x-rays and casts if necessary. Patients in this situation likely consider the fact that family physicians are not generally equipped to deal with fractures or provide orthopedic services.

Having heard of TeleHealth Ontario was associated with a two-fold increase in the odds of a patient rating their ED visit as non-urgent. This result may appear paradoxical in light of TeleHealth Ontario's function to provide access to a qualified health professional to assess symptoms and recommend appropriate actions.(72) Ideally this should decrease the likelihood of a non-urgent ED visit for patients using the service. While 58% of patients had heard of TeleHealth, only 6% reported calling TeleHealth prior to coming to the ED. We could find no studies evaluating the effectiveness of Telehealth in reducing ED visits. It is possible that having heard of TeleHealth Ontario may have been associated with non-urgent ED use since it is likely that patients who have heard of the service have used it in the past, and the advice often given is to go to the emergency room. This evidence is, however, anecdotal as we could not find any published data regarding the advice that TeleHealth nurses give. However, having heard of TeleHealth Ontario may result in a greater likelihood of using the ED for a non-urgent reason due to additional factors that were not captured with this survey. This finding suggests that further investigation into the efficacy and efficiency of TeleHealth Ontario may be warranted by the MOHLTC.

5.2 Differences between patients who rated themselves non-urgent and urgent

5.2.1 Symptoms and Symptom Duration

There was a large discrepancy between the patient and physician ratings of urgency. The similarities that were seen were no greater than those that would be expected due to chance. This discrepancy might exist because emergency physicians might have rated urgency strictly from a medical perspective whereas patients would not have

the training to be so narrow-minded. While this might be true in general, it was not universal. A larger percentage of patients with MSK symptoms rated themselves non-urgent, while a larger percentage of patients with chest pain symptoms rated themselves urgent. Given the possible consequences of chest pain syndromes, this finding suggests patients have at least a basic understanding of the medically-defined urgency of their conditions.

Liggins has suggested that the differences in urgency ratings between physicians and patients may be due to patients taking other factors into consideration (33). For example, a patient may have to consider social factors such as getting supervision for children, not being able to take time off work, or needing to get care on their day off no matter where they have to go to receive it. Another explanation is that patients really do not have a good understanding of medical conditions, and are therefore unable to judge how urgent their symptoms really are. If true, this would imply that increasing access to other sources of care could help alleviate some of the pressure on EDs to deal with at least some of the non-urgent patients.

The longer the patient had symptoms, the less likely they were to rate their visit non-urgent. This could be because they expected the symptoms to go away on their own, and when they did not get better the patient may have been inclined to believe their condition was urgent. However, from the physician's perspective, the longer the patients have their symptoms the less likely the problem is to be medically urgent, and therefore could and likely should have been handled in a primary care setting.

5.2.2 Family Physicians and System Use

We were surprised self-reports of having a family doctor were not associated with urgency ratings. Intuitively, it would make sense that people without a family doctor would be more likely to use the ED for non-urgent care. The possible explanation for an absence of such an effect is that perhaps patients believe there are barriers to accessing primary care services they need. This idea is further supported by the fact that while about 80% of patients reported having a family doctor only about 60% reported that their family doctor was their primary source of care. It is important to note that less than a quarter of

people reported attempting to make an appointment with their family doctor prior to coming to the ED, so while the barriers to accessing primary care may be real or perceived by the patients, they are leading people to use the ED for non-urgent care. Access to the family doctor has been presented as factor associated with non-urgent ED use in many studies (24;32-34;36;40;41;48;51;54;55). However, in the 2009 Commonwealth Fund International Health Policy Survey, Canada ranked lowest out of the 11 countries surveyed regarding access to a primary care physician, with only 36% of adults able to get an appointment on the same or next-day. In Ontario, that number climbs slightly to 38% (73). While we did not find that having a family doctor or using that family doctor was a statistically significant factor related to non-urgent ED use, this may be worth exploring more explicitly in the future.

5.3 Non-urgent ED visit costs

This is one of few studies evaluating the costs attributable to ambulatory care in a Canadian ED. This study adds to the small but growing body of literature suggesting EDs are more expensive than non-urgent medical care delivered in other primary care settings (4-6;24;59). The cost analysis showed the provision of non-urgent care in an ED costs three to four times as much as visiting a family doctor. The majority of the extra cost comes from the emergency physician fees and the overhead from the ED itself. Family doctors receive payment from the MOHLTC in the form of fees billed to OHIP; they generally do not have an extra source of income to pay for overhead costs or any staff and nurses they may need to run their practice. Hospitals, on the other hand, receive a separate budget for overhead costs, with physicians being paid from a different source. Increasing the base funding provided to family doctors and creating incentives to provide 'after hours care', such as is done through Family Health Teams might help improve the accessibility of the primary care system.

5.4 Contribution to current knowledge on non-urgent ED use and associated costs

For this study, we designed a survey that was guided by an extensive review of the literature to test factors that have previously been identified as being associated with non-urgent ED use. When adjusted for all other factors, only two were found to be associated with non-urgent ED use: having a musculoskeletal injury and having heard of TeleHealth Ontario. This study failed to find an independent significant association between non-urgent ED use and having a family doctor, awareness (or lack thereof) of services offered by the family doctor, awareness of other avenues of care, belief in superior quality of care in the ED or belief that a specific service, such as an x-ray, will be required. These factors were all identified in previous studies of non-urgent ED use (24;32-34;36;37;39;40;43;51-56;56;57).

