

**Non-Urgent Emergency Department Use: Exploring Patient Characteristics in an  
Urban and Rural Area**

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## **Attestation of Authorship**

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.”

**Rachel Mattock**



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## **Confidential Material**

The District Health Board used in this study requested confidentiality in reporting. Therefore, the District Health Board and regional ethics committee have not been named in this publication, and all references to the District Health Board or regional ethics committee have been removed. In addition, individuals within the organisation who assisted with this research process have not been acknowledged or named. Confidential material relating to the District Health Board sign-off process and ethical approval are provided in a separate annex of this dissertation.

## **Abstract**

The use of the emergency department for non-urgent healthcare has received considerable attention in international literature. People utilising the emergency department for non-urgent health problems have been referred to as ‘inappropriate’ users of the healthcare system, and it has been suggested that such use contributes to emergency department overcrowding, lengthy wait times, and decreased standards of care. However, there is a paucity of research examining this issue from a New Zealand perspective. Audit data from one District Health Board showed that differences in non-urgent attendance exist across an urban and rural setting, which raises important questions regarding factors precipitating such use, and how and why these differ based on emergency department location. This dissertation provides a ‘first look’ into the non-urgent use of the emergency department from a New Zealand perspective.

The purpose of this study was to examine the demographic and clinical characteristics of individuals presenting to an urban and rural emergency department for non-urgent care, and to determine whether these characteristics differ based on ED location. The conceptual framework used in this study was Andersen’s Behavioural Model of Health Services’ Use. The model proposes that individual determinants, conceptualised as predisposing characteristics, enabling resources, and need collectively influence health utilisation behaviour.

Using emergency department location as a grouping variable, this retrospective descriptive study examined the individual determinants of 4745 patients who sought non-urgent care between July 1 2009 and June 30 2010. The findings provide a comprehensive demographic and clinical overview of non-urgent attendees; significant differences ( $p = 0.001$ ) were found in the characteristics of individuals seeking non-urgent care at the urban and rural emergency department with regard to age, ethnicity,

time of presentation, season of presentation, distance to the emergency department, wait time for medical assessment, length of stay, referral source, presentation type, and discharge disposition. Further New Zealand based research is needed to explore possible interaction(s) between the predisposing, enabling, and need components of the model, and to identify the factors precipitating a non-urgent visit across the urban and rural setting.

## **Chapter One – Introduction**

The Emergency Department (ED) service delivery model was first developed in the 20<sup>th</sup> century to provide rapid assessment and treatment to those critically unwell or injured (Guttman, Zimmerman, & Nelson, 2003). Today, the ED plays a pivotal role in the delivery of acute healthcare services, while also acting as an interface between primary and secondary care.

Over the last decade, many EDs have experienced a significant rise in the utilisation of their services (Brim, 2008; Milbrett & Halm, 2009). This increase is considered disproportionate to the population growth of many regions, and reflects a phenomenon whereby the ED has become a provider of primary care for those with non-urgent ailments or injuries (Brim, 2008; Gribben, 2003; Milbrett & Halm, 2009; Tang, Stein, Hsia, Maselli, & Gonzales, 2010).

A body of literature exists examining the prevalence of non-urgent ED use, the characteristics of the non-urgent attendee, the reasons for utilising ED services, and the effectiveness of new strategies to minimise such use. However, there is a paucity of research examining this issue from a New Zealand perspective.

This dissertation is a report on a retrospective descriptive study undertaken to examine the demographic and clinical characteristics of non-urgent attendees at a rural and urban hospital site in a New Zealand District Health Board (DHB). This chapter describes the purpose and background of the study and its significance to nursing.

### **Purpose of the Study**

This project was undertaken to investigate the use of the ED for non-urgent care. The purpose of the study was to examine the demographic and clinical characteristics of non-urgent attendees, and to determine if these characteristics differ based on ED

location. Andersen's Behavioural Model of Health Services' Use (1968) provided the conceptual framework for the study. A retrospective descriptive design has been used, which reflects the scope of this research dissertation.

## **Background**

The field of emergency medicine first emerged during the 1960s in response to an increasing demand for immediate and unscheduled medical care (American College of Emergency Physicians, 2008). The American College of Emergency Physicians (2008, p. 1) defines emergency medicine as “a medical speciality dedicated to the diagnosis and treatment of unforeseen illness or injury”. The provision of emergency care is delivered in what is currently referred to in New Zealand as the ED.

In the past decade, many EDs have experienced a significant rise in the utilisation of their services, particularly by individuals with non-urgent health complaints (Brim, 2008; Daniels, 2008; Milbrett & Halm, 2009; Pitts, Niska, Xu, & Burt, 2008). The term “non-urgent” refers to a non-life threatening health problem or an injury that has occurred from a minor accident. “Less-urgent” or “minor” health problems are other terms used in literature to describe such conditions, and people presenting to the ED with these health problems have been described as ‘inappropriate’ users of the health-care system (Hodgins & Wuest, 2007). In the United States, 119.2 million visits were made to EDs in 2006, 34.1% of which were considered semi or non-urgent (Pitts, et al., 2008). In Canada, 51% of ED visits in 2003 were judged to be for ‘less urgent’ or non-urgent conditions based on the Canadian Triage and Acuity Scale (Canadian Institute for Health Information, 2005). This scale is one of many used in EDs to prioritise a patient's need for care. In New Zealand, triage nurses are guided by the Australasian Triage Scale, which rates clinical urgency on a scale of one (life-threatening) to five (nonurgent; Australasian College for Emergency Medicine, 2006).

The topic of non-urgent ED use has received considerable attention in healthcare literature, driven by the perception that such use contributes to overcrowding, lengthy wait times, and decreased standards of care (Bezzina, Smith, Cromwell, & Eagar, 2005; Elley, Randall, Bratt, & Freeman, 2007; Northington, Brice, & Zou, 2005; Richardson, 1999a). Other assumptions regarding ED use include the idea that, given the discontinuous and episodic nature of the ED, individuals with non-urgent health problems are better suited to the primary care setting, and that providing non-urgent care in the ED is fiscally improvident (Hider, Kirk, Helliwell, Weir, & Tolan, 1998; Richardson, 1999b). In a systematic review, Hider and colleagues found no conclusive evidence supporting these assumptions. Similar findings have also been reported in more recent literature reviews on the topic (Carret, Fassa, & Kawachi, 2007; Hoot & Aronsky, 2008; Konkelenberg, Esterman, & Konkelenberg, 2003).

Internationally, the response of health services to non-urgent presentations has been varied. The interventions presented in the literature to minimise such use have largely focused on: 1) attempting to decrease the number of patients attending the ED, 2) referring non-urgent patients to alternative providers of care, and 3) developing new models of service delivery to meet the increasing user demand. Consequently, the impact of cost sharing, media campaigning, and patient referral on ED usage have been examined (Grilli, Ramsay, & Minozzi, 2002; Hsu, et al., 2006; Reed, et al., 2005; Remler & Greene, 2009; Wharam, et al., 2007). The efficacy of changes to service delivery, such as the provision of nurse-led ‘walk-in centres’ and fast track systems have also been explored (Fry, 2009; Sakr, et al., 2003). As most of this research is internationally based its relevance to the New Zealand healthcare environment remains uncertain.

At present, ED attendance is not included in the New Zealand national minimum dataset and consequently no data exists that describes attendance trends across New

Zealand EDs. However, audit data from two hospital sites in a New Zealand DHB revealed variances in non-urgent use between a rural and urban setting. Audit data collected for the rural ED over a three-year period showed a 17% increase in patient visits (Table 1). The statistics also revealed that the greatest increase in attendance was by individuals with non-urgent health complaints, with triage five presentations increasing by more than 130%. In comparison, attendances at the urban ED only increased by 6% over the same time period, with a 12% decrease in triage five presentations (Table 1).

Table 1

*Presentation Volumes at an Urban and Rural ED in New Zealand 2008 - 2010*

<b>Triage Category</b>	<b>Urban ED</b>			<b>Rural ED</b>		
	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
<b>ATS 1</b>	263	347	342	41	57	68
<b>ATS 2</b>	6473	7391	7648	1043	1058	1095
<b>ATS 3</b>	21688	22245	24438	3884	3969	3796
<b>ATS 4</b>	20018	19173	19623	5279	5448	5436
<b>ATS 5</b>	4420	4295	3853	1382	2490	3279
<b>TOTAL</b>	52862	53451	55904	11629	13022	13674

*Note.* ED = emergency department. ATS = Australasian triage score.

The difference in the prevalence of non-urgent ED visits between the rural and urban ED setting raises important questions regarding factors precipitating such use, and how and why these differ based on ED location. There is a growing body of evidence supporting the idea that ‘place matters’ to health-care access and health outcomes (Andersen, 1995; Atmore, 2004; Hodgins & Wuest, 2007; Litaker, Koroukian, & Love, 2005; McDonald & Conde, 2010). The importance of contextual characteristics on health service use was first recognised in 1978, however Hodgins and Wuest (2007) state that much of the research since then has continued to focus on the



individual factors of those accessing health services, rather than the communities in which the care was sought. From a New Zealand perspective, little is known about the characteristics of the non-urgent ED attendee, or if, how and why these differ based on geographic location (place). New Zealand based research to develop a demographic and clinical profile of individuals seeking non-urgent care is an important first step towards better understanding the health needs of this population. Moreover, comparing profiles across a rural and urban ED setting will provide valuable insight as to whether population characteristics differ by location, and may inform future prospective, exploratory research on the topic.

### **Significance of the Study**

The purpose of the study was to examine the demographic and clinical characteristics of individuals presenting to an urban and rural ED for non-urgent care, and to determine whether differences in these characteristics exist between settings. For the DHB and its employees, the findings from this study will provide new knowledge on an issue that is currently not well understood. The findings may also inform further research on the topic to support the development of new models of service delivery that respond to the health needs of individuals requiring non-urgent care. From a political perspective, an appreciation of the differences in the population characteristics and health-care behaviours of urban and rural residents is needed to allow for the planning of appropriate and accessible services for those with less urgent health problems. Lastly, for people utilising the ED non-urgently, the study is an important first step towards better understanding their health needs, which may in turn result in improvements to the quality and accessibility of healthcare services.

## Conclusion

This dissertation is presented in five chapters, which together report on a project undertaken as part of a Master of Health Science Degree from the Auckland University of Technology (AUT). This chapter has provided an introduction to the study including the purpose, background, and significance of the research. *Chapter Two* provides the reader with an overview of the literature relating to the non-urgent use of the ED. The definition of urgency and the influence of place on health service utilisation is explored, and the theoretical work of Andersen (1968) presented. The following chapter, *Chapter Three*, outlines the quantitative descriptive research methodology. The purpose of the study, research questions, study design and methods are discussed, along with the ethical and cultural considerations. *Chapter Four* presents the research findings. The final chapter, *Chapter Five*, considers the findings of the study and examines these in relation to Andersen's (1968) behavioural model of health services use. This chapter also explains the practical implications of the study and its strengths and limitations. Finally, recommendations are made for further research on non-urgent ED use in New Zealand.

## **Chapter Two – Literature Review**

This chapter reviews literature related to the use of the ED for non-urgent care. The review specifically explores characteristics of the non-urgent attendee and the factors influencing their attendance. To begin, the systematic process employed to identify and appraise relevant research literature is described. Following this, the issues associated with defining the urgency of an ED presentation are discussed. As a framework for examining health service use, Andersen's (1968) behavioural model is then presented. The synthesis of research evidence in this review has been arranged to reflect the components of Andersen's model. To conclude, the effect of 'place' on healthcare utilisation is explored.

### **Literature Search and Appraisal**

Literature was derived from both national and international sources and comprises qualitative and quantitative research, theoretical and opinion-based articles, and policy documents. The publication by The Centre for Reviews and Dissemination (CRD) on the Guidance for Undertaking Systematic Reviews in Health Care (2008) provided the framework for the literature search and appraisal.

Methods used for the literature search were consistent with those recommended by the CRD (2008). Four questions were developed to guide the review of literature:

1. How has previous research examining non-urgent ED use been approached?
2. How have researchers defined urgency and how has it been measured?
3. What demographic and clinical characteristics of non-urgent attendees have been reported as influential in previous studies?

4. What reasons for seeking non-urgent ED care have been cited by attendees in previous studies?

The literature search was conducted in four bibliographic databases, including: Medline (via EBSCO), CINAHL (via EBSCO), SCOPUS, and Cochrane. In addition, the reference list of all selected articles were reviewed. Searches incorporated both subject heading terms with keywords or phrases (Table 2). Results were limited to studies published from the year 2000 onwards and in the English language. No restrictions were placed on the study design or sample.

Table 2

*Subject Headings and Keywords*

Subject Headings	Keywords
<u>MeSH Headings</u>	- Non-urgent
- Emergency Service, Hospital	- Inappropriate use
- Geographic Locations	- Misuse
<u>CINAHL Headings</u>	- Nonemergency
- Emergency service	- Primary-care patient
- Geographic Locations	AND
	- Patient characteristics
	- Associated factors
	- Reasons for presentation
	- Factors influencing use

*Appraisal Methodology*

The identification of relevant studies followed the two-stage process described by the CRD (2008). First, the title and abstract of studies from the search results were screened for relevancy. Second, the full text was obtained for studies that were considered potentially relevant and were re-assessed against the inclusion criteria.

Studies were excluded if they did not meet specific quality standards. A single reviewer assessed the methodological quality (i.e. rigour) of included studies with a checklist developed by the Critical Appraisal Skills Programme (CASP). Three design-specific checklists were used to assess and score study quality. The scoring of study quality is consistent with the appraisal method adopted in a previous literature review on the topic (Carret, Fassa, & Domingues, 2009). A score of one was allocated for each checklist quality that was met. The maximum score for the checklists varied, and are summarised in Table 3. Irrespective of the CASP appraisal score, studies were excluded if they did not clearly define a non-urgent or ‘inappropriate’ presentation, or if there were discrepancies in the description of the method or results.

No specific CASP checklist exists for cross-sectional designs. Therefore, these studies were individually assessed and appraised using the CASP checklist that was considered to best suit the study method. This assessment was based on how the sample was identified, the aims of the research and the data collection methods.

Table 3

*Maximum Score for CASP Checklists*

<b>CASP checklist</b>	<b>Maximum score</b>
Qualitative studies	10
Cohort studies	12
Case control studies	11

The data from each study were extracted directly into Microsoft Excel by one reviewer, and double-checked for accuracy on a separate occasion. The following information was obtained from each study: 1) author(s), 2) year of publication, 3) country where the study was based, 4) study design, 5) sample size, 6) primary purpose of the study, 7) criteria used to identify a ‘non-urgent’ attendee, 8) main findings, and 9) completed statistical analyses (univariate, bivariate, and/or multivariate). To synthesise qualitative data, individual papers were analysed to identify key concepts and issues

within each paper. These were compared across studies and categorised into main themes.

It is important to note that discrepancies exist in the literature with regards to the definition of univariate, bivariate, and multivariate statistics. For this review, the definitions of these statistical procedures have been based on those provided by Polit and Beck (2010):

Univariate statistics: Statistical procedures for analysing a single variable at a time (p. 408).

Bivariate statistics: Statistics used to analyse the empirical relationship between two variables (p. 397).

Multivariate statistics: Statistical procedures for analysing the relationships among three or more variables (p. 404).

From the electronic searches, a total of 1023 abstracts were retrieved and screened for relevancy (Figure 1, p. 12). The full text version of 97 studies were obtained and re-assessed against the inclusion criteria. A total of 24 research studies examining the characteristics of non-urgent attendees and/or the factors influencing their attendance were included in this review; twenty-one used a quantitative research approach and three qualitative (Appendix A). In addition, theoretical and opinion based articles and policy documents were included.

Included studies covered both adult and paediatric populations. In studies that compared groups, non-urgent ED presentations were compared to urgent ED presentations, outpatient clinic, or primary care presentations. One study (Redstone, Vancura, Barry, & Kutner, 2008) examined non-urgent ED presentations during business hours versus all other times (e.g. weekends and after hours); another study

compared non-urgent visits between non-urgent ED presenters with Medicaid (U.S. benefit) insurance and non-urgent ED presenters with private insurance (Stanley, Zimmerman, Hashikawa, & Clark, 2007). The methodological score from the CASP appraisal ranged from 7-12. The main quality limitations in quantitative studies were: poorly described procedures for data analysis, a lack of sample representativeness due to convenience sampling methods, and the wide-range of criteria used to define the non-urgent presentation. In qualitative studies, poorly described data collection methods and minimal discussion of study limitations were the identified quality issues.

### *Limitations of this Review*

While a structured approach was implemented to collect and appraise the literature there are some potential limitations inherent in this process. First, a single reviewer completed the literature search, data extraction and critical appraisal of studies. This increases the risk of error and the potential for bias. Moreover, it is recognised that limiting the literature search to articles published in the English language may have excluded relevant studies.

The lack of a specific CASP tool for the appraisal and scoring of cross-sectional studies is a limitation of this review. Consequently, cross-sectional studies were appraised using the CASP tool that was considered appropriate for the studies methodology. Such an approach has the potential to introduce reviewer bias and also decreases the reproducibility of the appraisal process.

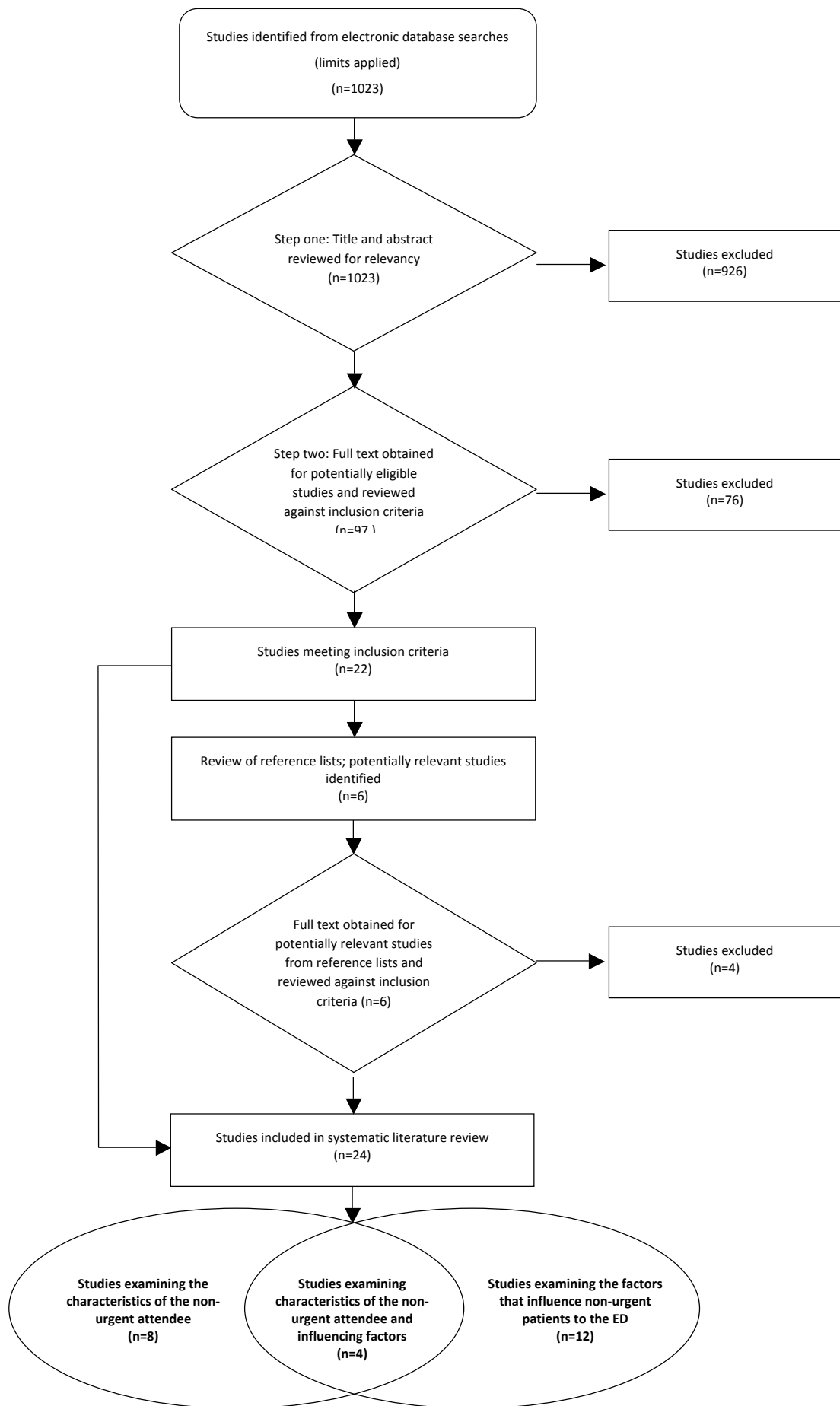


Figure 1. The selection process for selected studies.



## **Defining the Non-Urgent Presentation**

In the included studies, ED presentations were often dichotomised as being either ‘appropriate’ or not. However, the lack of a gold standard that reliably defines the appropriateness of ED use has resulted in the development and application of a wide-range of criteria.

In most studies, appropriateness was closely related to the concept of urgency, in that a patient was considered ‘inappropriate’ if the presenting complaint was deemed to be non-urgent. This was most commonly operationalised through the use of standardised triage scales. Triage scales are ordinal-level measurements that determine a patient’s urgency based on the maximum safe waiting time for medical assessment and treatment (Australasian College for Emergency Medicine, 2006; Warren, Jarvis, LeBlanc, & Gravel, 2008). There are several limitations of using triage to identify non-urgent or inappropriate presentations. First, The Australasian College for Emergency Medicine (2006) states that triage was never intended to be used as a tool for determining the ‘appropriateness’ of a patient’s health problem for ED care, but rather to ensure that patients are assessed by a medical professional in a safe and timely manner. Second, previous literature suggests that triage categorisation alone misses approximately 5% of patients who require hospital admission (Derlet, Kinser, Ray, Hamilton, & McKenzie, 1995; Gill, Reese, & Diamond, 1996; Young, Wagner, Kellermann, Ellis, & Bouley, 1996). It therefore needs to be questioned whether the triage process is an accurate method for determining the appropriateness of a patient’s condition for presentation at the ED. In addition to triage, the patient diagnosis, admission status, amount of ED resources required for assessment and treatment, and whether they could have been managed within the primary care setting were other common concepts that underpinned criteria for a non-urgent presentation (Table 4, p.14).

Table 4

*Criteria Used to Define a Non-Urgent ED Visit*

Criteria Used to Define a Non-Urgent ED Visit			Urgency	Acuity	Diagnosis	Non-admission	No resources	GP treatable	Prospective	Retrospective
Reference	Year	Criteria of non-urgent ED visit*	Core elements						Application	
Backman et al	2008	Triage category 4/4	✓						✓	
Berry et al	2008	Presented to ED during GP opening hours and triage category 4 or 5/5	✓						✓	
Bianco et al	2003	No active symptoms or they were recent and minor, without any feeling of emergency and he/she desires a check-up, a prescription refill or a return-to-work release.	✓	✓					✓	
Brim	2008	Triage category 4 (level not defined)	✓						✓	
Callen et al	2008	Triage category 4 or 5/5	✓						✓	
De Vos et al	2008	Request for follow up for a chronic problem; diagnosis was ‘asymptomatic’, ‘upper respiratory tract infection’ or ‘parasite infection’; the patient was discharged after anamnesis and clinical examination only, with no further technical acts, observation or immediate referral, and with no treatment	✓	✓		✓		✓		✓
Howard et al	2005	Diagnosis of: rash without fever, rhinitis or a cold, and cystitis.			✓					✓
Kennedy et al	2004	The 4 following criteria must be met: No physician referral, non-urgent triage code at time of presentation, no investigations preformed in the ED, discharged home	✓			✓	✓			
Koziol-McLain et al	2000	Triage category 3 or 4/4	✓						✓	
Lee et al	2000	Based on a blind retrospective record review conducted independently by a panel of emergency physicians	✓				✓	✓		✓
Lega & Mengoni	2008	No active symptoms or they were recent and minor, without any feeling of emergency and he/she desires a check-up, a prescription refill or a return-to-work release	✓	✓					✓	
Northington et al	2005	Triage category 4 or 5/5	✓						✓	
Pereira et a	2001	Self referred, discharged, no diagnostic testing, or if IV fluids, oxygen or prescription medications were not required in ED (other than tetanus and oral analgesia).		✓		✓	✓			✓
Pileggi et al	2006	A presenting condition that was acute and non-urgent, a condition, which may be part of a chronic problem with or without evidence of deterioration, the investigation or interventions for these illnesses or injuries, could be delayed or referred to other providers.	✓	✓				✓		✓
Pomerantz et al	2002	If discharged + based on chief complaint and history of presenting illness.	✓					✓	✓	✓
Rassin et al	2006	Defined as an individual who: 1) self referred without a physician referral, 2) arrived independently and 3) was discharged home without hospitalisation.	✓			✓			✓	✓
Redstone et al	2008	Triage category 3-5/5	✓						✓	
Selaswati et al	2007	If presenting with upper respiratory tract infection, mild acute gastroenteritis, urine tract infection or skin diseases			✓					✓
Sharma et al	2000	Based on the following questions: 1) would the patients condition have been worse if they have not been seen for 24 hours? 2) Did the patient need a history, physical or other ancillary data to rule out a condition that could have lead to worse outcomes if not seen within 24 hours? And used in conjunction with ICD-9-CM diagnostic codes	✓	✓	✓					✓
Siminski et al	2005	Triage category 4 or 5/5 + self-arrival, self-referral, presenting for a new episode of care and expected discharge	✓	✓		✓			✓	✓
Stanley et al	2007	Triage category 3 or 4/4 (depending on hospital system)	✓						✓	
Tsai et al	2010	Triage category 4/5	✓						✓	
Williams et al	2009	Triage category 4 or 5/5	✓						✓	
Zimmer et al	2005	Triage category 3/3	✓						✓	

\*Note. ED = emergency department. GP = general practitioner. IV = intravenous.

Variations also existed across the studies in regards to when urgency criteria were applied; some studies applied it prospectively (n = 14), others retrospectively (n = 7), and some had elements of both (n = 3). Retrospective approaches often involved an audit of patient notes by a panel of ED physicians and nurses. In some studies, this approach was problematic due to disparities between and amongst health professionals as to what can, and should be, defined as non-urgent; in the study by De Vos and colleagues (2008) *post hoc* changes were made to the criteria as poor interrater reliability between emergency physicians became apparent during data analysis. These inconsistencies occurred despite the initial use of objective-based medical criterion.

In the studies by Howard et al., (2005) and Selasawati, Naing, Aasim, Winn and Rusli (2007), the patients' final diagnosis were the main criteria to determine urgency, and thus the appropriateness of the ED presentation. The main implication of this method is that it fails to consider patients who, although received a non-urgent diagnosis on discharge, nevertheless required an ED assessment to rule out a more serious health problem.

It has been argued that the concept of what is urgent or appropriate largely depends on whose perspective is being considered. All of the studies included in this review adopted medically focused and objective-based criteria; none of the studies attempted to recognise the patient perspective by including patient-stated urgency or perceived need to attend in the criteria for a non-urgent visit. This has occurred despite the fact that a perceived need for urgent medical attention, as well as convenience and access-related issues, have been emphasised in previous surveys of attendees as important reasons for utilising the ED (Berry, Brousseau, Brotanek, Tomany-Korman, & Flores, 2008; Koziol-McLain, Price, Weiss, Quinn, & Honigman, 2000).

In short, determining what constitutes a non-urgent or 'inappropriate' presentation is problematic and further complicated by the lack of a gold standard for

identifying such patients. Without this, the true prevalence of the issue cannot be accurately assessed, nor can the effectiveness of new interventions to reduce non-urgent ED use be evaluated (Hider, et al., 1998). The challenge for researchers examining ED use is to develop an acceptable working definition of appropriateness that reflects the study purpose, local setting, population, and healthcare environment.

## **A Conceptual Framework for Assessing Health Services' Use**

In the late 1960s, Andersen developed The Behavioral Model of Health Services' Use and it has since become one of most frequently applied frameworks for predicting and explaining the use of healthcare services (Andersen, 1968; Davidson, Andersen, Wyn, & Brown, 2004; Phillips, Morrison, Andersen, & Aday, 1998). The development of the model was driven by the need to better understand the reasons why individuals and families access health services, to define and measure equitable access to healthcare, and to inform policy to support this (Andersen, 1995; Andersen & Newman, 1973). In his model, Andersen (1968) proposed that health service use is influenced by: 1) an individual's predisposition to use health services (predisposing), 2) an individual's ability to access health services (enabling), and 3) a need for healthcare (Figure 2, p. 17; Andersen, 1995; Hodgins & Wuest, 2007).

Predisposing determinants include the individual's demographic characteristics (i.e. age and gender), attributes of their social structure that may affect their ability to manage and obtain resources, and personal values or beliefs regarding health and healthcare (Andersen, 1968; Andersen, 1995; Andersen & Newman, 1973). Enabling resources relate to personal and community resources that must be available if the utilisation of health services is to occur (Andersen, 1995; Hulka & Wheat, 1985). These resources include the availability of health professionals and facilities to provide

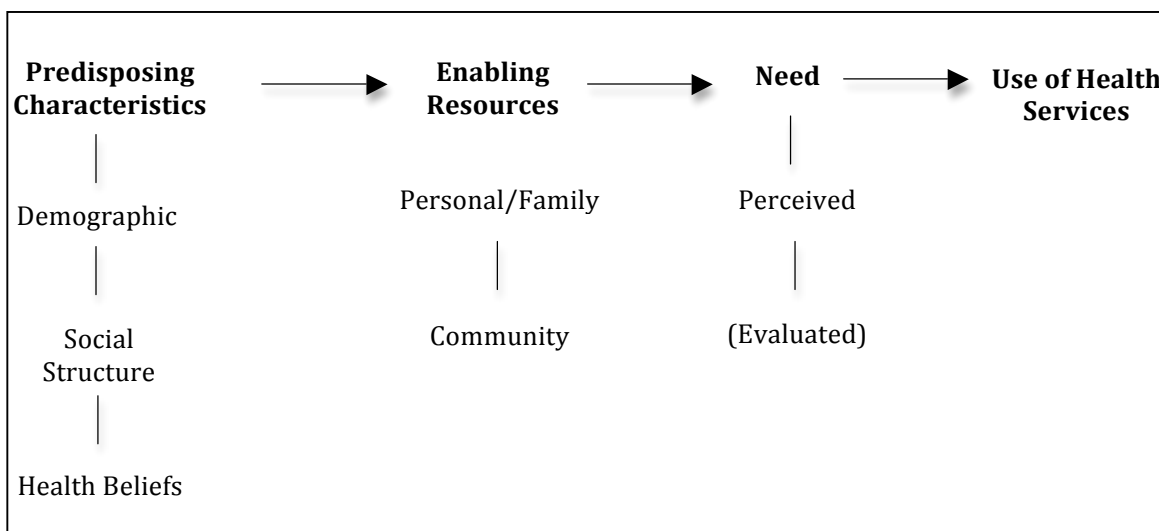


Figure 2. Andersen's Model of Health Services Use. Retrieved from "*Revisiting the Behavioural Model and Access to Medical Care: Does it matter?*" by Andersen, 1995, p. 2.

healthcare that is accessible to people in areas where they live and work. In addition, people and families must have the means and knowledge to access those services (Andersen, 1995). The third component relates to the need for healthcare as measured by the individual themselves (perceived) and/or a health professional (evaluated; Andersen, 1995; Hodgins & Wuest, 2007).

The model's lack of consideration of concepts such as social networks, social interactions, and culture has invoked criticism from various sources (Andersen, 1995; Bass & Noelker, 1987; Guendelman, 1991). These concerns were acknowledged by Andersen (1995) in a recent review of his model, and are now regarded as 'expanded' measures that may also be used to assess social structure. Another expressed concern in regards to enabling resources was that, given their potential influence on health service use, organisational factors were not sufficiently reflected in the model (Gilbert, Lawrence, & Longmate, 1993; Kelley, Perloff, Morris, & Wangyue, 1992). Andersen (1995) recognised that examining the organisation of medical care and the availability

of medical providers would improve the ability to explain and predict use, and suggested they be included as additional factors if necessary.

It is important to note that the behavioural model has evolved since its development in 1968; the initial model has been revised and expanded in response to advancements in health research and medical sociology, as well as critique and input from colleagues (Andersen, 2008). The most recent model, ‘phase 5’, has placed a greater emphasis on the importance of contextual factors in explaining health service use. In this version, contextual characteristics have been conceptualised in the same manner as individual determinants (i.e. predisposing, enabling, need), and encompass the social, economic, structural and public policy environment in which access to health services occurs. The model also includes health behaviours of the individual and the service provider, as well as health outcomes (Andersen, 2008). Due to the scope and purpose of this research dissertation and the use of data from routinely collected variables, Andersen’s first model was selected to provide the conceptual framework for the study. The following section presents the research evidence relating to the structural components of Andersen’s framework: predisposing characteristics, enabling resources and need.

## **Review of Predisposing Characteristics**

Predisposing factors indicate the inclination of individuals to need or use healthcare services and include demographic characteristics, social structure, and health beliefs (Andersen, 1995).

### *Demographic Characteristics*

Demographic characteristics, namely gender and age, are non-modifiable factors that “represent biological imperatives suggesting the likelihood that people will need

health services” (Andersen, 1995, p. 2). Whilst age and gender cannot be altered to influence utilisation patterns, Hulka and Wheat (1985) suggest that examining these variables may identify important trends in healthcare utilisation.

### *Gender*

Across 19 adult studies, the percent of non-urgent patients that were female varied significantly (22%-75%). However, only five studies found the prevalence of females seeking non-urgent care to be below 50%. Of these five studies, two were convenience samples recruited between the restricted hours of 9am – 1am and 7am – 3pm, respectively (Northington, et al., 2005; Rassin, Nasie, Bechor, Weiss, & Silner, 2006). In addition, one study (Bianco, Pileggi, & Angelillo, 2003) reported that only 22% of non-urgent ED attendees were female, compared to 78% of urgent presenters. However, in the multivariate analysis female gender was found to be a significant predisposing factor for a non-urgent visit, when compared to male (Odds ratio [OR] = 3.30, 95% CI 1.6-18.2). Only one study had a differing result; Selasawati and colleagues (2007) found that the odds of utilising the ED non-urgently among males was approximately 2.8 times the odds compared to female. However, this was a case control design that matched ED patients to primary care patients by diagnosis. Furthermore, the study was preformed in Malaysia where cultural differences may have contributed to this contradictory finding.

In studies with paediatric samples, the percent of female carers ranged from 73%-87%, while the percent of female children ranged from 47% to 53%. However, in the study by Pileggi et al (2006), in which non-urgent ED presenters and urgent ED presenters were compared, female gender was found to be an important predictor for seeking non-urgent ED care, with an odds ratio of 1.71 (95% CI 1.26-2.32).

The finding that females utilise the ED more frequently for non-urgent care is consistent with the general patterns of healthcare use. Evidence indicates that females utilise healthcare services more frequently and readily compared to men. It is therefore possible that this same trend is maintained with non-urgent ED use (Carret, et al., 2007).

### *Age*

Twenty-three studies reported the age of non-urgent ED attendees. The cohort study by Sharma et al (2000), whose sample comprised infants born in a calendar year, was the only study that did not include this demographic variable.

Eleven studies with adult samples reported mean age, which ranged from 31-44 years. In paediatric studies, two authors reported a mean age of 3 years and 5.5 years, respectively (Berry, et al., 2008; Williams, O'Rourke, & Keogh, 2009). Six authors only provided the combined mean age of the entire population, while the remaining 6 studies recorded age as an ordinal-level variable (rather than a continuous).

Based on inferential (multivariate) statistical analyses, age was found to be a significant predisposing factor for non-urgent ED use in 2 studies (Lee, et al., 2000; Pereira, et al., 2001). Interestingly, Pereira et al (2001) concluded that the strongest determinant for a non-urgent visit was being aged below 60 years, with an odds ratio of 1.7 for female and 2.3 for male. Meanwhile, Lee et al (2000) observed that the odds of presenting non-urgently were higher (OR = 5.44, 95% CI 1.6-18.2) for children aged 0-9 years, compared to all other age categories (reference 65 years or above).

In a paediatric study comparing non-urgent to urgent ED presentations, mothers aged below 20 years had the greatest odds (OR = 3.30, 95% CI 2.28-4.78) of utilising the ED non-urgently, compared to mothers aged above 28 years (Pomerantz, Schubert, Atherton, & Kotagal, 2002). In a similar study, Kennedy, Purcell, LeBlanc, and



Jangaard (2004) found that a maternal age of below 25 years was an important predictor for a non-urgent visit, with a relative risk of 2.09 (95% CI 1.29-3.39).

There are several possible explanations as to why younger aged individuals have a higher prevalence of non-urgent ED use. First, Carret and colleagues (2007) suggest that ED attendance among the elderly is typically considered appropriate due to the greater prevalence of chronic-degenerative disease and risk for adverse events. Previous international studies have also found an association between increasing age and a greater incidence of urgent as opposed to semi or non-urgent ED visits (Salvi, et al., 2007). Second, these findings may reflect the fact the younger aged individuals are more likely to present to the ED with trauma-related health problems, and therefore seek care due to a perceived need for urgent or specialty services (i.e. radiology) or general practitioner (GP) referral.

### *Social Structure*

‘Social structure’ relates to the social determinants or factors that may impede or facilitate an individual’s access to healthcare services (Andersen, 1995). In measuring these factors, an individual’s status within their community can be assessed, as well as their ability to cope and obtain resources to manage their health problem (Andersen, 1995). Traditional measures of social structure include education level, employment status and/or income level, and ethnicity.

### *Education Level*

Education level was examined in eight studies, however there were considerable differences in the categorisation of this variable. This may be a reflection of the differing study settings and education systems. Two case-control studies found education level to be statistically significant, both of which matched the non-urgent ED

population to the outpatient or primary care population by the presenting complaint (Lega & Mengoni, 2008; Selasawati, et al., 2007). Lega and Mengoni (2008) reported that the ED sample had a higher number of individuals with a low level education, when compared to the primary care population ( $p = < 0.0001$ ). Meanwhile, Selasawati and colleagues (2007) found that cases (non-urgent ED attendees) had a higher education level when compared to patients in the outpatient clinic ( $p = < 0.001$ ). Several factors may have contributed to these contradictory findings, such as the differences in sample size ( $N=527$  and  $N=340$ , respectively), study settings (Italy and Malaysia, respectively), or the way in which education level was categorised.

#### *Employment Status or Income Level*

The employment status or income level of individuals utilising the ED for non-urgent care was reported in eight studies. In a descriptive study, the greatest proportion (35%) of patients presenting for non-urgent care earned below \$15,000 (Brim, 2008). Only 25% of participants were in full time employment, while 22% were unemployed. In a paediatric study, the reported income level for 34% of mothers presenting with their child for non-urgent care was above \$50,000 Canadian per year (Kennedy, et al., 2004).

In the study by Pereira and colleagues (2001), it was observed from the multivariate analysis, in which two separate logistic models for men and women were constructed, that wage-earning women visited the ED for non-urgent care 70% more than retired women, even after adjusting for age ( $OR = 1.7$ , 95% CI 1.0-2.7). It is also interesting to note that Selasawati and colleagues (2007) found that the odds of utilising the ED for non-urgent care was 2.3 times greater in shift workers (when compared to office hours or unemployed). This is likely to be closely related to an inability to access primary care services after-hours.

### *Ethnicity*

Seven studies reported the ethnicity or race of the non-urgent sample. Due to the diversity of the study settings, this variable was categorised differently and therefore it is not possible to summarise the findings. However, it is worth noting that the study by Sharma et al (2000) was the only study that identified race as a significant factor associated with non-urgent ED use in the multivariate analysis.

### *Health Beliefs*

Health beliefs are defined by Andersen (1995, p. 2) as “attitudes, values and knowledge that people have about health and health services that might influence their subsequent perceptions of need and use of health services”. In an attempt to better understand the reasons why individuals seek ED care, several authors have examined the health beliefs of non-urgent attendees. Research findings indicate that the ED is considered a convenient healthcare option for a wide range of individuals, including shift workers, those in full-time employment, or with no transport. Several features of the ED, such as time efficiency and the availability of specialist services were described in several studies as being particularly appealing. Such information offers valuable insight in regards to the service features that are important to healthcare consumers, and provides a useful foundation upon which new service-delivery models can be developed.

In a case control study, 56% of non-urgent attendees utilising the ED on weekdays reported that the ED was a more convenient option due to difficulties in obtaining a timely consultation with their primary care provider (Redstone, et al., 2008). Similar findings were also reported in two qualitative studies; non-urgent presenters stated that the walk-in aspect of the ED was convenient, and it was a ‘much quicker’ option compared to the GP (Berry, et al., 2008; Howard, et al., 2005). Moreover,

Koziol-McLain and colleagues (2000) reported that the ED was considered a convenient option for those working long hours, or for those with no transportation or childcare.

In the study by Lee et al (2000), perceived efficiency of the ED (compared to the GP) was found to be a statistically significant factor related to a non-urgent visit ( $p = < 0.05$ ). In the same study, participants frequently stated that they believed their presenting complaint was best handled in the ED. This factor was independently associated with a non-urgent visit.

In five descriptive studies, the availability of specialist resources such as x-ray and the laboratory was cited among participants as an important factor. In the study by Williams and colleagues (2009), the ED was described as a “one stop shop” where patients knew they had access to medical services, pathology and pharmacy in one location.

## **Review of Enabling Resources**

The second component of Andersen’s model relates to personal and community resources that facilitate the use of health services (Andersen, 1995; Hulka & Wheat, 1985). The measures most frequently used in the literature to assess enabling resources include health insurance and having a regular source of care. Wait times and distance to hospital are additional measures that may also be used (Andersen, 1995).

### *Health Insurance Status*

The insurance status of non-urgent ED presenters was assessed in eight studies. The percent of non-urgent attendees with health insurance ranged from 66% to 100%. The one study reporting that 100% of participants had insurance was a qualitative study with a relatively small ( $N = 34$ ) sample size (Howard, et al., 2005).

In a paediatric study that compared the insurance status of people with non-urgent ED presentations to urgent presentations, it was observed that a higher percent of those presenting for non-urgent ED care were publically (Medicaid) insured (Pomerantz, et al., 2002). In the multivariate analysis, the odds of making a non-urgent visit were greater (OR = 1.55, 95% CI 1.15-2.08) in mothers with Medicaid insurance coverage (Pomerantz, et al., 2002). Similar findings were also reported in the paediatric cohort study by Sharma et al (2000); infants having Medicaid insurance (U.S benefit) were found to have a incidence rate ratio of 4.09 for a non-urgent visit compared to those with private insurance.