It appears when motives for ED use are examined from a patient perspective, there may be another set of as yet to be identified factors influencing the decision of where and when to seek care. Prior work has been mostly performed in the United States and Europe. There are major cultural and health system differences which could explain possible differences in how patients would seek care in these geo-political areas. Therefore, factors associated with non-urgent visits identified in Canada are likely different than the factors identified in United States or Europe.

This study does provide a reasonable estimate of the costs of non-urgent ED visits in Canada. It shows, for the first time in a Canadian context, an estimate of the cost differences between ED visits and primary care visits. The limited number of studies analyzing cost came from the United States (3-5;58) and there was no literature looking specifically at the costs of delivering non-urgent ambulatory care in Canada. Since our health care system is very different from that of the United States, their costs could not necessarily be generalized to Canada. That being said, this study is similar to several of these studies (4-6;24;59) because we found that low acuity ED visits cost much more than primary health care visits. This implies that there are some similarities in the cost structures of hospitals in Canada and the U.S and that there might be ways to encourage the use of primary care services for low acuity problems that may be applicable in both

settings. Knowledge concerning the actual costs of delivering care in an ED may be able to provide a starting point for improving the cost efficiency of the hospital system.

5.5 Study Strengths

Strengths of this study include that it looked at urgency and ED use from the patient and physician perspectives. Other studies have tended to look at one perspective or the other. Assessing ED use from the patient perspective is important, because while the physician can say whether or not a visit was medically urgent, it is ultimately the patient who will decide when and where to seek medical care. Understanding how patients interact with the health care system is important and necessary to move towards a more patient-centred system.

This study shows what factors patients consider, or do not necessarily consider, when choosing the ED as their source of care. This is important because patients using the ED for low acuity problems represent an inappropriate demand for emergency services (14). In order to provide patients with the highest quality care in the most appropriate location, we need to fully understand the motivations behind the choice to go to the ED.

Finally, our study had a high response rate, at 76%, and used appropriate sampling methods.

5.6 Study Limitations

This study had several limitations. First, the sample size may not have been sufficient to detect meaningful differences between the groups. Second, the factors selected may not have been the right ones; patients may be considering completely different factors when choosing to come to the ED. Finally, one of the main reasons people gave for declining to participate in the survey was that they felt they were too ill. This could have resulted in the more 'urgent' cases being excluded from the study, which would result in skewed findings that did not capture the full range of ED visits.

Another limitation involved the cost analysis. Some of the cost data were estimated due to a lack of available information. Most notably, we estimated the overhead costs based on a study from another hospital in the Ottawa, ON region. While

we decided that this assumption was valid, it would have been preferable to have the actual overhead costs associated with The Civic Campus of The Ottawa Hospital. The analysis was also limited by the underlying assumptions, discussed in section 3.7.2. The basis for the analysis was that the primary care system may be equipped to handle an increase in visits if such visits were reduced in EDs. As the health care system in Ontario and Canada currently stands, this may not necessarily be the case. Therefore, at this time, it may not be feasible to attempt to deter patients from using the ED for low acuity problems. More importantly, we also assumed that non-urgent visits to primary care sites would not have any tests, treatments or medications given to the patients. However, since the majority of the cost difference in the ED was due to the overhead costs and emergency physician fees, adding tests and treatments to the primary care visits would not make them more expensive than the ED visits.

We performed the study studying a single center, which might limit its generalizability. However, the study hospital is typical of large, urban teaching hospitals. Therefore, it would likely have similar prescribing practices and patient flow as other similar hospitals. We can, however, generalize the results of the cost analysis since the fees are regulated by the Ministry of Health and Long Term Care, they will be the same across the province, and similar in other provinces as well.

5.7 Recommendations for future research

Despite numerous studies looking at reasons patients choose the ED for non-urgent problems, there is still a relatively poor understanding of the suggested reasons. Future work might look at the social context associated with seeking care in the ED, looking at factors other than strictly medical criteria. It would also be good to look explicitly at people's patterns of access to other care sources, rather than just relying on self-reported data.

Additional work to determine more exact costing data for EDs, such as specific ways of calculating the overhead, etc. would enable more detailed and concise cost analyses to be conducted. More information about the prescribing practices of family

physicians would also allow for a more complete picture of the costs of seeking medical care. For example, there is little to no information concerning the prescribing practices of family physicians and emergency physicians. Specifically, the prescribing practices for drugs, diagnostic imaging and laboratory services of family physicians and emergency physicians should be studied and compared to allow for a more thorough understanding of the costs of seeking services in each respective location. Finally, looking at the costs from different perspectives, societal for example, would provide a different interpretation of the costs of seeking medical care since this would take into account people's time, lost wages, transportation, etc.

A future study might look at cohorts of patients could be followed in both ED and primary care sites to evaluate their perceptions and reasons for seeking care where they did. The costs associated with the visits, including all tests and procedures both carried out in the ED and prescribed by the family doctor, could be determined and the long-term health outcomes of both groups evaluated. Such a study would provide a more in depth cost-effectiveness analysis, where both the treatments and outcomes would be evaluated.