One author (Stanley, et al., 2007) conducted a bivariate analysis comparing the characteristics of non-urgent ED presenters with Medicaid insurance, to non-urgent ED presenters with private insurance. It was found that children insured with Medicaid were more likely to have had previous ED visits ( $p = < 0.05$ ), to have had more than three ED visits in the last year ( $p = < 0.05$ ), and to name the ED as their usual source of care ( $p = < 0.05$ ). Given the differences in healthcare systems, the influence of insurance status on ED use is likely to differ across settings and over time.

### *Regular Source of Care*

According to Hulka and Wheat (1985), having a regular source of care indicates that the patient has established a relationship with a medical provider, and that access has been facilitated. Regular source of care was evaluated in six studies. The descriptive study by Brim (2008) reported that 70% of non-urgent patients had a regular source of care, however 38% identified this as being the ED. In a qualitative study, only 33% of participants stated that they had an association with a primary care provider (Koziol-McLain, et al., 2000). Furthermore, the case control study by Lee et al (2000), which matched non-urgent ED presenters to outpatient presenters by morbidity, found that

17% of the ED sample claimed to have a family doctor, compared to 39% of the outpatient sample ( $p = < 0.01$ ).

When examining the association between regular source of care and ED use, an important consideration is whether patients have access to the provider at the time of need. In seven studies, access-related barriers to primary care services were reported as being influential in a patient's decision to utilise ED services. In a case control study, 35% of non-urgent attendees stated that closure of the primary care clinic was the main reason for not seeking care from the GP (Lee, et al., 2000). In the multivariate analysis, closure of the primary care clinic had a very high odds ratio of 9.1. In two other studies appointment unavailability was cited by 69% and 29% of non-urgent attendees, respectively (Brim, 2008; Callen, Blundell, & Prgomet, 2008). In addition, Brim (2008) reported that 66% of non-urgent ED presenters stated that they had to wait too long for an appointment with their GP and therefore sought ED care.

In a paediatric study sample (Berry, et al., 2008), parents explained that a major problem for families was the long wait times for a consultation with their primary care provider. One father said, "They say there is no space and they don't give you an appointment even though he's getting sick" (Berry, et al., 2008, p. 362). It is evident that in some healthcare settings the ED serves as an alternative source of care for patients who are unable, rather than unwilling to attend their regular primary care provider.

#### *Distance to Hospital*

Distance to hospital was examined in five studies. In two descriptive studies, geographical proximity was cited as an important factor influencing an ED visit by 6.6% (Callen, et al., 2008) and 47.17% (Rassin, et al., 2006) of non-urgent attendees. Rassin and colleagues (2006) stated that this reason was especially prominent (66.67%)

among the 70 years and older age group, possibly indicating that problems of physical accessibility to GPs exist for people in this population group.

In a study comparing the characteristics of non-urgent ED attendees to GP patients, Lee and colleagues (2000) found that patients who lived within 5 km of the hospitals used the ED more for non-urgent care, whereas those residing more than 6 km away tended to use ED services more for emergencies. Similar findings were reported by Tsai, Liang and Pearson (2010); they found that a greater number of non-urgent attendees (compared to urgent) lived in close proximity to the hospital, travelling 15 minutes or less to obtain ED care. In the multivariate analysis, this factor was found to be statistically significant, with an odds ratio of 1.46 (95% CI 1.03-2.08). The findings from these studies provide some evidence to support the idea that people utilise the ED for non-urgent care due to convenience and ease of access, and that distance and travel time are important considerations. Further discussion pertaining to ‘place’ and its influence on health service use is provided later in this chapter.

## **Review of Need**

As stated by Hodgins and Wuest (2007, p. 82) the determinants of need “reflect the impetus for health-care use as measured by the perceived (self-rated) or evaluated (rated by a health-care professional) need for care”. In the literature, most studies have examined perceived need using qualitative methods.

### *Perceived Need*

In nine studies, self-perceived urgency or severity of illness was cited as a main reason for attending the ED for non-urgent care. In a descriptive study (Callen, et al., 2008, p. 714), almost three quarters (73%) of participants considered their presenting complaint to be an emergency, with one patient stating “it was an emergency to me”.

Interestingly, there was no correlation observed between patient perception of urgency and triage category; some urgent patients did not consider their condition to be time sensitive or life threatening, while several non-urgent patients in low triage categories believed their presenting condition to be extremely urgent (Callen et al., 2008).

Similarly, in the case control study (Lee, et al., 2000) that matched non-urgent ED presentations to outpatient presentations by morbidity, having a perceived emergency was the strongest predictor for a non-urgent ED visit (43.8% versus 0.1%). From the findings it can be determined that 318 of the 726 non-urgent ED presentations (cases) accessed the ED due to a perceived emergency, rather than primary care services.

Meanwhile, only 7 out of the 726 outpatient patients presented to the GP for this reason (Lee, et al., 2000). Not surprisingly, perceived emergency had an odds ratio of 557 (95% CI 50.8-6112). These findings are supported by a similar case control study (Selasawati, et al., 2007), which concluded that the odds of utilising the ED for non-urgent care among those perceived to have a very serious illness were nine times compared to those perceived as not having a serious illness (OR = 9.13, 95% CI 0.50-0.85).

It is apparent from these findings that the escalating use of EDs for non-urgent care is not entirely a result of consumer preference for the service, but rather it occurs because individuals believe they require timely medical attention that can often not be provided by alternative providers. As stated by Selasawati and colleagues (2007), it is understandable that non-medical individuals have difficulty in determining the urgency of their illness. While the patients presenting complaint is not always considered urgent from the ED perspective, they should not be discouraged from seeking care for a condition which they believe warrants it. The New Zealand Ministry of Health (2009) supports this view; the 'triaging away' of non-urgent patients presenting to the ED is not condoned, nor is denial of care.



### *Evaluated Need*

According to Andersen (1995), 'evaluated need' represents the judgement of a health professional regarding an individual's health status and need for healthcare (Andersen, 1995). Across studies, evaluated need has been measured by examining a patient's referral source, presenting complaint and/or principle diagnosis, and the presence of chronic conditions.

### *Referral to the ED*

Three authors reported the referral source of the non-urgent ED presenter. In these studies, the percent of individuals who were medically referred (compared to self or relative referred) to the ED ranged from 0.6% to 23%. The study reporting that only 0.6% of non-urgent patients were medically referred was a cross-sectional study preformed in Cuba (De Vos, et al., 2008). In this study non-urgent and urgent ED presentations were compared in two separate hospital sites; the first site reported that 7.8% of non-urgent presenters were medically referred, compared to 6.8% of urgent attendees. Comparatively, in site two 0.6% of the non-urgent sample and 0.2% of the urgent sample were medically referred. Possible reasons for the low referral rate in site two are discussed in the study; the most influential is thought to be inaccessibility to primary care physicians (De Vos, et al., 2008). In the multivariate analyses, De Vos et al (2008) and Bianco et al (2003) both observed that the odds of making a non-urgent visit were higher in patients who were self or relative referred.

It is important to note that being referred by a medical professional certainly does not imply that the care for which the patient is seeking is urgent or 'appropriate' to the emergency setting; one study reported that 49% of physician-referred patients were non-urgent (Redstone, et al., 2008). High demand for primary care services, a shortage of providers, and a lack of diagnostic capacity are possible reasons why physicians refer

non-urgent patients to the ED. Further research into this issue would be required prior to the development strategies to reduce non-urgent ED attendance.

### *Presenting Complaint or Principle Diagnosis*

The presenting complaint or principle diagnosis of the non-urgent ED attendee was reported in six studies. However, due to differences in study design and sample age the classification of this variable differed across studies. In studies with adult samples, orthopaedic injuries were the most frequently described, the percent of which ranged from 36% and 49%. In a paediatric study, the most common presenting complaints included fever (26%), cold symptoms (21%), rash (15%) and minor trauma (12%).

One case control study compared the presenting complaints of non-urgent ED patients with primary care patients (Backman, Blomqvist, Lagerlund, Carlsson-Holm, & Adami, 2008). Among the non-urgent ED patients, digestive, musculoskeletal and trauma-based complaints were the most common, while those at the primary care centres frequently presented with respiratory, musculoskeletal and genital or urinary-based complaints (Backman, et al., 2008).

### *Presence of Chronic Conditions*

Four studies evaluated whether individuals presenting for non-urgent care had chronic conditions. In a bivariate analysis comparing non-urgent to urgent ED presentations, Bianco et al (2003) reported that 14.5% of non-urgent ED presentations had a chronic condition, compared to 85.5% of urgent presentations. However, in the multivariate analysis this variable was not found to be significant ( $p = 0.376$ ). A descriptive study reported that 43% of non-urgent ED presentations were being monitored for chronic disease, compared with 35% of primary care patients (Backman, et al., 2008). In the paediatric study by Sharma et al (2000), the presence of a chronic

disease was found to be a significant predictor of non-urgent ED use for infants, with an incidence rate ratio of 1.24 (95% CI 1.13-1.37).

## **Influence of Place on Health Service Use**

Both nationally and internationally, reducing inequalities in the access to and utilisation of healthcare services dominates political health agendas and public policy. In New Zealand, the provision of appropriate and accessible healthcare services to people residing in rural areas is of ongoing concern. In a recent study, Brabyn and Barnett (2004) found that significant regional variations in geographical accessibility exist in New Zealand, with those residing in rural areas facing barriers to primary healthcare due to deprivation and the additional travel resources required to access care. Importantly, one of the key priorities underpinning the Primary Health Care Strategy is ensuring appropriate and accessible services for people living in rural areas (Ministry of Health, 2002).

There is a growing body of research examining the influence of place on healthcare access (Arcury, et al., 2005; Hodgins & Wuest, 2007; Litaker, et al., 2005; McDonald & Conde, 2010; McLean, Guthrie, & Sutton, 2007), health outcomes (Howell & McFeeters, 2008; Levin & Leyland, 2006; Peen, Schoevers, Beekman, & Dekker, 2010), and health disparities (Brems, Johnson, Warner, & Roberts, 2006; Roberts, Johnson, Brems, & Warner, 2007; Rosenberg & Wilson, 2000). The findings from these studies support the idea that contextual factors play an important role in influencing a variety of health outcomes and shaping health-seeking behaviours, including the use of healthcare services.

The term “place” has been used in literature to describe the environment, location, context or system in which healthcare is sought. The conceptualization and measurement of *place* in health research has varied significantly, however in terms of

geographical location it has most frequently been operationalised as urban or rural. One limitation of the rural/urban dichotomy is the ambiguous definition of 'rural', and the multiplicity of ways in which the term has been measured (Wood, 2004). Attempts to develop an all-encompassing definition have been labeled as impracticable due to the diversity and changeability of rural areas across settings. Instead, it has been suggested that definitions are developed and applied for the specific project for which it is intended (Hodgins & Wuest, 2007; Wood, 2004).

Several studies have explored urban/rural differences in terms of health behaviours and access to healthcare (Hodgins & Wuest, 2007; Litaker, et al., 2005; McDonald & Conde, 2010). Across these studies, differences were found in the characteristics of health service users, the nature of the health problems experienced, the actions taken to manage the health problem, and the roles and functions of health-care facilities. In the study by Hodgins and Wuest (2007), it was observed that urban/rural differences in the demographic characteristics of ED attendees existed, with the rural ED catering for a higher proportion of older individuals with lower education and income levels. Similarly, McDonald and Conde (2010) found that those living in rural areas were less likely to have a GP or to have visited a GP, dentist or specialist in the past year. This factor remained significant despite controlling for various predisposing, enabling, and need factors (McDonald & Conde, 2010). Differences were also observed in the self-care behaviours of rural and urban residents, with those in rural communities more likely to seek advice from family and friends. These findings support the idea proposed by Long (1993), who stated that rural dwellers relied more on informal networks of friends and family compared to those in urban areas.

In another study, it was found that the roles and functions of health-care facilities were shaped in part by the communities in which they were located (Béland, Lemay, & Boucher, 1998). Similar findings were reported in the study by Hodgins and

Wuest (2007). They observed that the ED role differed between urban and rural communities, in that the rural ED was utilised more readily and frequently for primary care. Rural participants reported that they utilised the ED for primary care because they knew their regular physician was working there at the time, and therefore considered the ED as an extension of the primary care service. For 30% of participants, the ED was the only facility for obtaining routine healthcare, as they did not have a regular family physician (Hodgins & Wuest, 2007).

When examining the influence of place on the utilisation of health care services, a key consideration is geographical access. Distance to needed healthcare services has been referred to as a 'critical' variable for studying health utilisation patterns of people residing in rural areas (Arcury, et al., 2005; Hodgins & Wuest, 2007). When compared to urban dwellers, rural residents often have to travel farther to obtain care and face additional barriers such as associated travel costs, added time, and a lack of public transport. In the literature, distance has been measured in various ways, including linear distance across a map, road distance, travel time, and perceived distance (Arcury, et al., 2005).

Given that one in four New Zealanders resides in a rural area or small town (Ministry of Health, 2002), the issue of *place* and its influence on health services' use is an important one. Audit data presented in Chapter One of this dissertation has raised important questions regarding the differences in non-urgent attendance across urban and rural settings, and the factors precipitating such use. This descriptive study aims to provide a first look into non-urgent ED use from an urban and rural perspective by comparing demographic and clinical characteristics of individuals utilising the ED service for non-urgent health problems. The use of a geographical information system will provide useful insight into the extent to which rural and urban populations vary in their geographical access to the ED. Such information is important for effective health

planning and decision-making for the DHB, and may inform debate on the appropriateness of non-urgent ED use.

## **Summary**

A considerable range of international literature examining non-urgent ED use exists. This chapter has introduced a framework developed by Andersen (1969) to examine the utilisation of healthcare services. The framework proposed that predisposing characteristics, enabling resources, and need collectively influence health utilisation behaviour. The synthesis of research findings, presented according to the structural components of the framework, provided some insight into the characteristics of the non-urgent ED attendee and the factors influencing their attendance. Whilst many of the studies included in this review were robust in their methodology, there are various reasons to expect that ED use in other countries will differ from that in New Zealand. The funding, structure, and delivery of healthcare systems as well as differences in culture, disease patterns, and social structures could all lead to ED populations dramatically different from those seen in international settings. Moreover, the application of a wide-range of criteria to define urgency further limits the generalisability of the findings. Thus, further New Zealand based research is required. Developing a demographic and clinical profile of non-urgent attendees would be an important first step toward better understanding the health needs of this population. Exploring urban/rural differences in patient characteristics may help explain the variance in utilisation trends across these settings, and inform debate on the appropriateness of such use. The knowledge obtained from this study will provide a useful foundation for future exploratory research on the topic, and would be necessary for the development of new policies or models of service delivery to manage the issue.

## **Chapter Three – Methods**

The literature reviewed in Chapter Two provided direction for studying non-urgent ED use in New Zealand. This chapter outlines the purpose of the study and research questions and relates these to the choice of methodology, study design, and methods. The ethical and cultural considerations taken into account during this process will also be discussed.

### **Purpose of the Study**

This project was undertaken to examine the demographic and clinical characteristics of individuals presenting to an urban and rural ED for non-urgent care, and seeks to determine whether differences in these characteristics exist between settings. The research proposed was undertaken to inform New Zealand based research, policy and service delivery.

### **Research Questions**

Reviewing the literature pertaining to non-urgent ED use resulted in the development of a conceptual framework and the following research questions:

1. What are the predisposing, enabling, and need characteristics of individuals seeking non-urgent ED care?
2. Do the predisposing, enabling, and need characteristics of individuals seeking non-urgent ED care differ based on the place (urban/rural) in which healthcare is sought?

## **Methodology**

According to Grant and Giddings (2002, p. 14), the positivist paradigm assists in discovering knowledge so that “people can explain, predict, or control events”. The reason for examining the characteristics of individuals seeking non-urgent care was to provide new knowledge on this topic from a New Zealand perspective. Moreover, the comparison of urban and rural samples was undertaken to explain the variance in utilisation trends across these settings. Consequently, the positivist paradigm was chosen for this research.

The research methods underpinning positivist research are based on the assumption that objectivity enhances credibility, and thus the researcher is detached from the research subjects (Weaver & Olson, 2006). In the context of this study, patient characteristics were retrospectively examined and consequently the researcher remained separated from the study sample.

## **Study Design**

A retrospective descriptive design was used for this research. The study’s conceptual framework is underpinned by Andersen’s (1968) Behavioural Model of Health Services’ Use. This model has been used extensively in healthcare research, and previous studies have validated its use for investigating the use of healthcare services (Alexandre, 2008; Elhai & Ford, 2007). As a framework for analysis, Andersen’s model does not dictate the exact variables or research methods that must be used. Therefore, the choice of study design and the variables included were based upon the purpose and scope of the study, data availability, and the extent of previous research on the topic. The phenomenon of interest was the use of the ED for non-urgent care at an urban and rural ED. Variables were selected to represent the components of Andersen’s behavioural model presented in Chapter Two of this dissertation. The variables used



were routinely collected in the DHB and chosen in collaboration with senior management from the rural and urban ED to ensure they were valid and relevant. The proposed focus for the study is depicted in Figure 3.

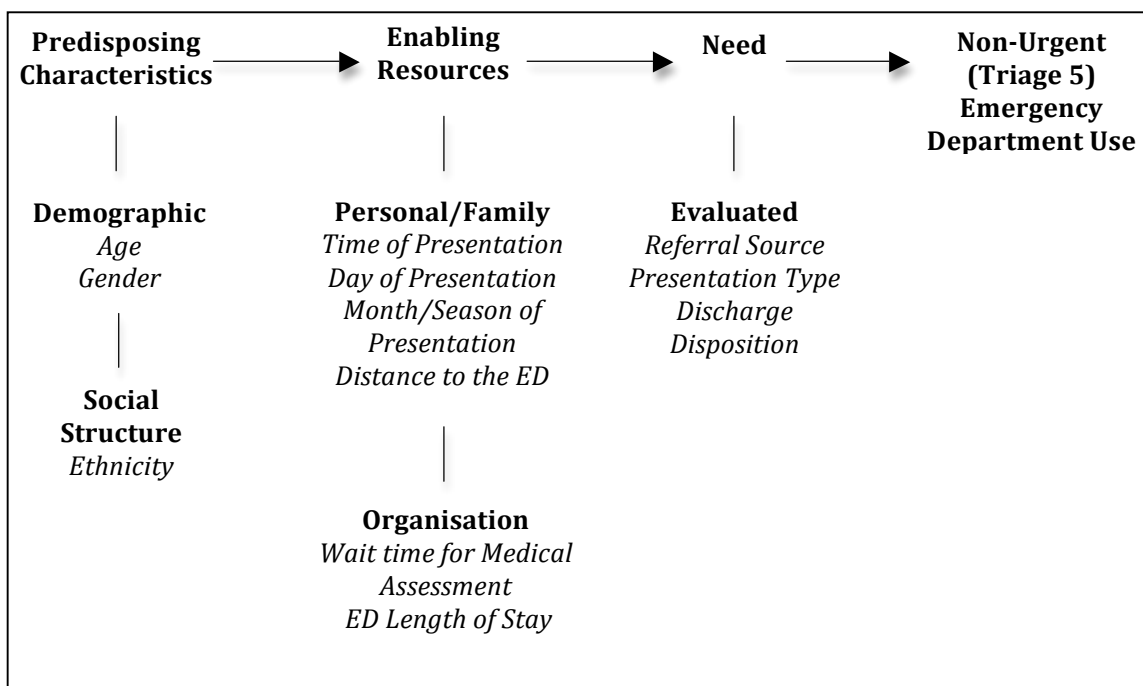


Figure 3. Conceptual framework for this research dissertation. Adapted from “Revisiting the Behavioural Model and Access to Medical Care: Does it matter?” by Andersen, 1995, p. 2.

## Methods

A research approach consistent with the positivist method was used. Data on the variables of interest were obtained retrospectively from a New Zealand DHB. The study settings, sampling method, and the procedure for data collection and data analysis are now presented.

### *Setting*

The New Zealand healthcare system consists of 20 DHBs, each of which are responsible for the provision of government funded health and disability services to a

geographically defined population. As of 2007, the catchment population of DHBs ranged from 32,000 to 516,000 (Ministry of Health, 2010a). In 2010, the researcher approached one DHB and permission was granted to access attendance data for two ED settings: a tertiary level hospital in an urban centre and a secondary level hospital in a rural area of New Zealand. The DHB of interest provided healthcare services to one of the largest catchment populations in New Zealand (Table 5). Confidentiality of the DHB is maintained at their request (refer to *Ethics* section. p. 49).

Table 5

*Population Characteristics for DHB Catchment Population*

Variable	Demographic	Percentage (%)
Gender	Male	49%
	Female	51%
Ethnicity	European	67%
	Maori	20%
	Asian	11%
	Pacific people	2%
	Other ethnicity	
	New Zealander	11%
	‘Other’	5%
Age	Median (Years)	35.9

*Note:* Information obtained from Statistics New Zealand (2009).

*Urban hospital setting*

The urban ED selected for this study was a university-affiliated teaching hospital located in an urban area of New Zealand. This hospital provided tertiary-level adult and paediatric services, and was also the trauma centre for the region (Harvey, Al Shaar, Cave, Wallace, & Brydon, 2008). Table 6 (p. 40) presents the demographic profile of the area.

In 2010, the urban ED had an annual attendance of approximately 55,900 patient visits. On arrival, all ED presentations were triaged by a registered nurse using the

Australasian Triage Scale. Triage was undertaken in two areas of the ED depending on the mode of arrival; patients arriving by ambulance were triaged in the ambulance bay, while patients arriving by car or foot were triaged in a designated area near the wait room. All nurses undertaking triage had completed and passed a national triage course provided by the College of Emergency Nursing New Zealand (College of Emergency Medicine New Zealand, 2008). This course was comprised of six-weeks pre-course study, followed by two days of classroom education and simulated triage scenarios.

### *Rural hospital setting*

The selected rural hospital provided emergency, inpatient, and maternity services to a geographically disperse population, with several remote communities over 100 kilometres away. Table 6 (p. 40) outlines the demographics for the district.

The rural ED provided acute care services to both adult and paediatric patients. In 2010 the ED had approximately 13,500 patient visits, an 18% increase from 2008. All patients presenting to the ED were triaged in a designated triage area regardless of the mode of arrival. All nurses undertaking triage had received training by the College of Emergency Nursing New Zealand (2008).

At the time of the study, GPs did not provide out-of-hour or on-call services to the community due, in part, to an aging GP workforce and as an incentive to recruit and retain primary care physicians. In 2008, an audit was conducted to assess the impact of this on ED attendance. Over the trial period (84 days), ED utilisation increased by 8%; a total of 448 people sought care after 10pm, 64% of which were allocated a triage score of four or five.

The surrounding remote communities had access to at least one primary care provider in their area. The ratio of rural GP per person was approximately 1:1700. Due

to the travelling distance to the hospital, on-call services were provided to these communities by GPs on a rotating roster.

Table 6

*Population Characteristics for Urban and Rural Setting*

Variable	Demographic	Urban	Rural
		Percentage	
Gender	Male	48.1%	49.1%
	Female	51.9%	50.9%
Ethnicity	European	62%	76%
	Maori	19%	15%
	Asian	10%	1%
	Pacific people	4%	1%
	Other ethnicity		
	New Zealander	10%	13%
	‘Other’	6%	4%
Age	Median (Years)	31.3	46.4

*Note:* Information obtained from Statistics New Zealand (2009).

*Sample*

The unit of analysis for this study was a patient presenting to the ED for non-urgent care. All adult ( $\geq 16$  years) patients who presented to either ED from July 1 2009 to June 30 2010 and were triaged as 5 were included. In the instance where a patient made multiple ED visits, only the first triage five presentation was included in the analysis to ensure that the results were not inaccurately skewed, and that the assumption of independence for statistical analysis was not violated. In accordance with previous research, paediatric patients ( $< 16$  years) were excluded from the study as it was recognised that they represent a unique population with differing predisposing, enabling, and need characteristics. Nevertheless, it was considered appropriate to explore the proportion of repeat and paediatric visits for future research. This is presented at the beginning of the Results chapter.

All National Health Index (NHI) numbers were encrypted to protect patient confidentiality and to allow for identification of first and repeat visits. Using the framework provided by Cohen (1992), a sample size calculation was performed to ascertain the number of patient visits needed to detect a medium-sized difference in the characteristics between rural and urban ED samples. It was calculated that a sample size of 177 for each group was required (effect size = 0.30, power = 0.80,  $\alpha = 0.05$ ).

### *Variables of Interest*

The research variables of interest were presented in Figure 3 (p. 37). A description of the variables and their measurement are outlined in Table 7 (p. 44).

Geographic location (rural/urban) of the ED was used as a grouping variable to allow for comparison between ED settings. The DHBs definition of rural and urban is based on that employed by Statistics New Zealand (2005), which categorises communities based on population size as well as relative isolation. The classification of the urban-rural spectrum is outlined below:

- Main urban area (minimum population of 300,000)
- Satellite urban area (population 10,000 - 30,000)
- Independent urban community (population 1,000 - 10,000)
- Rural area with high urban influence
- Rural area with moderate urban influence
- Rural area with low urban influence
- Highly rural/remote rural area

Based on this classification, the urban setting in question was considered a main urban area, while the rural setting was considered an 'independent urban community'.

However, the rural ED catered for a geographically disperse rural population that included numerous small and isolated rural centres.

Triage code, as measured by the Australasian Triage Scale (ATS), was the outcome variable used to identify patients presenting with a non-urgent health problem. All patients presenting to the ED for care were assessed and assigned a triage code by a trained triage nurse. Patients with a triage code of five were considered non-urgent. In previous studies testing the inter-rater reliability of nurse triage using the National Triage Score, the predecessor of the ATS, it was found that nurses consistently triaged within one triage category of each other when responding to 100 written profiles (Gabolinscy, 2005). In both ED settings, nurses undertaking the triage role had been certified by the College of Emergency Nursing New Zealand.

The demographic and clinical variables were selected to represent the components of the conceptual framework (Figure 2, p. 17). Predisposing characteristics were measured by two demographic variables (age and gender) and one measure of social structure (ethnicity). Age was recorded in years and calculated using the patient's date of birth and date of presentation recorded by reception on arrival. Self-reported ethnicity was collected at reception at both ED sites in a manner consistent with the protocol set by the Ministry of Health (2004). This protocol allows people to identify with more than one ethnic group.

Six variables were selected to measure the personal and organisational factors that may facilitate health service use. These included time of presentation, day of presentation, month/season of presentation, distance to the ED, wait time for medical assessment, and ED length of stay. Time of presentation was calculated from the arrival time to the ED and categorised based on eight hour nursing shifts. Day of presentation was calculated from the date of arrival. A binary variable for day of presentation was also created and categorised based on a weekday or weekend day presentation, which was consistent

with previous studies on ED use (Bianco, et al., 2003; Pereira, et al., 2001; Pileggi, et al., 2006; Zimmer, Walker, & Minkovitz, 2005). Month of presentation was calculated using the date of arrival and was further categorised (summer, autumn, winter, spring) to allow for seasonal variation to be examined.

Approximate distance to the ED was measured by spatial analysis using geographical information system software. Specified distances of 25, 50, 80, 100 and more than 100 kilometres were used to identify the distance from each town in the district to the ED. The distances are approximate and were rounded to 0 decimal points. Patients attending the ED who resided out of the district or overseas were classified accordingly (i.e. 'out of district/international').

Wait time for medical assessment was calculated as the difference between triage time (as recorded by the triage nurse) and time seen by the first ED doctor (recorded by the doctor), and was measured as a continuous variable (minutes). A binary variable was created to examine the proportion of patients that were seen within the allocated 120-minute timeframe for a triage five visit.

ED length of stay is one of the 6 national performance measures that EDs are required to report on to the Ministry of Health (Ministry of Health, 2009). Given that increased ED length of stay has been linked to non-urgent visits resulting in overcrowding and decreased standards of care, it was considered an important variable to include in the framework. Length of stay was calculated using time of arrival as the start time and the time of departure as the end time. A binary variable was created to examine the proportion of patients who were discharged, admitted, or transferred from the ED within 6 hours of arrival.

The variables selected to elicit information regarding the need for care included referral source, presentation type, and the patient's discharge disposition. Due to the nature of the research, the patients self perceived need for care was not examined.

Table 7

*Variables of Interest*

Variables	Description and Measurement		
	Measurement	Categorisation	Level of Measurement
<b>Grouping Variable</b>			
Geographic location	Place of ED presentation	1 = Urban 2 = Rural	Binary
<b>Outcome Variable</b>			
Triage Code	Level of urgency measured using the triage category assigned to the patient on arrival to the ED using the Australasian Triage Scale.	1 = ATS 1 2 = ATS 2 3 = ATS 3 4 = ATS 4 5 = ATS 5	Ordinal
<b>Predisposing Characteristics</b>			
Age	Patient age calculated from the date of birth recorded on arrival to the ED.	Years	Continuous
Gender	Gender as recorded at ED reception.	1 = Male 2 = Female	Binary
Ethnicity	Ethnicity as recorded at ED reception. Ethnicity was categorised according to the format recommended by Statistics New Zealand.	1 = Maori 2 = NZ European 3 = Non-NZ European 4 = Pacific Islander 5 = Chinese 6 = Indian 7 = Other / Unknown	Nominal
<b>Enabling Resources</b>			
Time of Presentation	Time of arrival to the ED as recorded at ED reception.	1 = 0700 to 1559 2 = 1600 to 2359 3 = 0000 to 0659	Nominal
Day of Presentation	Day of arrival to the ED as recorded at ED reception.	1 = Sunday 2 = Monday 3 = Tuesday 4 = Wednesday 5 = Thursday 6 = Friday 7 = Saturday	Nominal



Table 7

*(Continued)*

Variables	Description and Measurement		
	<i>Measurement</i>	<i>Categorisation</i>	<i>Level of Measurement</i>
Day of Presentation (Categorised)	Calculated from day of presentation and categorised according to a weekday (Mon to Fri) or weekend (Sat and Sun) presentation.	1 = Weekday 2 = Weekend	Binary
Month of Presentation	Month of presentation was extracted from the date of arrival in SPSS.	1 = January 2 = February 3 = March 4 = April 5 = May 6 = June 7 = July 8 = August 9 = September 10 = October 11 = November 12 = December	Nominal
Season of Presentation	Calculated from month of presentation and categorised according to seasons: Summer (Dec, Jan, Feb), Autumn (Mar, Apr, May), Winter (Jun, Jul, Aug), Spring (Sept, Oct, Nov).	1 = Summer 2 = Autumn 3 = Winter 4 = Spring	Nominal
Distance to the ED	Travel distance from township of residence to the ED (kilometres) as calculated by geographical information software.	1 = Up to 25 km 2 = 25 to 50 km 3 = 50 to 80 km 4 = 80 to 100 km 5 = 100+ km 6 = Out of District/International	Ordinal
Wait time for Medical Assessment	Difference between the time of triage and time seen by first doctor.	Total minutes waiting for medical assessment.	Continuous
Wait time for Medical Assessment (Categorised)	Calculated from 'wait time for medical assessment' to determine the proportion of medically assessed within 120 minutes.	1 = Within timeframe (< 120 minutes) 2 = Exceeding timeframe ( $\geq$ 120 minutes)	Binary

Table 7

*(Continued)*

Variables	Description and Measurement		
	<i>Measurement</i>	<i>Categorisation</i>	<i>Level of Measurement</i>
ED Length of Stay	Difference between the time and date of arrival to the ED to time and date of departure from the ED.	Total minutes in ED from arrival to discharge.	Continuous
ED Length of Stay (Categorised)	Calculated from 'ED length of stay' variable to determine the proportion of patients discharged from the ED within 6 hours.	1 = Within timeframe (< 6 hours) 2 = Exceeding timeframe ( $\geq$ 6 hours)	Binary
<b><i>Need (Evaluated)</i></b>			
Referral Source	Source who referred the patient to the ED for assessment/treatment.	1 = GP 2 = Other Health Professional 3 = Self/Family 4 = Other DHB 5 = Other / Unknown	Nominal
Presentation Type	Traumatic or non-traumatic injury based on ACC status.	1 = Traumatic 2 = Non-traumatic	Binary
Discharge Disposition	Where the patient was sent from the ED. Admitted patients were admitted to the same hospital. Those discharged were discharged to a private dwelling. Did not wait are patients who departed the ED before medical assessment. Transfers were to another health care facility.	1 = Admitted 2 = Discharged 3 = Transferred 4 = Did Not Wait 5 = Other / Unknown	Nominal

*Note.* ED = emergency department. ATS = Australasian triage score. DHB = district health board. GP = general practitioner.

A patient's referral source was obtained at reception or by the triage nurse, and was categorised according to the most common sources in the data file. The presentation type was based on the ACC status of the patient visit and was categorised as a traumatic or non-traumatic health problem. Disposition refers to the patients discharge destination from the ED following medical assessment and/or treatment.

### *Procedure*

Prior to the study being undertaken, the area manager and the clinical nurse managers (CNM) of the rural and urban EDs were consulted to discuss the aim of the research and their respective experiences of non-urgent ED use. A research proposal outlining the study was provided, and audit data on ED attendance trends was obtained at this time. At a later date, a meeting was held to address any questions or concerns, and to discuss the reliability and relevancy of research variables. The ethical issues of consent and confidentiality for the patient were also discussed. A meeting with a senior member of the DHB business analysis unit was also held to discuss the availability of data for the research variables of interest. Issues pertaining to the identifiability of data were explored. Once support for the research was gained from all stakeholders, the DHB research sign-off was completed and submitted. Approval to proceed was granted by the DHB on July 19, 2010 (Confidential Section). One data file was received from the DHB and was stored on a secure computer. Data management and statistical analysis was completed by the researcher.

### **Ethical and Cultural Considerations**

Ethical approval for the study was obtained from the Ethics Committee appropriate to the region in which the study was based (Confidential Section). Approval was also gained from the AUT Ethics Committee (Appendix B). The issues of privacy,

confidentiality and identifiability were considered in the process of gaining ethical approval.

In this study, access to data from one DHB was gained. The DHB in question requested confidentiality in the reporting of the study (Confidential Section). Therefore, the DHB and the regional ethics committee have not been named, and all references concerning these parties have been removed for this publication. Furthermore, the individuals who assisted in the research process have not been acknowledged or named.

All research participants have a right to determine the time, extent and circumstances under which private information is shared or withheld from others (Polit & Beck, 2010). Based on the right to privacy, research subjects also have the right to anonymity and to assume that all data collected will remain confidential (National Ethics Advisory Committee, 2006; Polit & Beck, 2010). Due to the retrospective nature of this study, informed consent was not gained from individuals whose data was used for the research. However, methods to ensure the researcher could not link a patient to the data were employed. All data received by the researcher had been de-identified by encrypting the presentation episode and NHI number. In addition, to maintain confidentiality the data file received from the DHB was stored on a secure computer. Only the researcher, her supervisor and statistician had access to the data.

### *The Principles of the Te Tiriti O Waitangi*

Guidance was sought from the DHB Maori Health Service as to how the principles of the Te Tiriti O Waitangi (Treaty of Waitangi) could be incorporated into the study. It was recommended that a research proposal be submitted to the DHBs Maori Research Subcommittee for review and comment. Support for the research was gained on the understanding that the subcommittee received a copy of the research

findings on completion of the study, and that a report be provided in regards to the prevalence of non-urgent ED use among Maori (Confidential Section).

## **Data Management and Analysis**

All data were managed and analysed using SPSS version 18 (SPSS Inc, 2010). This section will outline the procedures undertaken to manage and analyse the data for each of the research questions.

### *Data Management*

Data for both ED settings were received in one excel data file. The data file was checked for accuracy of data entry and imported into the SPSS database. Several variables (day of presentation, month of presentation, wait time for medical assessment, and length of stay) were computed in SPSS using existing data. The computed variable was checked for correctness and accuracy. Where errors were found the variable was recalculated and rechecked.

Descriptive statistics were undertaken to provide an overview of variables, and to summarise the proportion of paediatric and repeat triage five ED visits. The data were assessed for accuracy, missing data, outliers, and normal distributions before completing statistical analyses. In the instance where outliers were identified consideration was made as to whether they should be included in statistical analyses. Occurrences of missing data and outliers are provided in Chapter Four.

### *Statistical Analysis of Research Questions*

**Question 1: What are the predisposing, enabling and need characteristics of individuals seeking non-urgent ED care?**

The predisposing, enabling and need characteristics of non-urgent attendees were explored using univariate descriptive analysis. Descriptive analyses were also used to check for any violations of normality. Frequencies, means, medians, ranges, standard deviations, normal distribution, skewness and kurtosis are reported for each variable in the Results chapter.

**Question 2: Do the predisposing, enabling and need characteristics of individuals seeking non-urgent ED care differ based on the place (urban/rural) in which healthcare is sought?**

To determine whether differences in patient characteristics exist between ED settings, the Pearson chi-square (categorical variables) and the Mann-Whitney U test (continuous variables) were used for independent samples in bivariate analysis.

## **Summary**

This chapter has discussed the positivist methodological approach underpinning this study, and outlined the research methods undertaken. The following chapter, Chapter Four, presents the results of the statistical analyses. Discussion of the results in relation to the conceptual framework and the literature will follow in Chapter Five.

## Chapter Four – Results

The purpose of this research was to examine the demographic and clinical characteristics of individuals presenting to an urban and rural ED for non-urgent care, and to determine whether differences in these characteristics exist between urban and rural ED settings. This chapter describes the data collected in accordance with the methods outlined in Chapter Three.

### Sample

The data used in this study included patients presenting to the ED from 1 July 2009 to 30 June 2010 for non-urgent care. During this 12-month period, a total of 69,590 patients attended the rural and urban ED. Table 8 summarises the patient visits for all triage categories.

Table 8

*Total Number of ED Presentations for 2010 Fiscal Year (N = 69,578)*

Triage Code	Patient Visits <sup>a</sup>		
	Urban ED n (%)	Rural ED n (%)	Total
<b>ATS 1</b>	342 (0.6)	68 (0.5)	410
<b>ATS 2</b>	7648 (13.7)	1095 (8.0)	8743
<b>ATS 3</b>	24438 (43.7)	3796 (27.8)	28234
<b>ATS 4</b>	19623 (35.1)	5436 (39.8)	25059
<b>ATS 5</b>	3853 (6.9)	3279 (24.0)	7132
<b>Total</b>	55904	13674	69578

*Note.* ED = emergency department. ATS = Australasian triage code. <sup>a</sup>Triage code missing for 12 visits.

Of the 69,590 patient visits, 10% (n = 7132) were allocated a triage code of five. As explained in Chapter Three, it was considered important to identify the proportion of repeat and paediatric visits among the triage five sample for future research. Repeat visits accounted for 15% (n = 1062) of the total number of triage five presentations. At the urban ED, 11% (n = 418) of triage five patients had two or more non-urgent visits, with a range of 1 to 13 visits. At the rural ED, 20% (n = 644) of the triage five sample sought care for a non-urgent health problem on two or more occasions, with a range of 1 to 21 visits. It is uncertain how many patients returned at the request of emergency staff. Table 9 presents the number of first and repeat triage five presentations across the settings.

Table 9

*Number of First and Repeat Triage Five Presentations (N = 7132)*

<b>Patient Visit</b>	<b>Setting</b>	
	<i>Urban</i> n (%)	<i>Rural</i> n (%)
First Triage Five Presentation	3435 (89.2)	2635 (80.4)
Repeat Triage Five Presentation	418 (10.8)	644 (19.6)
Total	3853	3279

Across both settings, paediatric visits accounted for 22% (n = 1325) of the total number of first triage five visits (Table 10, p. 53). At the urban ED, paediatric presentations accounted for 19% of the total population of first triage five visits, compared to 25% at the rural ED.



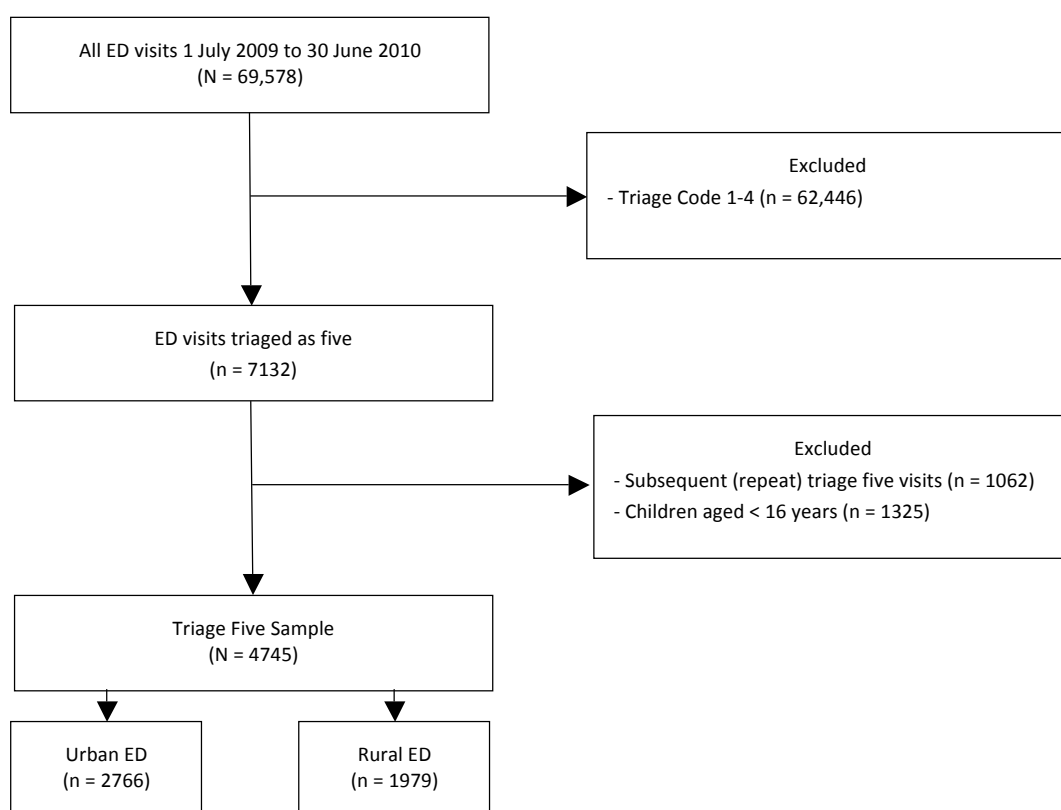
Table 10

*Number of First Triage Five Paediatric Presentations (N = 4745)*

Setting	Paediatric Triage Five Visit n (%)
Urban ED	669 (19.5)
Rural ED	656 (24.9)
Total	1325 (21.8)

*Note.* ED = emergency department.