There is also a need to conduct additional qualitative and exploratory studies to identify additional factors that may be associated with non-urgent ED use. Since the current sets of factors in the literature do not appear to be directly related to non-urgent ED use, more in-depth work with ED patients may provide additional insight into factors being considered when choosing a source of medical care.

6. Conclusion

This study refuted many of the factors identified in previous studies as being associated with non-urgent ED use. However, we found that having a presenting complaint of a musculoskeletal injury and having heard of TeleHealth Ontario were associated with non-urgent ED use, from the patients' perspective. We also found that non-urgent ED visits were significantly more costly than the equivalent visits to primary care.

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Appendix A: Patient Survey

Survey of Emergency Room Patients

1) The day of the week today is: _____
Time arrived at emergency room: _____

2) What problems/symptoms brought you to the Emergency Room today?

3) How long have you had these problems/symptoms?

4) On a scale of 1 to 10, with 1 being not urgent and 10 being extremely urgent (i.e. a life-or-death situation), how would you rate the urgency of the problem that brought you to the emergency room today?

(not urgent) 1 2 3 4 5 6 7 8 9 10 (life-or-death)

5) Not including today's visit, how many times have you come to the emergency room for a medical issue in the past 12 months? (please check one)

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

6) How did you get to the emergency room today? (please check one)

☐ In a car: I drove myself ☐ Bus ☐ Ambulance
☐ In a car: someone else drove me ☐ Taxi
☐ Other: _____

7) Do you have a family doctor? ☐ Yes ☐ No

→ If you do not have a family doctor, please go to question 11

8) How many times have you seen your family doctor in the past 12 months?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

9) Does your family doctor participate in an after hours visit group? (please check one)

☐ Yes ☐ No ☐ I don't know

10) Has your family doctor ever talked to you about the additional medical services they can provide? (please check one)

☐ Yes ☐ No ☐ I don't know

11) Have you ever heard of TeleHealth Ontario? ☐ Yes ☐ No

→ If no, please go to question 13.

12) Did you contact TeleHealth Ontario before coming to the emergency room today?

☐ Yes ☐ No

13) Who referred you to the emergency department today? (please check all that apply)

- ☐ Family member ☐ Friend ☐ Walk in clinic doctor
☐ Family doctor ☐ TeleHealth Nurse ☐ No one, I chose to come myself

☐ Other: _____

14) Which services, if any, do you think you will need during your emergency visit today? (please check all that apply)

- ☐ No services ☐ Blood test ☐ Specialist Physician
☐ Surgery ☐ X-ray ☐ A procedure (i.e.: stitches, casting, etc.)
☐ Diagnostic Imaging (i.e. MRI, CT scan, etc.) ☐ Other: _____

PLEASE COMPLETE THE OTHER SIDE OF THIS SURVEY →

15) Did you search your symptoms on the Internet before coming to emergency? (please check one)

- ☐ Yes, and it led me to the ER ☐ No
☐ Yes, and I decided to come to the ER on my own ☐ I don't have a computer

16) EXCLUDING today's visit, when do you normally seek medical care? (please check all that apply)

- ☐ In the evenings, after work ☐ On weekends
☐ In the mornings, before work ☐ As soon as I feel sick NO matter what the time
☐ In the afternoons ☐ Other: _____

17) Which is the one place where you usually go for health care? (please check one)

- ☐ Emergency Room ☐ Walk in Clinic ☐ Urgent Care Clinic ☐
Family Doctor's Office ☐ Other: _____

→ If your response was "Emergency Room" in Q17 please go to question 19

18) How does the Emergency Room compare to your other primary source of care, as you indicated in Q17? (better, same, worse – please check one for each row):

	Better	Same	Worse
Waiting time			
Quality of care			
Personal attention from staff			
Ease of being seen without an appointment			

19) On a scale of 1 to 5 where 1 is "strongly disagree" and 5 is "strongly agree," please indicate your level of agreement with each of the following statements by circling the appropriate number.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Besides the emergency room, I know of another place I could have gone at this time today and gotten the care I need.	1	2	3	4	5
I came to the emergency room today because I had to wait too long to get an appointment at my doctor's office.	1	2	3	4	5
The emergency department is the easiest place for me to get to in order to get medical care.	1	2	3	4	5
I believe that my condition is urgent, and may worsen in the next 24 hours if I do not get medical attention.	1	2	3	4	5
I think that my condition can only be effectively treated in the emergency department.	1	2	3	4	5

20) Did you try to make an appointment with your family doctor before coming to the emergency room today? (please check one)

☐ Yes ☐ No ☐ I don't have a family doctor

The following information is for classification purposes only.

21) Age: ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65-74
☐ 75+

22) Gender: ☐ Male ☐ Female

23) First 3 digits of your postal code: ____ ____ ____

Appendix B: Physician Survey

Survey of Emergency Room Physicians

Please answer the following questions regarding the patient you just examined.

1. Given the realities of the medical system in Canada and the availability of services in our health care system, how would you rate the patient that you just saw on a scale of 1 to 10? (With 1 being "definitely could have been seen elsewhere" and 10 "definitely needed to be seen in the emergency department")

(definitely could
have been seen
elsewhere)

(definitely needed to
be seen in the ER)

1 2 3 4 5 6 7 8 9 10

2. Which of the following services, specific to the emergency department, were used for the patient? Please check all that apply.

- ☐ Immediate access to diagnostic imaging
- ☐ Immediate access to a specialist, other than yourself
- ☐ Immediate access to the OR
- ☐ Immediate access to laboratory testing
- ☐ Procedures (examples: suture, cast, I&D, LP, etc.)
- ☐ Other (please specify: _____)
- ☐ All
- ☐ None

Appendix C: Chart Abstraction Tool

Chart Abstraction Form

Patient Initials: _____

Study ID: _____

Date: _____

Diagnosis: _____

Services Used:

☐ Specialist _____

☐ Imaging _____

☐ Drugs _____

☐ Tylenol

☐ Lab Tests _____

☐ Other _____

Appendix D: Itemized Resource Breakdown

Table D-1 Physician Consultation Costs (65)

Physician Consultation	Code	Cost (\$CAD)
Emergency	H055	97.60
Neurology	A185	169.90
Cardiology	A605	143.40
Psychiatry	A195	176.25
Gynecology	A205	93.65
Ophthalmology	A235	71.30
Orthopedic Surgery	A065	76.30
Ear-Nose-Throat (ENT)	A035	89.30
Gastro-Intestinal (GI)	A765	143.40
Neuro-Radiology	A185	169.90
Clinical Decision Unit (CDU)	A135	143.40
Neurosurgery	A045	121.10
Plastic Surgery	A085	77.55
Radiology	A335	35.70
General Surgery	A035	89.30
Internal Medicine	A135	143.40
Family Medicine	H055	97.60
Social Work*	n/a	50.00

* Estimate with guidance from thesis advisor

Table D-2 Diagnostic Radiology Costs – X-rays (65)

X-ray	Views	Code	H (\$CAD)	P (\$CAD)	Cost (\$CAD)
Neck for soft tissues	2	X020	14.10	8.35	22.54
Cervical Spine	2 or 3	X025	26.55	8.35	34.90
	4 or 5	X202	34.25	11.30	45.55
	6 or more	X203	41.40	13.95	55.35
Thoracic Spine	2	X027	24.25	8.35	32.60
	3 or more	X204	30.65	11.20	41.85
Lumbar or lumbosacral spine	2 or 3	X028	26.55	8.35	34.90
	4 or 5	X205	34.25	11.30	45.55
	6 or more	X206	41.40	13.95	55.35
Sacrum and/or Coccyx	2	X034	24.55	6.75	31.30
	3 or more	X207	31.85	11.20	43.05
Clavicle	2	X045	15.30	6.75	22.05
	3 or more	X209	23.50	9.35	32.85
AC Joints	2	X046	22.25	10.90	33.15
	3 or more	X210	30.35	13.75	44.10
Shoulder	2	X048	18.40	8.35	26.75
	3 or more	X212	26.25	11.20	37.45

Table D-2 Continued

X-ray	Views	Code	H (\$CAD)	P (\$CAD)	Cost (\$CAD)
Humerus including 1 joint	2	X050	15.30	6.75	22.05
	3 or more	X214	23.35	9.80	33.15
Elbow	2	X051	15.30	6.75	22.05
	3 or 4	X215	23.50	9.55	33.05
	5 or more	X216	31.65	12.25	43.90
Forearm including 1 joint	2	X052	15.30	6.75	22.05
	3 or more	X217	23.50	9.55	33.05
Wrist	2 or 3	X053	15.30	6.75	22.05
	4 or more	X218	23.50	9.55	33.05
Hand	2 or 3	X054	15.30	6.75	22.05
	4 or more	X219	23.50	9.55	33.05
Hip (unilateral)	2 or more	X060	24.35	8.05	32.40
Femur including 1 joint	2	X063	15.30	6.75	22.05
	3 or more	X223	22.75	9.55	32.30
Knee including patella	2	X065	22.05	15.30	6.75
	3 or 4	X224	33.05	23.50	9.55
	5 or more	X225	43.90	31.65	12.25
Tibia and fibula including 1 joint	2	X066	15.30	6.75	22.05
	3 or more	X226	23.50	9.55	33.05
Foot	2	X069	15.30	6.75	22.05
	3 or more	X229	23.50	9.55	33.05
Ankle	2 or 3	X067	22.05	15.30	6.75
	4 or more	X227	33.05	23.50	9.55
Toe	2	X072	16.75	11.80	4.95
	3 or more	X230	24.85	15.30	9.55
Chest	single	X090	22.05	15.30	6.75
	2	X091	33.75	22.45	11.30
	3 or more	X092	41.95	28.85	13.10
Abdomen	single	X100	22.05	15.30	6.75
	2 or more	X101	33.10	23.40	9.70

Table D-3 Diagnostic Radiology Costs – Computed Tomography (CT) Scans (65)

CT Scan	Contrast	Code	Cost (\$CAD)
CT Head	without IV contrast	X400	45.55
	with IV contrast	X401	68.35
CT Complex Head	without IV contrast	X402	68.35
	with IV contrast	X405	79.85
CT Abdomen	without IV contrast	X409	91.15
	with IV contrast	X410	102.65
	with and without IV contrast	X126	114.00
CT Pelvis	without IV contrast	X231	91.15
	with IV contrast	X232	102.65
CT Spine	without IV contrast	X415	91.15
	with IV contrast	X416	102.65
CT Thorax	without IV contrast	X406	68.35
	with IV contrast	X407	79.85
CT Extremities (one or more)	without IV contrast	X412	45.55
	with IV contrast	X413	68.35