The remainder of the statistical analyses in this chapter will only include first triage five visits of patients aged 16 years and older. Figure 4 illustrates the process undertaken to select the study sample.



*Figure 4.* Process undertaken to select study sample.

## Question One

The first question of this study asked, “What are the predisposing, enabling, and need characteristics of individuals seeking non-urgent ED care?” The findings are presented in accordance with the predisposing, enabling, and need variables.

### *Predisposing Characteristics*

The mean and median age of the sample was 42 years and 39 years, respectively. Figure 5 presents the age distribution of the sample. The graph shows considerable positive skew (.535) with marked negative kurtosis (-.748). The p-value ( $< 0.001$ ) from the Shapiro-Wilk test confirmed abnormal distribution. The majority of patients seeking non-urgent care were male (55%) and identified as NZ European (56%). Maori were also well represented, accounting for 22% of the study population. Table 11 (p. 55) presents these findings.

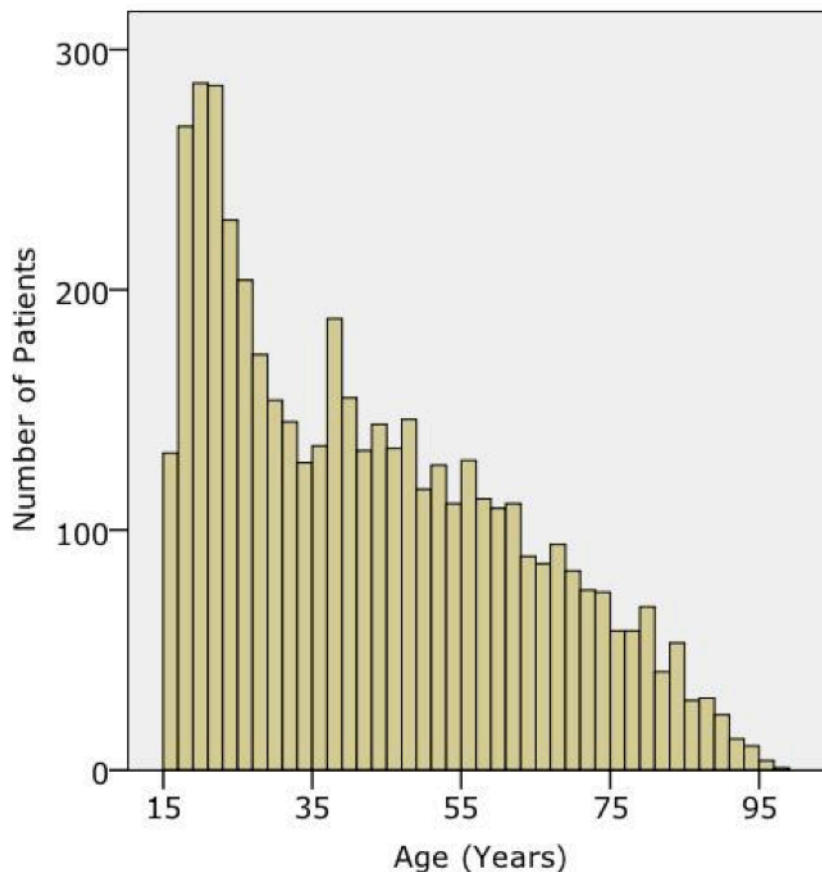


Figure 5. Age distribution of the triage five adult sample (N=4745)

Table 11

*Predisposing Characteristics of Triage Five Presentations (N = 4745)*

Variable	n (%)
<i>Predisposing Characteristics</i>	
Age (years)	
Mean (SD)	42 (19.97)
Median	39
Range	82
Minimum	16
Maximum	98
Gender	
Male	2648 (55.8)
Female	2097 (44.2)
Ethnicity	
Maori	1073 (22.6)
NZ European	2689 (56.7)
Other European	433 (9.1)
Pacific Islander	130 (2.7)
Chinese	30 (0.6)
Indian	58 (1.2)
Other	332 (7.0)

*Enabling Resources*

As presented in Table 12 (p. 56), the most common time to present to the ED for non-urgent care was between 0700 to 1600 hours (70%) and on a Sunday or Monday (15.9%). Patient visits were evenly dispersed across the months of the year, with only slight increases in December and January. The majority of patients seeking non-urgent ED care lived in close proximity to the hospital, with 59.8% of patients travelling less than 25km to the ED.

Table 12

*Enabling Resources of Triage Five Presentations (N = 4745)*

<b>Variable</b>	<b>n (%)</b>
<i>Enabling Resources</i>	
Time of Presentation	
0700 to 1559	3332 (70.2)
1600 to 2359	1201 (25.3)
0000 to 0659	212 (4.5)
Day of Presentation	
Sunday	755 (15.9)
Monday	755 (15.9)
Tuesday	649 (13.7)
Wednesday	660 (13.9)
Thursday	636 (13.4)
Friday	620 (14.1)
Saturday	670 (14.1)
Day of Presentation (Categorised)	
Weekday Day	3320 (70.0)
Weekend Day	1425 (30.0)
Month of Presentation	
January	555 (11.7)
February	391 (8.2)
March	371 (7.8)
April	412 (8.7)
May	401 (8.5)
June	370 (7.8)
July	342 (7.2)
August	380 (8.0)
September	391 (8.2)
October	354 (7.5)
November	353 (7.4)
December	425 (9.0)
Season of Presentation	
Winter	1092 (23.0)
Spring	1098 (23.1)
Summer	1371 (28.9)
Autumn	1184 (25.0)

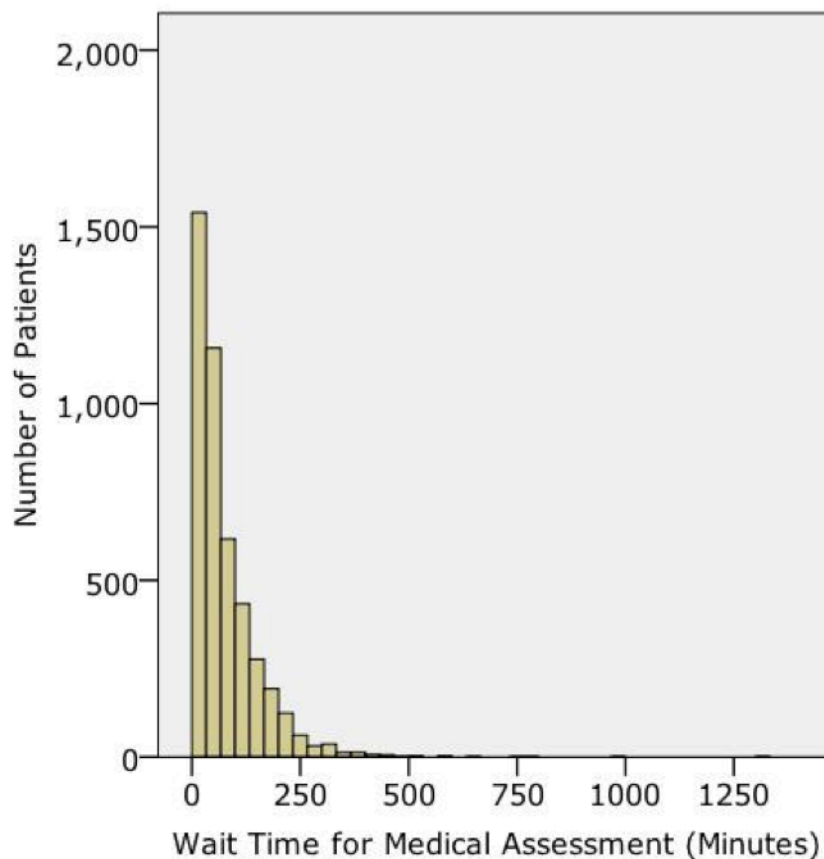
Table 12

*(Continued)*

Variable	n (%)
<i>Enabling Resources</i>	
Distance to the ED <sup>a</sup>	
< 25 km	2836 (59.8)
25 to 50 km	679 (14.3)
50 to 80 km	443 (9.3)
80 to 100 km	189 (4.0)
100+ km	69 (1.5)
Out of District / International	425 (9.0)
Missing	104 (2.2)
Wait time for Medical Assessment (minutes) <sup>b</sup>	
Mean (SD)	76.3 (76.98)
Median	51.0
Range	1320
Minimum	1
Maximum	1320
Missing values	242 (5.1)
Wait time for Medical Assessment (Categorised)	
< 120 minutes	3588 (75.6)
≥ 120 minutes	915 (19.3)
Missing	242 (5.1)
ED Length of Stay (minutes)	
Mean (SD)	161.8 (135.3)
Median	127.0
Range	1334
Minimum	1
Maximum	1335
ED Length of Stay (Categorised)	
< 6 hours	4440 (93.6)
≥ 6 hours	305 (6.4)

*Note.* ED = emergency department. <sup>a</sup>Missing data for 104 patients. <sup>b</sup>Missing data for 242 patients.

With regard to wait time for medical assessment, 76% of non-urgent patients were seen within the 120-minute timeframe allocated to a triage category five. Figure 6 presents the wait time for medical assessment. The mean wait time and standard deviation were both 76 minutes, with a median of 51 minutes. The graph shows positive skew (3.222) and marked positive kurtosis (25.914). The p-value ( $< 0.001$ ) from the Shapiro-Wilk test confirmed non-normality. One error in a wait time calculation that resulted in a negative value of -60 minutes was identified in the data. This error was categorised as 'system missing'. Several extreme outliers were noted but were retained as they were considered to be valid values.



*Figure 6.* Wait time for medical assessment of triage five attendees (N = 4745)

The length of stay of the sample is presented in Figure 7. Ninety-six percent of patients seeking non-urgent care left the ED within 6 hours. The mean length of stay was 161 minutes, with a median of 127 minutes. The graph shows marked positive skew (2.600) and positive kurtosis (12.097). The Shapiro-Wilk test confirmed non-normality ( $p = < 0.001$ ). Several extreme outliers were noted but were retained as they were considered to be valid values.

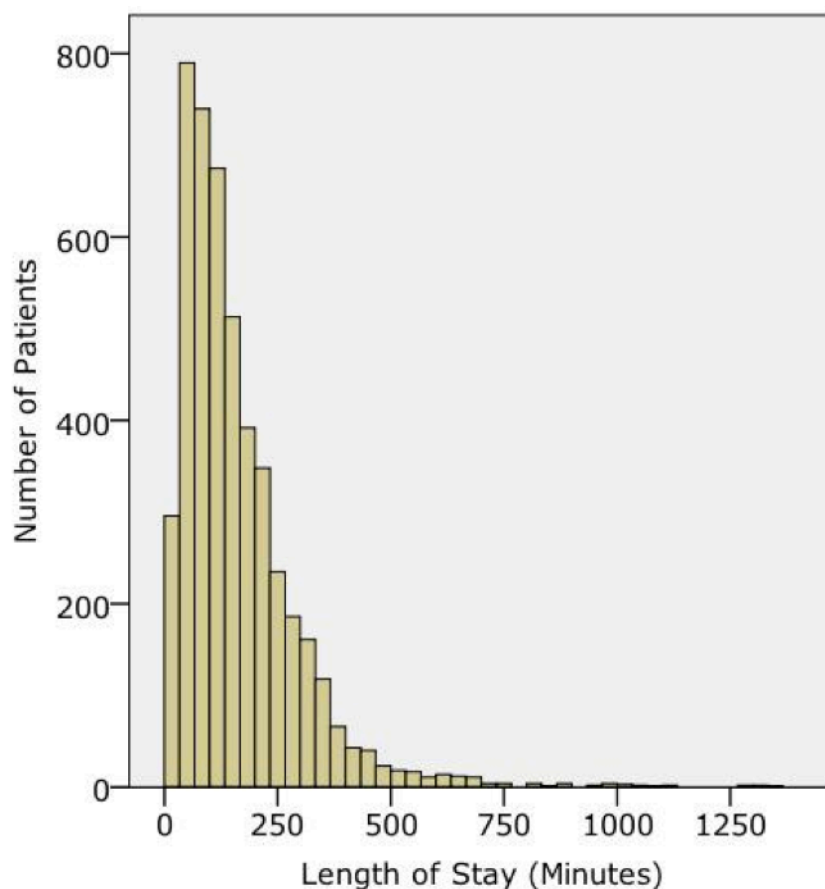


Figure 7. ED length of stay of triage five attendees (N = 4745)

#### *Need (Evaluated)*

Non-urgent attendees were most commonly self or family referred (68%), and sought care for a traumatic injury (51%). The majority of patients attending the ED non-urgently were discharged to home (85%), though 9% were admitted (Table 13, p. 60).

Table 13

*Need Characteristics of Triage Five Presentations (N = 4745)*

<b>Variable</b>	<b><i>n</i> (%)</b>
<i>Need (Evaluated)</i>	
Referral Source <sup>a</sup>	
GP	723 (15.2)
Other Health Professional	36 (0.8)
Self/Family	3244 (68.4)
Other DHB	19 (0.4)
Other	318 (6.7)
Missing	405 (8.5)
Presentation Type	
Traumatic	2434 (51.3)
Non-traumatic	2311 (48.7)
Discharge Disposition	
Admitted	412 (8.7)
Discharged	4022 (84.8)
Transferred	9 (0.2)
Did Not Wait	290 (6.1)
Other	12 (0.3)

*Note.* DHB = district health board. GP = general practitioner. <sup>a</sup>Missing data for 405 patients.



## Question Two

The second question of this study asked, “Do the predisposing, enabling, and need characteristics of individuals seeking non-urgent ED care differ based on the place (urban/rural) in which healthcare is sought?” Due to non-normal distributions continuous variables were analysed using a non-parametric (Mann-Whitney U) statistical test.

### *Predisposing Characteristics*

Significant differences were found in the characteristics of individuals seeking non-urgent care at the urban and rural ED with regards to age (Mann-Whitney U Test [ $U$ ] = 3,347,813.000,  $p = < 0.001$ ) and ethnicity (Pearson Chi-Square [ $\chi^2$ ] = 271.167, 6 df,  $p = < 0.001$ ). The median age of patients seeking non-urgent care at the urban ED was 35 years, compared to 47 years at the rural ED. The age distribution for the urban sample (Figure 8, p. 62) shows considerable positive skew (.792) and negative kurtosis (-228). The graph for the rural sample (Figure 9, p. 62) shows positive skew to a lesser degree (.196), and severe negative kurtosis (-1.063).

Maori made up a greater proportion of triage 5 visits at the urban ED (30% vs. 14%), while NZ Europeans accounted for the majority of visits at the rural ED (68% vs. 49%). No significant difference in the proportion of male and female were found between settings. Table 14 (p. 63) presents the distribution of non-urgent patients across settings according to the predisposing variables.

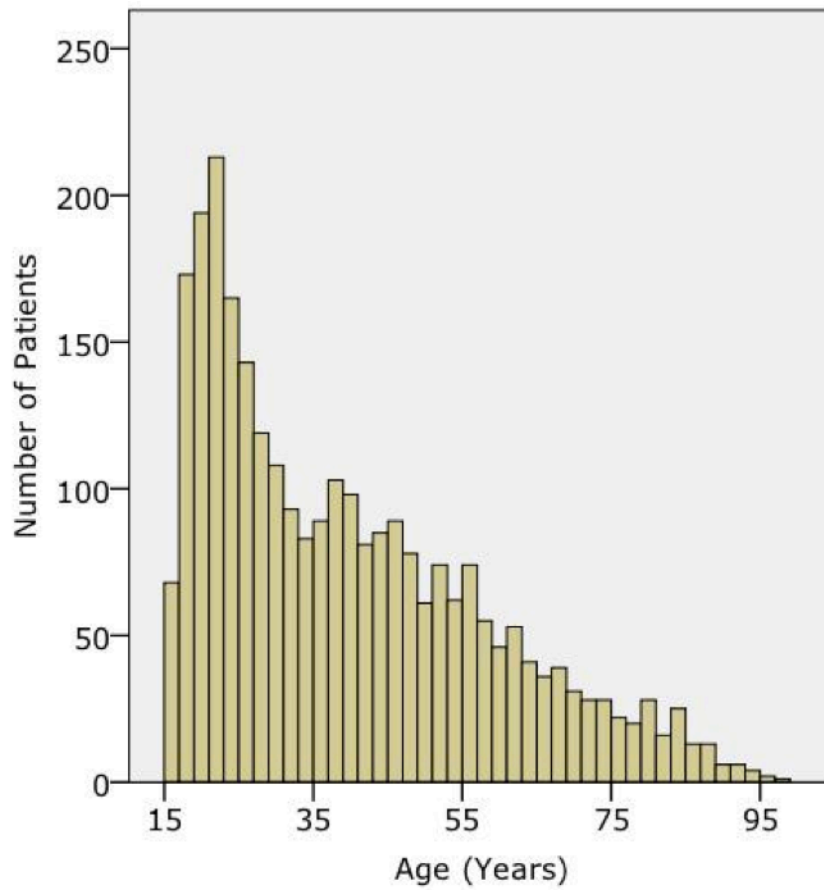


Figure 8. Age distribution of the urban triage five adult sample (N=2766)

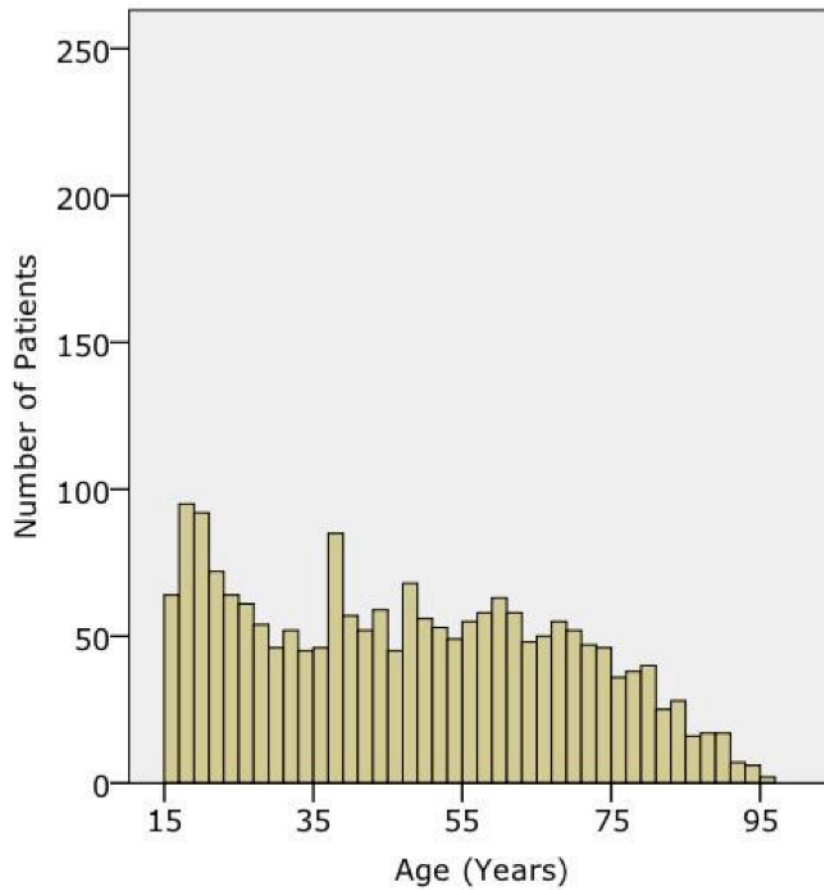


Figure 9. Age distribution of the rural triage five adult sample (N=1979)

Table 14

*Distribution of Urban and Rural Non-Urgent Visits According to Predisposing Variables*

Variables	Urban		Rural	
<i>Predisposing Characteristics</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Age (years)				
Mean (SD)	39 (18.5)		47 (20.9)	
Median	35		47	
Range	82		80	
Minimum	16		16	
Maximum	98		96	
$U = 3,347,813.000, p = < 0.001$				
Gender				
Male	1564	56.5	1084	54.8
Female	1202	43.5	895	45.2
$\chi^2 = 1.463, 1 \text{ df}, p = 0.226$				
Ethnicity				
Maori	799	28.9	274	13.8
NZ European	1348	48.7	1341	67.8
Other European	231	8.4	202	10.2
Pacific Islander	112	4.0	18	0.9
Chinese	26	0.9	4	0.2
Indian	53	1.9	5	0.3
Other / Unknown	197	7.1	135	6.8
$\chi^2 = 271.167, 6 \text{ df}, p = < 0.001$				

*Note.*  $U$  = Mann Whitney U test statistic.  $\chi^2$  = Pearson Chi-Square test statistic.

*Enabling Resources*

Table 15 (p. 64) shows that, except for day of presentation ( $p = 0.256$ ), the differences between the values found in the two groups with regard to the enabling variables were statistically significant ( $p = < 0.001$ ). With regard to time of presentation, patients most commonly (70%) sought non-urgent care between 0700 and 1600 hours at both settings. However, the urban ED experienced a greater number of visits between midnight and 7am (6% vs. 3%) compared to the rural setting.