Table D-4 Magnetic Resonance Imaging (MRI) Costs (65)

MRI	Code	Cost (\$CAD)
Head	X421	73.05
Limited Spine (1 segment)	X490	62.65

Table D-5 Diagnostic Ultra Sound Costs (65)

Ultra Sound	Code	H (\$CAD)	P2 (\$CAD)	Cost (\$CAD)
Neck	J405	48.50	23.40	71.90
Abdominal - complete	J435	50.00	24.20	74.20
Abdominal - limited study	J428	32.90	16.00	48.90
Early Obstetrics	J457	32.90	16.00	48.90
Pelvis - complete	J462	50.00	24.20	74.20
Carotid artery	J490	43.75	16.85	60.60
Peripheral vessel assessment	J493	22.60	14.00	36.60
Portal Vein	J506	22.60	14.00	36.60
Breast	J427	24.30	11.75	36.05
Leg Veins	J498	7.60	9.80	17.40
Extremities (per limb)	J482	26.15	13.10	39.25
Intracavity	J438	50.00	24.20	74.20

Table D-6 Laboratory Services Costs (66)

Service / Test	Code	Units	Cost (\$CAD)
Cost per unit			0.517
Patient document and specimen fee	L700	15	7.755
Complete Blood Count (CBC)	L393	16	8.272
Electrolytes			
Sodium (Na)	L226	5	2.585
Potassium (K)	L204	5	2.585
Chloride (Cl)	L053	5	2.585
Bicarbonate/CO2	L061	5	2.585
Calcium (Ca)	L045	5	2.585
Magnesium (Mg)	L165	5	2.585
Phosphate (PO4)	L194	5	2.585
Glucose	L111	5	2.585
Urea	L251	5	2.585
Creatinine	L067	5	2.585
Total Bilirubin	L030	5	2.585
Alanine Aminotransferase (ALT)	L223	5	2.585
Aspartate Aminotransferase (AST)	L222	5	2.585
Gamma-glutamyl transpeptidase (GGT)	L107	5	2.585
Alkaline Phosphatase (ALP)	L191	5	2.585
Lipase	L155	100	51.7
International Normalized Ratio (INR)	L445	12	6.204
Partial Thromboplastin Time (PTT)	L462	14	7.238
D-dimer	L405	30	15.51
Creatine Phosphokinase (CK)	L066	5	2.585
Erythrocyte Sedimentation Rate (ESR)	L451	3	1.551
Albumin	L005	5	2.585
Iron (not to be claimed with L329)	L139	34	17.578
Iron-binding capacity (not to be claimed with L329)	L327	24	12.408
Ferritin	L329	28	14.476
Fibrinogen	L402	28	14.476
Direct Bilirubin		5	2.585
Total Cholesterol	L055	5	2.585
HDL Cholesterol	L117	18	9.306
Triglycerides	L243	5	2.585
Single Immunoglobulin			
IgA	L550	15	7.755
IgG	L550	15	7.755
IgM	L550	15	7.755
Hepatitis associated antigen or antibody immunoassay			
Hepatitis A antibody	L319	28	14.476
Hepatitis B surface antigen	L319	28	14.476
Hepatitis B core antibody	L319	28	14.476
Hepatitis C core antibody	L319	28	14.476
Urine Dip (do not claim if claim urinalysis)	L253	5	2.585
Urinalysis	L253	5	2.585

Table D-6 Continued

Service / Test	Code	Units	Cost (\$CAD)
Urine Microscopy	L254	2	1.034
Urine Quantitative Culture	L641	7	3.619
Urine HCG (do not claim if claim urinalysis)	L253	5	2.585
N. gonorrhoeae / C. trachomatis testing	L625	25	12.925
N. gonorrhoeae testing (cervix)	L625	25	12.925
Skin swab routine culture	L628	25	12.925
Cervical swab routine culture	L625	25	12.925
Vaginal swab microscopic	L625	25	12.925
Throat culture	L640	6	3.102
Blood culture	L624	30	15.51
Abcess culture	L628	25	12.925
Blood smear thick & thin	L374	18	9.306
HbA1c	L093	22	11.374
Alpha-1-antitrypsin	L555	12	6.204
Ceruloplasmin	L052	19	9.823
Anti-tissue antibodies	L582	150	77.55
ANA screen	L582	150	77.55
Morphology	L374	18	9.306
TT - Thrombin Time	L460	10	5.17
Beta-hCG Quantitation	L318	30	15.51
Blood gas	L031	10	5.17
C-reactive protein	L665	6	3.102
Rheumatoid factor	L500	6	3.102
Progesterone	L331	28	14.476
Blood group	L490	18	9.306
Antibody screen	L582	150	77.55
Blood transfusion			479.59
CSF Microbiology	L639	28	14.476

Table D-7 Drug Costs (67)

Drug	Type*	DIN	Dose (mg)	Cost (\$CAD)
Tylenol	PO	00589241	325	0.0114
	PO	00545007	500	0.0149
Advil	PO	00441643	200	0.0243
Morphine	SQ	00591475	5	0.0803
Plavix		02238682	75	2.5775
Clindamycin	IV	00260436	300	4.574
	PO	02258358	300	0.7762
Tylenol 3	PO	02163926	30	0.0524
Percocet (oxycodone & acetaminophen)	PO	02324628	5 & 325	0.1285
Gravol	IV		50	1.54
	PO		50	0.1299
Toradol	IV	02245821		1.6
Normal Saline				
Zofran	IM	02229639	4	1.4614
Hydromorphan	PO	02125390	30	3.6684
Ceftriaxone	PO	02292289	2000	33.5
Tetanus	IM			43.5
Ancef	IV		500 mg/ml	2.5
Penicillin	IV	00391603	60	0.0472
	PO	00021202	300	0.071
Ativan		02041421	1	0.0447
Nitro Patch		02230733	0.4	0.64
Azithromycin	PO	02278359	250	2.4667
Codeine	PO	00608882	30	0.13
Heparin	IV	00740519	10000 USPU	3.5875
Plavix	PO	02238682	75	2.5775
Stemetil	IM	00789747	10	1.4
Dilaudid	IM	00622133	10	2.338
	IM	00627100	2	0.945
	PO	00125083	2	0.1417
Keflex	PO	00403628	250	0.225
		00244392	500	0.45
Maxeran	IV	00842834	10	0.0583
Fragmin	IV	02132648	5000 IU	9.88
	IV	09853910	17000 IU	35.568
Ranitidine	PO	00733067	300	0.36
Decadron	IV	00664227	4	1.69
Oxycontin	PO	02202476	40	2.2116
Cogentin	IV		1 mg/ml	2.49
Hydromorphone	IM	02145936	10	3.668
Benadryl	IM		50mg/ml	3.67
Ferrous fumarate	PO	02237556	300	0.1234
Conjugated estrogen	PO	00265470		0.0774
Leuprolide acetate	IM	00884502	3.75	335.06
Levofloxacin	IV	02313979	250	2.22

Table D-7 Continued

Drug	Type*	DIN	Dose (mg)	Cost (\$CAD)
Doxycycline	PO		100	0.586
Ciprofloxacin	IV	02237514	400	0.5582
Pantoloc	IV	02229453	40	0.9785
Demerol	PO	02138018	50	0.1439

* PO = oral, IV = intravenous, IM = intramuscular, SQ = subcutaneous

Table D-8 Diagnostic and therapeutic procedure costs (65)

Procedure	Cost (\$CAD)
Electrocardiogram (ECG)	16.50
Slit lamp procedure (eye exam)	200.00

Appendix E: Results of analysis from physician perspective

Table E-1 Presenting symptoms and symptom duration broken down by physician-rated urgency scores

Characteristic	All [§]	Non-urgent (%) ⁺	Urgent (%) ⁺	p value*
Presenting Symptoms				0.1001
Musculoskeletal Injury	117	54 (46.2)	63 (53.9)	
Other	94	38 (40.4)	56 (59.6)	
Chest Pain	50	15 (30.0)	35 (70.0)	
Infections / Flu-like symptoms	39	17 (43.6)	22 (56.4)	
Soft Tissue Injury	42	20 (47.6)	22 (52.4)	
Abdominal Pain	40	14 (35.0)	26 (65.0)	
Blood / Vascular	24	8 (33.3)	16 (66.7)	
Head Injury	18	6 (33.3)	12 (66.7)	
Primary Care / Administrative	8	7 (87.5)	1 (12.5)	
Symptom Duration				<0.0001
< 24 hours	114	36 (31.6)	78 (68.4)	
1 - 7 days	176	64 (36.4)	112 (63.6)	
> 7 days	124	72 (58.1)	52 (41.9)	

[§] Some values missing
⁺ Row percentages add to 100% with the exception of rounding error
* p value calculated using chi-square analysis

Table E-2 Presenting symptoms broken down by symptom duration and physician-rated urgency

Presenting Symptom	All [†]	Symptom Duration					
		< 24 hours (%) [*]		1-7 days (%) [*]		> 7 days (%) [*]	
		Non-Urgent	Urgent	Non-Urgent	Urgent	Non-Urgent	Urgent
Chest Pain	50	1 (2.0)	9 (18.0)	5 (10.0)	12 (24.0)	9 (18.0)	14 (28.0)
Abdominal Pain	40	0 (0.0)	5 (12.5)	6 (15.0)	15 (37.5)	8 (20.0)	6 (15.0)
Head Injury	15	0 (0.0)	7 (46.7)	2 (13.3)	5 (33.3)	1 (6.7)	0 (0.0)
Musculoskeletal Injury	108	12 (11.1)	21 (19.4)	17 (15.7)	30 (27.8)	23 (21.3)	5 (4.6)
Soft Tissue Injury	39	9 (23.1)	11 (28.2)	5 (12.8)	7 (17.9)	6 (15.4)	1 (2.6)
Infections / Flu-like symptoms	38	2 (5.3)	4 (10.5)	11 (28.9)	16 (42.1)	3 (7.9)	2 (5.3)
Blood / Vascular	23	4 (17.4)	2 (8.7)	4 (17.4)	9 (39.1)	0 (0.0)	4 (17.4)
Primary Care / Administrative	8	0 (0.0)	0 (0.0)	1 (12.5)	0 (0.0)	6 (75.0)	1 (12.5)
Other	89	8 (9.0)	18 (20.2)	12 (13.5)	16 (18.0)	16 (18.0)	19 (21.3)