Table 15

*Distribution of Urban and Rural Non-Urgent Visits According to Enabling Variables*

<b>Variables</b> <i>Enabling Resources</i>	<b>Urban</b>		<b>Rural</b>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Time of Presentation				
0700 to 1559	1943	70.2	1389	70.2
1600 to 2359	668	24.2	533	26.9
0000 to 0659	155	5.6	57	2.9
$\chi^2 = 22.681, 2 \text{ df}, p = < 0.001$				
Day of Presentation				
Sunday	437	15.8	318	16.1
Monday	441	15.9	314	15.9
Tuesday	374	13.5	275	13.9
Wednesday	390	14.1	270	13.6
Thursday	393	14.2	243	12.3
Friday	355	12.8	265	13.4
Saturday	376	13.6	294	14.9
$\chi^2 = 5.127, 6 \text{ df}, p = 0.528$				
Day of Presentation (Categorised)				
Weekday Day	1953	70.6	1367	69.1
Weekend Day	813	29.4	612	30.9
$\chi^2 = 1.289, 1 \text{ df}, p = 0.256$				
Month of Presentation				
January	304	11.0	251	12.7
February	193	7.0	198	10.0
March	226	8.2	145	7.3
April	258	9.3	154	7.8
May	268	9.7	133	6.7
June	224	8.1	146	7.4
July	208	7.5	134	6.8
August	214	7.7	166	8.4
September	219	7.9	172	8.7
October	188	6.8	166	8.4
November	212	7.7	141	7.1
December	252	9.1	173	9.0
$\chi^2 = 39.569, 11 \text{ df}, p = < 0.001$				

Table 15  
(Continued)

Variables	Urban		Rural	
Enabling Resources	<i>n</i>	%	<i>n</i>	%
Month of Presentation (Categorised into Season)				
Winter	646	23.4	446	22.5
Spring	619	22.4	479	24.2
Summer	749	27.1	622	31.4
Autumn	752	27.2	432	21.8
$\chi^2 = 22.829, 3 \text{ df}, p = < 0.001$				
Distance to the ED <sup>a</sup>				
< 25 km	1917	70.7	919	47.6
25 to 50 km	348	12.8	331	17.3
50 to 80 km	153	5.6	290	15.0
80 to 100 km	55	2.0	134	6.9
100+ km	50	1.8	19	1.0
Out of District / International	189	7.0	236	12.2
Missing	54	2.0	50	2.5
$\chi^2 = 323.238, 5 \text{ df}, p = < 0.001$				
Wait time for Medical Assessment (minutes) <sup>b</sup>				
Mean (SD)	90.3 (89.52)		57.93 (51.03)	
Median	64.00		42.00	
Range	1320		434	
Minimum	0		1	
Maximum	1320		1325	
Missing	215 (7.8)		27 (1.4)	
$U = 1,985,646,500, p = < 0.001$				
Wait time for Medical Assessment (Categorised)				
< 120 minutes	1850 (72.5)		1738 (89.0)	
$\geq 120$ minutes	701 (27.5)		214 (11.0)	
$\chi^2 = 186.314, 1 \text{ df}, p = < 0.001$				

Table 15

(Continued)

Variables	Urban		Rural	
<i>Enabling Resources</i>	<i>n</i>	%	<i>n</i>	%
ED Length of Stay (minutes)				
Mean (SD)	193.60 (140.52)		117.56 (113.72)	
Median	164.00		88.00	
Range	1334		1324	
Minimum	1		1	
Maximum	1335		1325	
$U = 1,607,646.500, p = < 0.001$				
ED Length of Stay (Categorised)				
< 6 hours	2506 (90.6)		1934 (97.7)	
≥ 6 hours	260 (9.4)		45 (2.3)	
$\chi^2 = 97.396, 1 \text{ df}, p = < 0.001$				

*Note.* ED = emergency department.  $U$  = Mann Whitney U test statistic.  $\chi^2$  = Pearson Chi-Square test statistic. <sup>a</sup>Town of residence data missing for 104 patients. <sup>b</sup>Wait time data missing for 242 patients.

Monthly and seasonal variation was also apparent, with the rural ED experiencing a more dramatic increase in non-urgent use during summer months compared to the urban setting. Comparatively, patient visits to the urban ED were more evenly dispersed across the year, with slight increases during autumn and summer.

With regard to distance to the ED, the majority (71%) of patients attending the urban ED travelled less than 25km to obtain care, whereas a large proportion of patients in the rural sample travelled more than 25km ( $\chi^2 = 323.238, 5 \text{ df}, p = < 0.001$ ). In addition, the rural ED had a greater number of non-urgent visits from patients who resided out of the district or overseas compared to the urban ED (12% vs. 7%).

Significant variation existed in the median wait time for medical assessment across EDs. The median wait time experienced by patients attending the urban ED was 64 minutes, compared to 42 minutes at the rural ED ( $U = 1,985,646.500, p = < 0.001$ ).

Moreover, 73% of triage five presentations at the urban ED were medically assessed within 120 minutes, compared to 89% at the rural setting ( $p = < 0.001$ ).

Similar findings were observed in the length of stay; the median length of stay at the urban and rural ED was 164 and 88 minutes, respectively ( $U = 1,607,646.500$ ,  $p = < 0.001$ ). A greater proportion of patients at the rural ED were discharged within 6 hours than at the urban setting (98% vs. 91%,  $\chi^2 = 97.396$ , 1 df,  $p = < 0.001$ ).

#### *Need (Evaluated)*

All variables representing a patient's evaluated need for care were found to differ significantly across ED settings (Table 16, p. 68). Patients' presenting for non-urgent care at the rural ED were more frequently referred by a GP than patients attending the urban ED (19% vs. 15%,  $p = 0.001$ ). Moreover, 55% of patients triaged as 5 at the rural ED presented with a traumatic injury, compared to 48% at the urban ED. Lastly, significant differences in the discharge disposition of non-urgent attendees were also observed across settings; the rural ED had a greater proportion of non-urgent patients discharged to home than the urban ED (90% vs. 81%). Meanwhile the urban ED had a much higher number of patients who left the department before being medically assessed compared to the rural setting (9% vs. 2%).

Table 16

*Distribution of Urban and Rural Non-Urgent Visits According to Need Variables*

<b>Variables</b> <i>Need (Evaluated)</i>	<b>Urban</b>		<b>Rural</b>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Referral Source <sup>a</sup>				
General Practitioner	368	14.8	355	19.2
Other Health Professional	26	1.0	10	0.5
Self/Family	1889	75.9	1355	73.2
Other DHB	14	0.6	5	0.3
Other	192	7.7	126	6.8
Missing	277	10.0	128	6.5
$\chi^2 = 19.846, 4 \text{ df}, p = 0.001$				
Presentation type				
Traumatic	1341	48.5	1093	55.2
Non-traumatic	1425	51.5	886	44.8
$\chi^2 = 21.029, 1 \text{ df}, p = <0.001$				
Discharge Disposition				
Admitted	260	9.4	152	7.7
Discharged	2239	80.9	1783	90.1
Transferred	4	0.1	5	0.3
Did Not Wait	252	9.1	38	1.9
Other	11	0.4	1	0.1
$\chi^2 = 125.028, 4 \text{ df}, p = <0.001$				

*Note.* Mann Whitney U test statistic.  $\chi^2$  = Pearson Chi-Square test statistic. DHB = district health board. <sup>a</sup>Missing data for 405 patients

## Summary

Data from 4745 patients who attended the ED for non-urgent care were analysed. Sample characteristics, including the proportion of paediatric and repeat visits, were explored using descriptive statistics. To ensure that the assumptions of analyses were met, the distribution of continuous variables were tested and graphed. Non-normality was confirmed using the Shapiro-Wilk test, and consequently non-parametric tests were employed.



Descriptive univariate analysis provided a demographic and clinical overview of patients seeking non-urgent care at both ED settings. Bivariate analysis, using the Pearson chi-square and Mann-Whitney U tests, showed that significant differences exist in non-urgent ED populations with regards to predisposing, enabling, and need characteristics. The final chapter, Chapter Five, discusses the results in the context of the conceptual framework and research literature. Discussion on the implications of the findings and strengths and limitations of the study will also be provided.

## **Chapter Five – Discussion**

The need to better understand the health needs of individuals utilising ED services for non-urgent health problems was the catalyst for this research. Developing a demographic and clinical overview of this population was an important first step toward achieving this. Moreover, comparing triage five samples provided important insight into urban/rural differences that exist in the characteristics of ED attendees. Such knowledge is important for effective health planning and to inform debate on the appropriateness of ED use.

In reviewing the literature, a conceptual framework for examining health service use was identified, which proposed that predisposing, enabling, and need determinants collectively influence health utilisation behaviour (Figure 2, p. 17). Using ED location as a grouping variable, the study examined the characteristics of 4745 patients who sought non-urgent care between July 1 2009 and June 30 2010. This chapter will discuss the main findings in relation to the research questions, conceptual framework, and literature. The implications of the findings, strengths and limitations of the study, and recommendations for further research on the use of the ED for non-urgent care in New Zealand will also be presented.

### **Characteristics of Individuals Seeking Non-Urgent ED Care**

Age, gender, and ethnicity were collected in this study as factors that may influence health service use both directly and indirectly through the enabling and need variables (Andersen, 1995). Statistics New Zealand categorises population age by 16-64 years (64%) and 65 years and above (12%). The contribution of non-urgent visits from people in these age groups was similar (67% and 13% respectively). The age distribution of triage five attendees was abnormal, with peaks at 20 to 25 years and 40

to 45 years. The more frequent use of the ED for non-urgent care by younger aged individuals is consistent with research findings from international studies (Carret, et al., 2007; Lee, et al., 2003; Pereira, et al., 2001). Several explanations for this trend have been presented in the literature; Hider and colleagues (1998) stated that younger aged individuals were more likely to present to the ED with traumatic injuries, and therefore seek care due to a perceived need for specialist services, such as radiology. It has also been suggested that the high prevalence of chronic disease among elderly contribute to such findings; Carret and colleagues (2007) stated that ED use among this group is typically considered appropriate, even in instances when their care could be effectively managed in alternative settings, as they often receive complementary investigations. If this is true, it further emphasises the need for a valid and consistent definition of urgency.

The univariate analysis revealed that a higher proportion of males (56%) attended the ED for non-urgent care compared to females (44%). This finding does not reflect trends observed across international literature, in which females were found to attend the ED more frequently for non-urgent care (Backman, et al., 2008; Berry, et al., 2008; Bianco, et al., 2003; Brim, 2008; De Vos, et al., 2008; Koziol-McLain, et al., 2000; Pereira, et al., 2001; Pileggi, et al., 2006; Redstone, et al., 2008; Williams, et al., 2009). Moreover, the proportion of males and females in the study sample was not consistent with the demographics of the DHB catchment population, which is 49% and 51% respectively. There are several possible explanations for these findings. First, literature suggests that women in New Zealand are more likely than men to be affiliated with a primary care provider (Jatrana & Crampton, 2009a, 2009b). As stated by Jatrana and Crampton (2009a), this finding is likely to reflect women's greater use of primary care services for contraceptive, pregnancy, and child-related issues, and the tendency for men to be less willing to seek professional help for certain types of health problems.

Second, the correlation between gender and complaint type is well documented. Therefore, as with age it is possible that males attend the ED for assessment of a traumatic injury and a self-perceived need for emergency and/or specialist services. However, further investigation of this association is required.

With regard to ethnicity, individuals of European descent made the majority of non-urgent visits (66%). When compared to the DHB catchment population, the contribution of non-urgent visits from people in this ethnic group was similar (67%). The proportion of Maori and Pacific peoples was also consistent with that of the DHB catchment population; Maori and Pacific peoples accounted for 23% and 3% of the study sample, respectively. The proportion of these ethnic groups in the regional population was 20% and 2%, respectively. This finding does not support the conclusions made in previous studies where it was reported that minority groups were more likely to receive routine healthcare in an ED (Hong, Baumann, & Boudreaux, 2007). However, it is worth noting that in New Zealand a greater proportion of Europeans are affiliated with a primary care provider compared to Maori and Pacific people (Jatrana & Crampton, 2009a). This trend is reflected in the DHB population, whereby Maori and Pacific people have a significantly lower enrolment rate with a primary care organisation than other ethnicities. Other research has also shown that the annual exposure to primary medical care for Maori and Pacific ethnic groups is significantly lower (Crampton, Jatrana, Lay-Yee, & Davis, 2007). Therefore, it is possible that the ED acts as a 'safety-net' for a proportion of the Maori and Pacific population who are unwilling or unable to access primary care services, either due to associated costs, accessibility, or availability. Additional research that goes beyond a univariate analysis and explores the impact of confounding factors, such as age, gender, socioeconomic status, and perceptions of quality or convenience is needed.

In examining the enabling factors it was found that non-urgent care was sought most commonly on Sundays and Mondays between the hours of 0700 and 1600. Several other studies examining ED use reported similar results (Bianco, et al., 2003; De Vos, et al., 2008; Kennedy, et al., 2004; Pereira, et al., 2001; Pileggi, et al., 2006). Based on international literature possible explanations for these trends include preference for the ED service and self-perceived need. Given that primary care providers have restricted opening hours and have a lower technical capacity, it is also possible that the ED is seen to be a more accessible and convenient healthcare option (De Vos, et al., 2008). Further investigation of these associations in the New Zealand healthcare context is required.

The median wait time experienced by triage five attendees across ED settings was 51 minutes. The policy for Australasian Triage Scale stipulates that 70% of triage five presentations should be medically assessed within 120 minutes of triage (Australasian College for Emergency Medicine, 2006). In this study, 71% of patients triaged as five were seen within 120 minutes. As DHBs are only required to report triage times for triage categories 1-3 it is not possible to assess performance across the whole DHB or New Zealand.

ED length of stay is a national performance measure that all DHBs are required to report on to the Ministry of Health (2009). This health target was introduced in an attempt to improve patient flow and reduce overcrowding, with the aim of having 95% of patients admitted, discharged, or transferred from the ED within 6 hours of arrival (Ministry of Health, 2009). In this study, 96% of triage five patients had left the department within this timeframe. In order to maintain confidentiality, the overall performance of the DHB in question cannot be presented. However, it is worthwhile to note that the performance of DHBs nationwide for this health target is currently 87% (Ministry of Health, 2010b).

Consistent with the findings from previous studies, patients attending the ED were most commonly self or relative referred, sought care for a traumatic injury, and were discharged to home. Based on previous research findings, it could be hypothesised that people self-refer to the ED because of access-related issues to primary care providers, or that the traumatic nature of the health problem influences the patients perceived need for emergency or speciality services. Again, it would be important to investigate the reasons why people choose to seek ED care to ensure that these findings are interpreted in the context of the New Zealand healthcare environment. It is also worth noting that 9% of the non-urgent sample were admitted. This finding may reflect the current practice in the urban ED where patients with traumatic injuries are referred to the hospital for assessment by a medical specialty (i.e. plastics). In many instances, the health problem requiring further assessment is not acute and it is therefore likely that the patient would be allocated a triage code of five (ED clinical nurse manager, personal communication, August 21 2010).

### **Urban/Rural Differences in the Characteristics of Individuals Seeking ED Care**

The findings from this research provide some evidence supporting urban/rural differences in the characteristics of individuals seeking non-urgent care. In this study, differences in the predisposing, enabling, and need determinants of triage five attendees were observed between urban and rural settings. The urban ED had a younger and more ethnically diverse triage five sample than the rural ED, while the proportion of male and female presenters was similar across settings. These findings are consistent with the demographics of each area, and with those reported in previous studies exploring urban/rural differences (Hodgins & Wuest, 2007).

The urban sample had a greater proportion of people seeking non-urgent care between midnight and 7am compared to the rural setting. Given that the majority of patients in the urban sample lived within 25km of the hospital, this finding may reflect the fact that the urban ED is more conveniently accessible in terms of distance required to travel than the rural ED. These findings may also support the assertion by Long (1993) who suggested that, by necessity, people residing in rural areas learn to differentiate between health problems that require timely treatment and those that can be tolerated for a period of time.

The rural ED had a more notable increase in non-urgent presentations during the summer than the urban ED. While statistically significant, this finding was somewhat expected given that the rural population increases by approximately 20,000 during the summer holiday period, reflected also by the higher proportion of patients attending the ED who resided outside the district or overseas. Nevertheless, such knowledge may be useful in the planning of resource allocation and service provision for this period in the future.

Statistically significant differences were observed across settings in the wait time for medical assessment and the length of stay experienced by triage five attendees. A greater proportion of patients attending the rural ED were assessed within the 120-minute timeframe, and discharged, transferred or admitted within 6 hours of triage compared to patients at the urban ED. The factors contributing to these differences are unclear, and further research examining the characteristics of the EDs themselves would be needed to ensure that the interpretation of these findings is done within the context of the ED setting. However, given that the majority of patients attending the rural ED experienced relatively short wait times it is possible that this service is considered a convenient healthcare option in this community. This was found to be true in the study by Lee and colleagues (2000), who reported that shorter waiting time and efficiency of

services were main reasons for utilising ED services. Similar findings were also observed in two qualitative studies; non-urgent presenters stated that the walk-in aspect of the ED was convenient, and it was a ‘much quicker’ option than the GP (Berry, et al., 2008; Howard, et al., 2005).

In terms of distance required to travel, the findings revealed that the majority (52%) of patients attending the rural ED travelled more than 25km to obtain care, whereas 70% of urban attendees travelled less than 25km. While it is clear that those living in rural areas face longer travel times and additional economic costs for obtaining care, it remains uncertain how this influences ED or GP utilisation rates. Moreover, this study only included patients who decided to seek care. Therefore, the extent to which geographical and financial barriers limit the utilisation of needed healthcare services is also unknown. Further research is needed to investigate the extent to which distance to care influences health seeking behaviour and utilisation rates. Another important consideration for future studies would also be the extent to which access varies for particular rural population groups.

Lastly, differences were found across settings in regards to the need variables. The most notable was the high number of patients in the urban sample that failed to wait for medical assessment. This finding may be correlated to the longer wait times and length of stay experienced by urban attendees, but once again further investigation is needed to understand and explain this finding.

## **The Conceptual Framework: The Behavioural Model of Health Services’ Use**

The first version of Andersen’s (1968) behavioural model of health services use provided the conceptual framework for the study. This model was selected as it was considered to best suit the purpose of the research, which was largely focused on



examining individual determinants of non-urgent attendees. The framework provided structure to the literature review and informed the research process by guiding the formation of research questions and the collection and analysis of data. This process resulted in the development of a demographic and clinical profile of non-urgent attendees at an urban and rural ED. It was beyond scope of this descriptive study to establish causality between predisposing, enabling, and need factors or to test the ability of Andersen's model to explain or predict non-urgent ED use. As discussed above, the possible interaction between gender, age, presentation type and perceived need requires further investigation. It would be useful in future studies to employ multivariate techniques (i.e. logistic regression) to explore if and how the components of the model are interrelated, and to establish the predictive capabilities of Andersen's theoretical model.

In order to gain comprehensive insight into health services use, researchers must consider how people view their own general health and functional state, as well as how they experience and react to symptoms of illness and discomfort. Perceived need was considered an important component of Andersen's behavioural model and has been emphasised as an influential determinant of health service use. International research supports this assertion, with perceptions of urgency frequently cited in studies examining the factors influencing non-urgent ED utilisation (Callen, et al., 2008; Lee, et al., 2000; Selasawati, et al., 2007). The retrospective design of this study prevented the inclusion of perceived need as apart of the conceptual framework. A prospective or qualitative methodology would offer a greater scope for examining perceptions of need, and provide important insight into the decision making process of individuals seeking non-urgent ED care.

Lastly, examining the characteristics of the healthcare system may improve our understanding of ED usage beyond what individual determinants alone might do. In

Andersen's most recent version of the behavioural model, the importance of national health policy and the organisation of resources in the healthcare system were recognised as important determinants of the populations' use of services, as well as changes in patterns of use over time (Andersen, 1995). In terms of ED use, previous studies have most frequently focused on the availability and accessibility of primary care providers, the findings of which revealed that access-related issues were influential in a patient's decision to seek ED care. Thus, from a New Zealand perspective examining the availability and accessibility of community healthcare providers and the impact of national health policy might provide a more complete and valuable analysis of non-urgent ED use.

In consideration of the above comments a revised conceptual framework based on a more recent version of Andersen's behavioural model is presented in Figure 10 below.

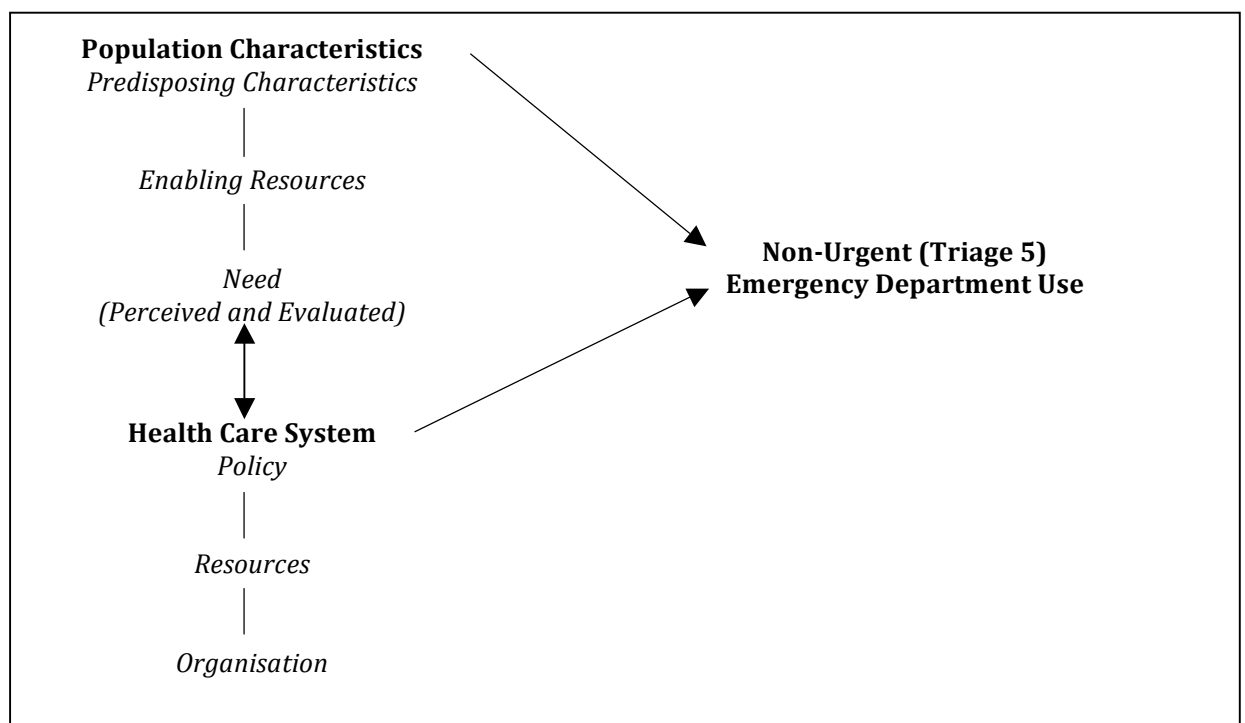


Figure 10. Conceptual framework for future studies examining non-urgent ED use.

Adapted from "Revisiting the Behavioural Model and Access to Medical Care: Does it matter?" by Andersen, 1995, p. 2.

## Implications

In examining the characteristics of individuals seeking non-urgent care a comprehensive demographic and clinical profile was developed. Moreover, comparing urban and rural study populations revealed important differences in the predisposing, enabling, and need determinants of non-urgent attendees. Three main implications have emerged from these findings.

This descriptive study was undertaken to provide a 'first look' into the non-urgent use of the ED and to address the lack of New Zealand based research on the topic. However many important questions remain and further research is needed. Rates of non-urgent attendance across New Zealand EDs need to be established, and the question as to why individuals with non-urgent health problems attend the ED remains unanswered. Further work should also focus on developing an accurate criterion for a non-urgent visit that has the properties of reliability and validity.

Second, when studying the non-urgent use of ED services there is a risk of implying that such use is unequivocally bad. Many researchers have justified the need for their study by suggesting that non-urgent visits contribute to overcrowding, lengthy wait times, and decreased standards of care. It has also been implied that such use is fiscally improvident, and that patients with non-urgent health problems are best suited to the primary care setting because of the continuity of care that is provided. In this study, the majority of patients seeking care for non-urgent health problems were medically assessed within 120 minutes, and departed the ED within 6 hours of arrival. Given that triage five patients are seen in order of priority, these findings challenge the idea that non-urgent attendees contribute to overcrowding and lengthy wait times. As stated by Lowe and Abbuhl (2001), there are a multitude of factors that may cause overcrowding and long wait times, which may not respond to reducing the number of ED patients who can be seen and discharged home. Thus, broad generalisations

regarding ED use should not be made, and further investigation is needed to establish the extent to which providing non-urgent care in the ED setting impacts on its efficiency.

Lastly, this study has raised an important issue in regards to the monitoring and collection of health data. Currently, ED attendance is not collected in the national minimum dataset and consequently the rates of attendances across New Zealand EDs are not reported. This would be useful for future New Zealand based research on the topic, and would also provide important insight into how patterns of use change over time.

### **Strengths and Limitations of the Study**

This research has examined the characteristics of non-urgent ED attendees and, in recognising the potential effect of place, explored how these characteristics differ across an urban and rural setting. This study represents an important first step towards better understanding the health needs of the triage five population, and addresses the lack of New Zealand based research on the topic. The large sample size increased the precision of the data analyses and allowed for significant differences across settings to be identified. Moreover, triage five presentations over a fiscal year were included to increase the likelihood of obtaining a representative sample. However, there are several limitations of the study that should be noted.

First, the study is limited by the descriptive nature of the design. As explained earlier in this chapter, causality between the predisposing, enabling, and need components of the model were not explored. This is important if the health seeking behaviour of non-urgent attendees is to be fully understood. Furthermore, this study did not use a comparison group. To answer the question of what leads patients to utilise the ED services for non-urgent health problems, it would be worthwhile to compare non-

urgent ED attendees to patients with similar problems who decide to seek care in the primary care setting.

Second, the study sample was limited to two hospital sites within a single DHB. While this reflected the scope of the research dissertation, examining non-urgent use throughout New Zealand would provide a more comprehensive demographic and clinical overview of non-urgent attendees, and a greater understanding of how place might influence health-seeking behaviour in terms of ED usage. Due to time constraints, it was not feasible to include more than one DHB as it was recognised that considerable time would have been needed to develop relationships in order to gain access to the necessary data. Nevertheless, the study may draw attention to an important issue and inform further New Zealand based research on the topic. Furthermore, the inclusion criterion was limited to individuals aged 16 years and above. While the decision to exclude paediatric presentations was justified, it was evident that this population made a significant contribution to non-urgent visits across settings. Additional research is needed to explore the characteristics of non-urgent paediatric presentations.

Another limitation of the study was the reliability of nurse triage. It is possible that the difference in the prevalence of non-urgent use between the rural and urban setting is a result of variability in triage practices, and the disinclination for nurses in the urban ED to allocate a triage category five. It was observed that one patient sought care at the urban ED 44 times during the fiscal year. However, despite the patient being 'flagged' as a frequent attendee none of the visits were triaged as five. This highlights the limitations of only using triage category to identify non-urgent presentations, and once again emphasises the need to develop a consistent and reliable measure of urgency.

The data used in this study were obtained from the DHBs administrative dataset. As stated by Perelman and Mateus (2009), data routinely collected in hospitals are not

specifically obtained for research purposes. Thus, researchers face a trade-off between the credibility of the data versus the feasibility of collecting data on a large number of people. In this study, several limitations regarding data completeness and data quality were noted. There was missing data for several of the research variables, which had the potential to reduce the representativeness of the sample and skew research findings. Significant inconsistencies were also noted in the coding of the 'referral source' and 'discharge destination' variables. This increased the risk of incorrectly categorising the data and producing inaccurate or misleading results. To minimise this risk, further input from the DHB was sought to assist with the categorising process. In doing so, the problems associated with the current coding practice have been recognised by the DHB.

Lastly, it is recognised that data quality may differ across hospital settings which, according to Iezzoni (1997) compromises the efficacy of using administrative data for comparing hospital performance. It is likely that data variance between the two hospital settings used in this study was minimal given that they both operate under the same DHB. However, it is an important consideration for future studies where non-urgent use is examined across several DHBs.

## **Recommendations for Future Research**

The findings from this research have provided a 'first look' into non-urgent ED use in New Zealand, and has explored how the characteristics of individuals seeking ED care differ based on the place in which healthcare is sought. This section outlines recommendations for future study on non-urgent ED use.

As discussed earlier, only one DHB was included in the study. Conducting a nationwide study would provide greater insight into the extent to which people use ED services for non-urgent care. Future research should also investigate the factors influencing health-seeking behaviour for non-urgent health problems. Such knowledge will inform debate on the appropriateness of these actions, and is also important for the

planning of appropriate and accessible care for individuals with non-urgent health problems (Hodgins & Wuest, 2007).

The variance in non-urgent use across the urban and rural setting requires further investigation. It is possible that this finding is influenced by contextual factors relating to the structure and delivery of current healthcare services in urban and rural areas, rather than determinants specific to the individuals seeking care. However, future research examining the impact of geographic location on access to health-care services may require more sophisticated methods of operationalising geographic location than the urban/rural dichotomy that was used in this study.

Other recommendations for further research mentioned in this chapter included the need to establish causality between the predisposing, enabling, and need determinants of non-urgent attendees, and to determine how non-urgent use impacts on the quality and efficiency of ED services and patient outcomes. In addition, it was observed that paediatric patients made significant contribution to non-urgent visits. It would therefore be important to examine the characteristics of this population and the factors influencing ED visits.

A key issue for future research will be developing a standardised definition of urgency. As discussed in Chapter Two of this dissertation, many definitions used in previous research have lacked validity and reliability, which may explain the variance in the proportion of ED visits deemed non-urgent or “inappropriate”. Ideally, a suitable definition that reflects the New Zealand healthcare environment would be developed before further research is undertaken to ensure that research findings are accurate and reliable.

## **Conclusion**

The main purpose of this study was to develop a demographic and clinical profile of non-urgent attendees, and to determine if and how patient characteristics differed across an urban and rural ED. The findings from this descriptive study have provided an important first look into an issue that has received considerable attention internationally, but remained unstudied from a New Zealand perspective. Some of the findings presented in this research dissertation were consistent with those reported in international settings, while others were contradictory. This is not surprising given the differences in study populations and healthcare environments. It is evident that further research is needed if this issue is to be fully understood. An important next step would be to develop a reliable measure of urgency and determine the prevalence of non-urgent use across all New Zealand EDs. It would then be necessary to establish whether or not using ED for non-urgent health problems impacts negatively on the service, and the factors precipitating such use.



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## Appendix A

### *Studies Examining the Characteristics of Non-Urgent Attendees and/or the Factors Influencing a Non-Urgent Visit*

Reference	Year of Publication	Country	Study Design	Sample	Findings	CASP Tool	Score
Backman et al	2008	Sweden	Cross-sectional	N = 736 (20-80 years)  Non-urgent ED presentations (n = 194)  Primary care patients (n = 542)	<b>Characteristics:</b> <u>Univariate:</u> Entire population: Mean age 48 years, female (59%), highest completed education secondary or high school (46%), presence of chronic disease (76%), married (63%), children (68%), employed $\geq 75\%$ (62%). <u>Bivariate:</u> Non-urgent presentations [compared to primary care patients]: Female (51% vs. 64%), presence of chronic disease (43% vs. 35%), ED patients more anxious ( $p = < 0.001$ ) and disturbed ( $p = < 0.017$ ) about their symptoms. ED patients presented more commonly with symptoms from the digestive system (23%, 95% CI 17-29), or the musculoskeletal system (20%, 95% CI 14-26), or due to trauma (19%, 95% CI 13-25). At primary care centres, patients had symptoms of from the respiratory system (47%, 95% CI 43-51), musculoskeletal system (13%, 95% CI 10-16), or from the genital or urinary tract (9%, 95% CI 7-12). Groups were similar regarding age distribution, highest level of education completed, country of birth, marital status, number of children, and proportions of employed, unemployed and disabled.	Case control	10
Berry et al	2008	USA	Qualitative	N = 31 ( $< 12$ years)	<b>Characteristics:</b> <u>Univariate:</u> Mean caregiver age 28 years (range 18-59), mean child age 3 years (range 1.5 months-11 years), female parent (73%), female child (53%), affiliation with a PC physician (97%), African-American (44%) or Latino (32%), public health insurance (68%), private health insurance (18%). Most common chief complaints were fever (26%), cold symptoms $\pm$ throat or ear pain (21%), rash (15%), minor trauma (12%), vomiting/diarrhoea (9%), fussiness (6%). <b>Influencing Factors:</b> <u>Thematic analysis:</u> Three categories; 1) problems with primary care provider [long appointment wait, dissatisfaction with the primary care provider, communication problems], 2) Referral to the ED by primary care physician or office staff, or a nurse phone service, and 3) Advantages of the ED [efficiency, resources, convenience, quality of care, EX expertise with children].	Qualitative	9
Bianco et al	2003	Italy	Cross-sectional	N = 541 ( $> 15$ years)  Non-urgent ED presentations (n = 106)  Urgent ED presentations (n = 435)	<b>Characteristics:</b> <u>Univariate:</u> Entire population: Mean age 50 years (range 15-98), female (51.8%), married (74.3%), highest number of education years, 8 years (30.6%), stated chronic illness (24.2%), attending Mon-Thurs (78.2%), arrival time 8.30am-2.00pm (59.9%), medically referred (15.9%), duration of presenting symptoms $\leq 1$ hour (15.9%), 1-24 hours (61.4%), $\geq 24$ hours (22.7%). <u>Bivariate:</u> Non-urgent presentations [compared to urgent presentations]: Age ( $\chi^2$ test for trend = 11.98, 1 df, $p = 0.0005$ ), female (22.1% vs. 77.9%, $\chi^2 = 2.4$ , 1 df, $p = 0.12$ ), stated chronic condition (14.5% vs. 85.5%, $\chi^2 = 2.84$ , 1 df, $p = 0.09$ ), marital status (18.2% vs. 81.7%, $\chi^2 = 2.04$ , 1 df, $p = 0.15$ ), medically referred (10.5% vs. 89.5%, $\chi^2 = 5.41$ , 1 df, $p = 0.02$ ), and with problems of longer duration ( $\chi^2 = 6.14$ , 2 df, $p = 0.046$ ). Patients receiving at least one investigation or a medical/surgical examination were much lower in non-urgent cases ( $\chi^2 = 7.79$ , 1 df, $p = 0.005$ ). Day of presentation not significant ( $p = 0.18$ ). <u>Multivariate:</u> Non-urgent presentations [compared to urgent presentations]: Younger age (odds ratio [OR] = 0.98, 95% CI 0.96-0.99, $p = < 0.001$ ), female (OR = 1.56, 95% CI 1.0-2.51), not referred by physician (OR = 2.42, 95% CI 1.13-5.16), longer duration of symptoms (OR = 1.78, 95% CI 1.23-2.58). No relationship to education ( $p = 0.052$ ), number of persons in household ( $p = 0.357$ ), distance from home to ED ( $p = 0.39$ ), chronic disease ( $p = 0.376$ ), or day of the week ( $p = 0.258$ ).	Cohort	11
Brim	2008	USA	Cross-sectional	N = 64 ( $> 18$ years)	<b>Characteristics:</b> <u>Univariate:</u> Mean age 36 years (range 18-76), female (63%), Caucasian (83%), some college education (43%), full-time employment (25%), annual income $< \$15,000$ (55%), insurance coverage (66%), routine source of care (70%) – 38% stated usual source of care was the ED, 53% attempted to make an primary care appointment; 60% could not get a timely appointment, 30% referred to the ED. <b>Influencing Factors:</b> <u>Univariate:</u> Too long a wait for an appointment (66%), no appointment available (69%), lack of medical insurance (43%).	Qualitative	7



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(Continued)

Reference	Year of Publication	Country	Study Design	Sample	Findings	CASP Tool	Score
Callen et al	2008	Australia	Cross-sectional	N = 215 (All ages)	<b>Influencing Factors:</b> <u>Univariate:</u> Unavailability of general practitioner (28.8%), referred to the ED by health professional (18.1%), a need for specialist services (13.5%), quality of care provided at the ED (8.8%), proximity (6.6%), no regular source of care (4.7%), second opinion (4.7%), and cost (2.5%).	Qualitative	8
Tsai et al	2010	Taiwan	Cross-sectional	N = 759 (All ages)  Non-urgent ED presentations (n = 395)  Urgent ED presentations (n = 364)	<b>Characteristics:</b> <u>Univariate:</u> <i>Entire population:</i> Male to female ratio was 1.12, mean age 37.4 years, 11.7% < 14 years. Presence of chronic disease (26.1%), Self-referred (92.0%), ambulance referred (6.5%), ambulatory care referred (1.5%). Moment of consultation 8.00-18.00 (47.7%), weekend presentation (33.6%). Travel time to the ED < 30 minutes (88.6%), < 15 minutes (54.2%). <u>Bivariate:</u> <i>Non-urgent presentations [compared to urgent presentations]:</i> Unmarried (61.4% vs. 38.6%), government employees (65.3% vs. 34.7%), have a chronic illness (45.5% vs. 54.5%), moment of consultation 8.00-18.00 (59.4% vs. 40.6%), weekend presentation (58.5% vs. 40.6%), travel time < 15 minutes (58.2% vs. 41.8%). <u>Multivariate:</u> <i>Non-urgent presentations [compared to urgent presentations]:</i> Unmarried (OR = 1.55, 95% CI 1.03-2.33), time of presentation between 8.00 and 18.00 hours (OR = 1.93, 95% CI 1.34-2.77), < 15 minutes travel time to ED (OR = 1.46, 95% CI 1.03-2.08) <b>Influencing Factors:</b> <u>Univariate:</u> <i>Entire population:</i> Appropriateness of visit (54.2%), previous medical records (35.6%), convenience of the ED (19.6%), referral by other medical facility/service (19.6%), perceived convenience for medical care (75.8%), perceived need for ED care (55.1%). <u>Bivariate:</u> <i>Non-urgent presentations [compared to urgent presentations]:</i> Chose the ED for its convenience (59.7% vs. 40.3%), self-perceived need for ED care (45.5% vs. 54.5%). <u>Multivariate:</u> <i>Non-urgent presentations [compared to urgent presentations]:</i> Chose the ED for its convenience (OR = 1.15 95% CI 0.75-1.77), self-perceived need for ED care (OR = 0.73, 95% CI 0.51-1.04). Both not significant.	Case control	11
De Vos et al	2007	Cuba	Cross-sectional	N = 4562 (All ages across two hospital sites) <i>Site one</i> (n = 2540)  Non-urgent ED presentations (n = 1462)  Urgent ED presentations (n = 1078)  <i>Site two</i> (n = 2022)  Non-urgent ED presentations (n = 1179)  Urgent ED presentations (n = 843)	<b>Characteristics:</b> <u>Univariate:</u> Site one: Mean age 39.9 years (standard deviation [S.D] 24.7), female (61.1%), medically referred (14.6%), non-urgent presentation (57.6%), moment of consultation 8am-4pm (59.4%), discharged home (38.4%), referred to primary care physician (34.2%). Site two: Mean age 35.4 years (S.D: 22.9), female (58.6%), medically referred (0.8%), non-urgent presentation (58.3%), moment of consultation 8am-4pm (44.3%), 5pm-7am (55.7%), discharged home (32.5%), referred to primary care physician (62.1%). <u>Bivariate:</u> <i>Non-urgent presentations [compared to urgent presentations]:</i> Site one: Female (61.8% vs. 60%), medically referred (7.8% vs. 25%), moment of consultation 8.am to 4.pm (62.5% vs. 55%). Site two: Female (58.5% vs. 58%), medically referred (0.6 vs. 1.0%), moment of consultation 8.am to 4.pm (49.7% vs. 36.8%). <u>Multivariate:</u> <i>Non-urgent presentations [compared to urgent presentations]:</i> Site one: Not referred (OR = 4.0, 95% CI 3.2-5.1), moment of consultation 8am-4pm (OR = 1.4, 95% CI 1.2-1.6), child (OR = 1.0, 95% CI 0.8-1.2), female (OR = 1.0, 95% CI 0.9-1.2). Site two: Not referred (OR = 1.8, 95% CI 0.7-4.9), moment of consultation 8am-4pm (OR = 1.7, 95% CI 1.4-2.0), child (OR = 1.1, 95% CI 0.9-1.4), female (OR = 1, 95% CI 0.8-1.2).	Case control	10