[†] Some values missing

^{*} Row percentages add to 100% with the exception of rounding error

Table E-3 Usual source of medical care and recent medical care contact broken down by physician-rated urgency scores

Characteristic	All [§]	Non-urgent (%) [†]	Urgent (%) [†]	p value*
Family Doctor				0.2293
Yes	339	135 (39.8)	204 (60.2)	
No	101	47 (46.5)	54 (53.5)	
Attempt to make appointment with family doctor before coming to ED				0.1229
Yes	95	41 (43.2)	54 (56.8)	
No	259	98 (37.8)	161 (62.2)	
I don't have a family doctor	77	39 (50.7)	38 (49.4)	
Usual care source				0.0337
Emergency Room	41	25 (61.0)	16 (39.0)	
Family Doctor	256	100 (39.1)	156 (59.9)	
Walk In Clinic	120	45 (37.5)	75 (62.5)	
Other	15	8 (53.3)	7 (46.7)	
Number of ED visits in past twelve months				0.6134
0	224	94 (42.0)	130 (58.0)	
1	118	45 (38.1)	73 (61.9)	
2	46	17 (37.0)	29 (63.0)	
3 or more	50	24 (48.0)	26 (52.0)	
Number of family doctor visits in past twelve months				0.0628
0	45	26 (57.8)	19 (42.2)	
1	58	17 (29.3)	41 (70.7)	
2	68	24 (35.3)	44 (64.7)	
3	49	22 (44.9)	27 (55.1)	
4	44	15 (34.1)	29 (65.9)	
5 or more	81	33 (40.7)	48 (59.3)	
Does family doctor participate in an after hours visit group				0.3068
Yes	73	23 (31.5)	50 (68.5)	
No	65	27 (41.5)	38 (58.5)	
I don't know	203	84 (41.4)	119 (58.6)	
Has family doctor discussed additional services they can provide				0.5776
Yes	91	40 (44.0)	51 (56.0)	
No	182	69 (37.9)	113 (62.1)	
I don't know	62	23 (37.1)	39 (62.9)	
Heard of TeleHealth Ontario				0.3625
Yes	253	100 (39.5)	153 (60.5)	
No	187	82 (43.9)	105 (56.2)	
Contact TeleHealth Ontario prior to ED visit				0.9197
Yes	26	11 (42.3)	171 (41.3)	
No	414	15 (57.7)	243 (58.7)	

[§] Some values missing

[†] Row percentages add to 100% with the exception of rounding errors

* p value calculated using chi-square analysis

Table E-4 Transportation to the ED and time of day preferred to seek medical care broken down by physician-rated urgency scores

Characteristic	All [§]	Non-urgent (%) ⁺	Urgent (%) ⁺	p value*
Method of transportation to the ED				0.2136
In a car: I drove myself	85	38 (44.7)	47 (55.3)	
In a car: Someone else drove me	200	79 (39.5)	121 (60.5)	
Bus	58	31 (53.5)	27 (46.6)	
Taxi	52	18 (34.6)	34 (65.4)	
Ambulance	25	7 (28.0)	18 (72.0)	
Other	20	9 (45.0)	11 (55.0)	
Preferred time to seek medical care				0.4474
In the evenings	29	13 (44.8)	16 (55.2)	
In the mornings	45	17 (37.8)	28 (62.2)	
In the afternoons	36	15 (41.7)	21 (58.3)	
On weekends	19	4 (21.1)	15 (79.0)	
As soon as I feel sick no matter what the time	204	84 (41.2)	120 (58.8)	
By appointment	31	16 (51.6)	15 (48.4)	
Rarely / never	14	8 (57.1)	6 (42.9)	
Other	49	18 (36.7)	31 (63.3)	

[§] Some values missing
⁺ Row percentages add to 100% with the exception of rounding errors
* p value calculated using chi-square analysis

Table E-5 Reasons for using the ED for medical care broken down by physician-rated urgency scores

Characteristic	All [§]	Non-urgent (%) [†]	Urgent (%) [†]	p value*
Who referred / suggested an ED visit				0.0074
Health Care Professional	93	44 (47.3)	49 (52.7)	
Other person	94	28 (29.8)	66 (70.2)	
Self	204	99 (48.5)	105 (51.5)	
Services Wanted**				0.3765
No Services / I don't know	52	26 (50.0)	26 (50.0)	
A procedure	22	7 (31.8)	15 (68.2)	
Blood test	22	11 (50.0)	11 (50.0)	
X-ray / Diagnostic Imaging	197	76 (38.6)	121 (61.4)	
Specialist	63	31 (49.2)	32 (50.8)	
IV / Medication	18	7 (38.9)	11 (61.1)	
Other	55	19 (34.6)	36 (65.5)	
Did you search symptoms on the Internet before coming to the ED				0.5783
Yes, and it led me to the ED	40	15 (37.5)	25 (62.5)	
Yes, and I decided to come to the ED on my own	314	129 (41.1)	185 (58.9)	
No	55	21 (38.2)	34 (61.8)	
I don't have a computer	25	14 (56.0)	11 (44.0)	
Waiting time in the ED compared to usual medical care source				0.0051
Better	62	24 (38.7)	38 (61.3)	
Same	93	48 (51.6)	45 (48.4)	
Worse	221	71 (32.1)	150 (67.9)	
Quality of care in the ED compared to usual medical care source				0.1978
Better	121	54 (44.6)	67 (55.4)	
Same	210	75 (35.7)	135 (64.3)	
Worse	23	7 (30.4)	16 (69.6)	
Personal attention from ED staff compared to usual medical care source				0.0080
Better	87	44 (50.6)	43 (49.4)	
Same	215	79 (36.7)	136 (63.3)	
Worse	52	13 (25.0)	39 (75.0)	
Ease of being seen in ED without appointment compared to usual medical care source				0.0072
Better	136	65 (47.8)	71 (52.2)	
Same	164	58 (35.4)	106 (64.6)	
Worse	62	16 (25.8)	46 (74.2)	
Know of another place besides the ED to get medical care at same time on same day				0.2278
Strongly Disagree	173	60 (64.7)	113 (65.3)	
Disagree	144	64 (44.4)	80 (55.6)	
Neither Agree nor Disagree	46	22 (47.8)	24 (52.2)	
Agree	41	17 (41.5)	24 (58.5)	
Strongly Agree	23	12 (52.2)	11 (47.8)	

Table E-5 Continued

Characteristic	All [§]	Non-urgent (%) [†]	Urgent (%) [†]	p value*
Came to ED because had to wait too long to get appointment with family doctor				0.1407
Strongly Disagree	187	65 (34.8)	122 (65.2)	
Disagree	94	42 (44.7)	52 (55.3)	
Neither Agree nor Disagree	53	27 (50.9)	26 (49.1)	
Agree	47	23 (48.9)	24 (51.1)	
Strongly Agree	36	15 (41.7)	21 (58.3)	
ED is the easiest place to get to for medical care				0.0168
Strongly Disagree	83	23 (27.7)	60 (72.3)	
Disagree	91	35 (38.5)	56 (61.5)	
Neither Agree nor Disagree	101	41 (40.6)	60 (59.4)	
Agree	102	53 (52.0)	49 (48.0)	
Strongly Agree	49	23 (46.9)	26 (53.1)	
Believe that condition is urgent and will worsen in next 24 hours without medical attention				0.5392
Strongly Disagree	22	13 (59.1)	9 (40.9)	
Disagree	30	12 (40.0)	18 (60.0)	
Neither Agree nor Disagree	94	39 (41.5)	55 (58.5)	
Agree	165	67 (40.6)	98 (59.4)	
Strongly Agree	112	44 (39.3)	68 (60.7)	
Believe that condition can only be treated in the ED				0.8587
Strongly Disagree	21	9 (42.9)	12 (57.1)	
Disagree	52	18 (34.6)	34 (65.4)	
Neither Agree nor Disagree	88	38 (43.2)	50 (56.8)	
Agree	152	65 (42.8)	87 (57.2)	
Strongly Agree	110	44 (40.0)	66 (60.0)	

[§] Some values missing[†] Row percentages add to 100% with the exception of rounding errors

* p value calculated using chi-square analysis

** may have more values than N since more than one answer could be chosen

Table E-6 Factors associated with non-urgent ED use from the physicians' perspective

Explanatory Variable	Odds Ratio	95% CI	
Symptoms: Chest Pain			
No*	1.00		
Yes	0.47	0.15	1.43
Symptom Duration			
1-7 days*	1.00		
< 24 hours	0.64	0.26	1.59
> 7 days	4.66	1.91	11.35
Attempt to contact family doctor before coming to the ED			
No*	1.00		
Yes	1.08	0.40	2.94
No Family Doctor	1.07	0.08	13.83

Table E-6 Continued

Explanatory Variable	Odds Ratio	95% CI	
Usual care source			
Family Doctor*	1.00		
Emergency Room	8.55	0.12	607.11
Walk In Clinic	0.82	0.27	2.47
Other	2.51	0.26	24.43
Family doctor visits in the past twelve months			
0*	1.00		
1	0.57	0.15	2.21
2	0.35	0.09	1.39
3	1.33	0.33	5.38
4	0.41	0.10	1.64
5 or more	0.73	0.19	2.72
Who referred to ED			
Health Care Professional*	1.00		
Other Person	0.55	0.18	1.55
Self	1.56	0.65	3.73
Wait time in ED compared to usual source of medical care			
Worse*	1.00		
Same	1.98	0.77	5.13
Better	0.40	0.11	1.44
Quality of care in ED compared to usual source of medical care			
Worse*	1.00		
Same	0.52	0.12	2.34
Better	1.38	0.28	6.93
Personal attention from staff in ED compared to usual source of medical care			
Worse*	1.00		
Same	1.71	0.56	5.20
Better	1.38	0.32	5.93
Ease of being seen without an appointment compared to usual source of medical care			
Worse*	1.00		
Same	0.71	0.23	2.24
Better	1.60	0.46	5.62
Came to ED because had to wait too long for appointment with family doctor			
Strongly disagree*	1.00		
Disagree	0.84	0.33	2.15
Neither Agree nor Disagree	1.48	0.42	5.23
Agree	0.72	0.20	2.55
Strongly Agree	0.74	0.19	2.91
ED is easiest place to get to in order to get medical care			
Strongly disagree*	1.00		
Disagree	2.49	0.79	7.84
Neither Agree nor Disagree	1.90	0.59	6.13
Agree	1.91	0.56	6.50
Strongly Agree	1.42	0.32	6.35
* Reference Category			