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Reference	Year of Publication	Country	Study Design	Sample	Findings	CASP Tool	Score
Howard et al	2005	USA	Qualitative	N = 31 (18-50 years)	<b>Characteristics:</b> <u>Univariate:</u> Mean age 34 years (range 22-43), some form of medical insurance (100%), usual source of care (100%), attempt made to contact their primary care provider prior to attending the ED (85%). <b>Influencing Factors:</b> <u>Content analysis:</u> Three themes; 1) 'People use the ED because they have been told to do so by staff in their primary care office', 2) 'People have difficulty gaining an appointment with their primary care provider in a timely manner', 3) 'Time played a factor in every response given by participants'; many patients felt that the ED provided faster, more convenient care.	Qualitative	7
Kennedy et al	2004	Canada	Cross-sectional	N = 92 (Infants ≤ 14 days)  Non-urgent ED presentations (n = 41)  Urgent ED presentations (n = 51)	<b>Characteristics:</b> <u>Univariate:</u> <i>Entire population:</i> Mean age 8 days (S.D = 3.4), mean weight 3.6 kg (SD 0.6), female (64%), non-urgent presentation (45%), admission (11%) <i>Mothers:</i> mean maternal age 27 years (S.D 5.8), vaginal delivery (76%), early discharge at < 48 hours (68%), primiparous (60%), married (66%), maternal education level high school or higher (55%), income > \$50,000 Canadian (34%). <u>Multivariate:</u> <i>Non-urgent presentations [compared to urgent presentations]:</i> Maternal age ≤ 25 years (Relative Risk [RR] = 2.09, 95% CI 1.29-3.39, <i>p</i> = 0.002), primiparous (RR = 2.6, 95% CI 1.33-5.22, <i>p</i> = 0.002).	Case control	8
Koziol-McLain et al	2000	USA	Qualitative	N = 30 (> 18 years)	<b>Characteristics:</b> <u>Univariate:</u> Mean age 31 years (range 17-60), female (73%), 33% from ethnic or racial minority groups, no primary care association (67%), self-perceived severity of illness rated as 3 (73%), rated satisfaction with the health care they received as 4 (83%). <b>Influencing Factors:</b> <u>Transcript analysis:</u> Five recurrent themes were identified; 1) Toughing it out, 2) Symptoms overwhelming self-care measures, 3) Calling a friend, 4) Nowhere else to go, 5) Convenience.	Qualitative	9
Lee et al	2000	Hong Kong	Case control	N = 2410 (All ages)  Non-urgent ED presentations (n = 1374)  Urgent ED presentations (n = 1036)  Matched cases (by morbidity): Non-urgent ED presentations (n = 726)  Controls: outpatient presentations (n = 726)	<b>Characteristics:</b> <u>Bivariate:</u> <i>Non-urgent ED presentations [compared to urgent ED presentations]:</i> female (58.4% vs. 41.6%, <i>p</i> = 0.2), aged 0-9 years (68.6% vs. 31.4%, <i>p</i> = < 0.01), and 10-19 years (68.6% vs. 31.4%, <i>p</i> = < 0.01), living within 5km of hospital (58.9% vs. 41.1%, <i>p</i> = < 0.01), secondary school or above education (74.9%), full time workers (62.4%), and residing in private accommodation (50.8%). <u>Bivariate:</u> <i>Matched cases [compared to controls]:</i> Higher proportion of cases living in private accommodation (26.0% vs. 22.9%, <i>p</i> = < 0.01), claimed to have a family doctor (17.2% vs. 39.1%, <i>p</i> = < 0.01), more educated (74.9% vs. 51%, <i>p</i> = < 0.01), skilled jobs (35.3% vs. 15%, <i>p</i> = < 0.01). <u>Multivariate:</u> <i>Matched cases [compared to control]:</i> Aged between 0-9 years (OR = 5.44, 95% CI 1.6-18.2), part-time worker or housewife (OR 0.38, 95% CI 0.19-0.78), skilled job (OR 0.4, 95% CI 0.16-0.96). <b>Influencing Factors:</b> <u>Bivariate:</u> <i>Matched cases [compared to controls]:</i> The main reasons for seeking non-urgent ED care were 1) perceived emergency status of disease (43.8% vs. 0.1%, <i>p</i> = < 0.05), feeling sick on public holidays or at night (28.9% vs. 0%, <i>p</i> = < 0.05), living in close proximity to the hospital (cases) or PC clinic (controls) (12.4% and 21.2% respectively, <i>p</i> = < 0.05), availability of proper diagnosis and efficient service at the time of day it was needed (11.4% vs. 2.9%, <i>p</i> = < 0.05). <u>Multivariate:</u> <i>Matched cases [compared to controls]:</i> Perceived emergency (OR = 557.6, 95% CI 50.8-6112), greater efficiency of diagnoses (OR = 66.0, 95% CI 2.7-15.9), closure of general practice clinic (OR = 9.1, 95% CI 1.96-42.2), and desperate need for help (OR = 8.3, 95% CI 1.6-41.7).	Case control	10

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(Continued)

Reference	Year of Publication	Country	Study Design	Sample	Findings	CASP Tool	Score
Lega & Mengoni	2008	Italy	Case control	N = 527 (All ages)  Non-urgent ED presentations: (n = 253)  Primary care patients (n = 274)	<b>Characteristics:</b> <u>Bivariate:</u> Non-urgent ED presentations [compared to primary care presentations]: Aged 25 years (20.6% vs. 9.5%, $\chi^2 = 19.139$ , $p = 0.0003$ ), female (48.4% vs. 63.5%, $\chi^2 = 8.804$ , $p = 0.003$ ), immigrants (13.2% vs. 2.1%, $\chi^2 = 19.116$ , $p = < 0.0000$ ), living between 5-31km from hospital (51.6% vs. 27.4%, $p = < 0.0000$ ), 'moderately' anxious (22.9% vs. 10.0%, $\chi^2 = 28.189$ , $p = < 0.0000$ ), with a 'very good' (15.5% vs. 11.6%) or 'moderate' (46.1% vs. 29.5%, $\chi^2 = 17.126$ , $p = 0.002$ ) perceived health condition, low-level education (25.8% vs. 8.4%, $\chi^2 = 33.849$ , $p = < 0.0000$ ), or a low-skill job ( $\chi^2 = 33.193$ , $p = 0.0002$ ). Marital status ( $p = 0.603$ ) and family situation ( $p = 0.660$ ) not significant. <b>Influencing Factors:</b> <u>Linear discriminant analysis:</u> Self-perceived immediacy, self perceived urgency, availability of diagnostic equipment and specialist consultants.	Case control	8
Northington et al	2005	USA	Cross sectional	N = 279 (> 18 years)	<b>Characteristics:</b> <u>Univariate:</u> Mean age 37.4 years (SD 14.9), female (48.8%), Caucasian (58.8%), primary care physician (56.3%), orthopaedic-based chief complaint (36.2%), insurance (68.5%). <b>Influencing Factors:</b> <u>Univariate:</u> Self-perceived urgency (73.6%), belief that they would receive better care (76.1%), nowhere else to go (65.6%).	Qualitative	8
Pereira et al	2001	Portugal	Cross sectional	N = 5818 (> 13 years)  Non-urgent ED presentations: (n = 1822)  Urgent ED presentations (n = 3997)	<b>Characteristics:</b> <u>Univariate:</u> Entire population: Mean age 43.2 years (S.D 19.9, range 13-99 years), female (51.4%), salaried work (49.2%), 'basic' education (49%), weekday ED visit (84.7%), arrival between 8am-midnight (90.4%), duration of complaint $\leq 24$ hours (52%). <u>Bivariate:</u> Non-urgent ED presentations [compared to primary care presentations]: Aged $\leq 60$ years (28.1% vs. 16.5%, $p = 0.001$ ), female (50.6% vs. 44.4%, $p = < 0.001$ ), salaried work (54.1% vs. 46.9%, $p = < 0.001$ ), more than basic level of education (34.6% vs. 28.7%, $p = < 0.001$ ), arrival between 8 am-midnight (94.6% vs. 88.2%, $p = < 0.001$ ), duration of complaint $\geq 24$ hours (58% vs. 29.6%, $p = < 0.001$ ), previous medical care for same complaint (34.6% vs. 24.6%, $p = < 0.001$ ), day of arrival not significant ( $p = 0.814$ ). <u>Multivariate:</u> Non-urgent presentations [females compared to males]. Female: strongest determinants for a non-urgent presentation: age $\leq 60$ years (OR = 1.7, 95% CI 1.0-2.9), duration of the complaint $\geq 24$ hours (OR = 2.7, 95% CI 2.1-3.7), and arrival at the ED between 8am-midnight (OR = 2.5, 95% CI 1.4-5.4), wage earning (OR = 1.7, 95% CI 1.0-2.7). Male: Strongest determinants for a non-urgent presentation: Age $\leq 60$ years (OR 2.3, 95% CI 1.5-3.9 vs. OR 1.7 95% CI 1.0-2.9) and duration of complaint $\geq 24$ hours (OR 4.0, 95% CI 2.9-5.3).	Cohort	10
Pileggi et al	2006	Italy	Cross sectional	N = 980 (< 16 years)  Non-urgent ED presentations (n = 271)  Urgent ED presentations (n = 709)	<b>Characteristics:</b> <u>Univariate:</u> Entire population: Mean age 6.7 years (range 1 month-16 years), weekend presentation (67.1%), between 8am-5pm (47.5%), medically referred (7.7%), duration of complaint 1-23 hours (47.3%), for traumatic injury (51.5%). <u>Bivariate:</u> Non-urgent ED presentations [compared to urgent ED presentations]: Female (33.4% vs. 66.6%, $\chi^2 = 11.69$ , 1 df, $p = 0.001$ ), younger age ( $t$ -test = 7.86, 978 df, $p = < 0.0001$ ), medical referral (22.7 vs. 77.3, $\chi^2 = 0.96$ , 1 df, $p = 0.32$ ), attending the ED late evening or in the early morning ( $\chi^2 = 8.52$ , 2 df, $p = 0.01$ ), in the weekend (31.7% vs. 68.3%, $\chi^2 = 4.09$ , 1 df, $p = < 0.04$ ), traumatic injury (7.5% vs. 92.5%, $\chi^2 = 209.34$ , 1 df, $p = < 0.0001$ ), duration of problems $\geq 24$ hours (49.5% vs. 50.5%, $\chi^2 = 92.61$ , 2 df, $p = < 0.0001$ ), requiring hospital admission (5.3% vs. 94.7%, $\chi^2 = 44.28$ , 1 df, $p = < 0.0001$ ). <u>Multivariate:</u> Non-urgent ED presentations [compared to urgent ED presentations]: Younger in age (OR = 0.88, 95% CI 0.85-0.91), female (OR = 1.71, 95% CI 1.26-2.32), those attending on weekends (OR = 0.71, 95% CI 0.52-0.97), no medical or surgical examination (OR = 0.33, 95% CI 0.23-0.48), did not require inpatient hospital admission (OR = 19.15, 95% CI 8.07-45.43), non-traumatic injuries (OR = 0.12, 95% CI 1.04-1.96).	Cohort	9

## Appendix A (Continued)

Reference	Year of Publication	Country	Study Design	Sample	Findings	CASP Tool	Score
Pomerantz et al	2002	USA	Cohort	N = 2137 (Full-term newborns)	<b>Characteristics:</b> <u>Univariate:</u> Entire population: Mean maternal age 41.5 years, white race (48.4%), primiparous (36.6%), ≤ prenatal visits (5.8%), Medicaid insurance (71.1%), birth weight (3233.5 grams), gestational age (38.7 weeks). <u>Bivariate:</u> Non-urgent ED presentations [compared to urgent ED presentations]: Mean maternal age (21.9 years, 95% CI 21.3-22.5 vs. 24.5 years, 95% CI 24.2-24.8), white race (35.0%, 95% CI 29.9-40.2 vs. 51.7%, 95% CI 49.4-54.1), primiparous (42.1%, 95% CI 36.7-47.4 vs. 36.9%, 95% CI 34.6-39.2), ≤ 2 prenatal visits (6.34%, 95% CI 3.72-8.97 vs. 5.70%, 95% CI 4.60-6.81), birth weight in grams (3212.8 grams, 95% CI 3164.4-3261.2 vs. 3239.6 grams, 95% CI 3217.0-3262.2), gestational age (38.7 weeks, 95% CI 38.5-38.8 vs. 38.8 weeks, 95% CI 38.7-38.8), Medicaid insurance (80.7%, 95% CI 76.4-84.9 vs. 68.4%, 95% CI 66.2-70.6). <u>Multivariate:</u> Non-urgent ED presentations [compared to urgent ED presentations]: < 20 years old (OR = 3.30, 95% CI 2.28-4.78), white race (OR = 0.614, 95% CI 0.485-0.777), Medicaid insurance (OR = 1.55, 95% CI 1.15-2.08).	Cohort	12
Rassin et al	2005	Israel	Cross sectional	N = 73 (> 18 years)	<b>Characteristics:</b> <u>Univariate:</u> Female (40%), age 18-29 years (38.3%), married (57.5%), one child or more (65.7%), high-school education (56.1%), “good” economic state (56%), clinical diagnosis of orthopaedic contusion (40%), duration of symptoms 3-24 hours (61%). <b>Influencing Factors:</b> <u>Univariate:</u> Proximity to the ED (47.7%), higher quality care at the ED compared to community clinic (62.8%), self perceived urgent (77%). <b>Factor analysis:</b> Relative recommendation ( $\beta = 0.333$ , $p = 0.012$ ).	Qualitative	7
Redstone et al	2008	USA	Case control	N = 240 (> 18 years)	<b>Characteristics:</b> <u>Bivariate:</u> Cases compared to controls: Mean age (44 years vs. 46 years), female (62% vs. 71%), married (40% vs. 36%), White race (61.7% vs. 61.7%), employed (53% vs. 38%), insured (86% vs. 88%), saw primary care physician in past year (88% vs. 96%). All differences are not significant. Called primary care provider before presenting (55% vs. 30%, $p = < 0.001$ ), primary care office open (75% vs. 1.7%, $p = < 0.001$ ), able to get appointment with primary care physician (77% vs. 91%, $p = < 0.01$ ). <b>Reasons for seeking non-urgent ED care:</b> <u>Bivariate:</u> Cases compared to controls: Problem too complex for primary care provider (45% vs. 28%, $p = < 0.05$ ), advised to present to the ED (49% vs. 91%, $p = < 0.05$ ), close proximity to the ED (39% vs. 20%, $p = < 0.05$ ).	Case control	8
Selasawati et al	2007	Malaysia	Case control	N = 340 (> 16 years)	<b>Characteristics:</b> <u>Bivariate:</u> Cases compared to matched controls: Female (42.9% vs. 72.9%, $\chi^2 = 31.39$ , $p = < 0.001$ ), mean age (36.7 vs. 40.2, $t$ -test = -2.29, $p = 0.023$ ), divorcee/widower (7.6% vs. 2.4%, $\chi^2 = 9.18$ , $p = 0.010$ ), shift worker (22.9% vs. 11.8%, $\chi^2 = 8.09$ , $p = 0.070$ ), university education (22.4% vs. 18.2%, $\chi^2 = 19.18$ , $p = < 0.001$ ), mean family size (5.1 vs. 5.8, $t$ -test = -3.39, $p = 0.001$ ), mean duration of illness before seeking care (48 hours vs. 48 hours, $t$ -test = 1.51, $p = 0.132$ ), mean duration to ED/outpatients (22.7 minutes vs. 24.9 minutes, $t$ -test = -1.09, $p = 0.274$ ), mean knowledge score on ED roles and functions; possible minimum = 0, maximum = 6, (3.1 vs. 4.1, $t$ -test = -6.84, $p = < 0.001$ ), mean knowledge score on outpatient department roles and functions; possible minimum = 0, maximum = 6, (5.6 vs. 6.2, $t$ -test = -5.09, $p = < 0.001$ ). <u>Multivariate:</u> Cases compared to controls: Male (OR = 2.83, 95% CI 2.68-4.75, $p = < 0.001$ ), divorcee/widower (OR = 3.44, 95% CI 1.10-10.76, $p = 0.034$ ), family size ≥ 5 (OR = 0.56, 95% CI 0.36-0.89, $p = 0.013$ ), shift worker (OR = 2.23, 95% CI, 1.24-4.02, $p = 0.007$ ), knowledge score ≥ 6 on the roles and functions of ED (OR = 0.56, 95% CI 0.43-0.74, $p = < 0.001$ ), knowledge score ≥ 7 on the roles and functions of outpatients (OR = 0.75, 95% CI 0.55-1.11, $p = < 0.001$ ). <b>Influencing Factors:</b> <u>Univariate:</u> Cases: Severity of illness (85%), cant attend the outpatients during office hours (42%), close proximity to the ED (27%), better treatment at the ED (26%), staff of family member referral (17%), no other place to go (15%), financial problem (8.8%). <u>Multivariate:</u> Cases: Perceived severity of illness (OR = 9.13, 95% CI 3.82-13.98, $p = < 0.001$ ), knowledge score for the roles and functions of ED ≥ 6 (OR = 0.65, 95% CI 0.50-0.85, $p = < 0.001$ ).	Case control	10

## Appendix A

(Continued)

Reference	Year of Publication	Country	Study Design	Sample	Findings	CASP Tool	Score
Sharma et al	2000	USA	Cohort	N = 70,043 (Infants born in 1996 calendar year)  Non-urgent ED presentation (n = 8,443)  Urgent ED presentation (n = 20,639)	<b>Characteristics:</b> <u>Univariate:</u> Entire population: Female (49%), white race (83%), black race (15%), normal birth weight (92%), major metro residence (57%), birth defects present (5%), insurance (95%), 1-2 day stay in nursery (77%), 3-4 day stay in nursery (16%), 5-7 day length of stay (3%), no ED visits (59%), 1 ED visit (21%), 2 or more ED visits (20%), 1 or more non-urgent ED visit (12%). <u>Multivariate:</u> Non-urgent ED presentations [compared to urgent ED presentations]: Medicaid insurance at birth (Incidence rate ratio [RR] = 4.09, 95% CI 3.89-4.30, $p < 0.001$ ), black race (Incidence RR = 1.60, 95% CI 1.51-1.70, $p < 0.001$ ), non-metro residence (Incidence RR = 1.50, 95% CI 1.43-1.58, $p < 0.001$ ), presence of birth defects (Incidence RR = 1.24, 95% CI 1.13-1.37, $p < 0.001$ ), 3-4 day stay in nursery (Incidence RR = 1.09, 95% CI 1.03-1.16, $p = 0.004$ ), 5-7 day length of stay (Incidence RR = 1.21, 95% CI 1.08-1.36, $p = 0.001$ ).	Cohort	11
Siminski et al	2005	Australia	Cross-sectional	N = 397 (All ages)	<b>Influencing Factors:</b> <u>Univariate:</u> Self-perceived urgency and immediacy (80%), convenience [ability to get all tests done in one location] (74%), health problem that is too complex or serious to see a general practitioner (91%), unavailability of general practitioner (8%). Presenting complaint injury (48%) or illness (37%)	Qualitative	7
Stanley et al	2007	USA	Cross-sectional	N = 422 (6 months – 18 years)  Non-urgent ED presentations with Medicaid insurance (n = 214)  Non-urgent ED presentations with private insurance (n = 183)	<b>Characteristics:</b> <u>Univariate:</u> Entire population: Female (50%), age 6 months-2 years (30%), 6-17 years (51%), no chronic condition (75%), white race (52%), black race (39%), insured [privately or Medicaid] (94%), presenting during weekday business hours (40%), evening or weekend hours (60%). <u>Bivariate:</u> Medicaid insured [compared to privately insured]: Female (54% vs. 44%), black race (46% vs. 33%, $p < 0.05$ ), white race (45% vs. 57%, $p < 0.05$ ), age 6 months-2 years (34% vs. 25%), 3-5 years (20% vs. 20%), 6-17 years (46% vs. 55%), no chronic condition (75% vs. 75%), regular primary care site (89% vs. 92%), ED named as usual source of care (29% vs. 16%, $p < 0.05$ ), previous ED visit (83% vs. 67%, $p < 0.05$ ), 3+ ED visit in past year (33% vs. 16%, $p < 0.05$ ). <b>Reasons for seeking non-urgent ED care:</b> <u>Univariate:</u> Entire population: Reassurance (41%), parent felt it was an emergency (33%), advised by child's primary care site to present to the ED (13%), timely primary care appointment not available (5%). <u>Bivariate:</u> Medicaid insured [compared to privately insured]: Reassurance (22% vs. 51%), parent felt it was an emergency (58% vs. 20%), advised by child's primary care site to present to the ED (16% vs. 11%), timely primary care appointment not available (< 1% vs. 7%).	Case control	9
Williams et al	2009	Australia	Cross-sectional	N = 355 (‘Children’ – specific age not specified)	<b>Characteristics:</b> <u>Univariate:</u> Female carer (87%), female child (48%), mean child age 5.5 years (S.D 4.4), female carer aged between 30-39 years (51%), mothers with postsecondary education (47%), no private health insurance for child (61%), residing in least disadvantaged area (70%), child living with two natural parents (71%), treatment of illness (n = 60%). <b>Influencing Factors:</b> <u>Univariate:</u> Perceived severity of child's illness (60%), expertise of ED doctors (24%), belief that child would end up in hospital anyway (14%), hospital viewed as ‘one stop shop’ [availability of diagnostic resources] (18%).	Qualitative	7
Zimmer et al	2005	USA	Cohort	N = 75,529 (0-18 years)  Non-urgent ED presentations in 1999 (n = 13,141)  Non-urgent ED presentations in 2000 (n = 14,229) Non-urgent ED presentations in 2001 (n = 12,550)	<b>Characteristics:</b> <u>Multivariate:</u> Non-urgent ED presentations [compared to urgent ED presentations]: Years 1999-2001: Children aged 1-4 years (33.0%, $p < 0.001$ ), Male: female ratio (51.0% vs. 49.0%, $p < 0.001$ ), black race using ED exclusively for non-urgent care (76%), walking to the ED more common among patients exclusively using the ED for non-urgent care (9.3%, $p < 0.001$ ), living within ≤ 4 miles of hospital (57.7%), greatest volume of non-urgent visits occurred on Saturdays (14.8%, 14.9%, 14.2%) and Tuesdays (14.2%, 14.6%, 15.0%), between the hours of 3 pm and 11 pm (53.1% all visits).	Cohort	9

## Appendix B

### *Auckland University of Technology Ethics Committee Approval*



## MEMORANDUM

### Auckland University of Technology Ethics Committee (AUTEC)

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To: Jane Koziol-McLain  
From: **Charles Grinter** Ethics Coordinator  
Date: 23 August 2010  
Subject: Ethics Application Number 10/185 **Characteristics of the non-urgent Emergency Department presentation.**

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Dear Jane

I am pleased to advise that the Auckland University of Technology Ethics Committee (AUTEC) approved your ethics application at their meeting on 9 August 2010. Your application is now approved for a period of three years until 23 August 2013.

I advise that as part of the ethics approval process, you are required to submit to AUTEC the following:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 23 August 2013;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. This report is to be submitted either when the approval expires on 23 August 2013 or on completion of the project, whichever comes sooner;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are reminded that, as applicant, you are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

Please note that AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to make the arrangements necessary to obtain this. Also, if your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply within that jurisdiction.

When communicating with us about this application, we ask that you use the application number and study title to enable us to provide you with prompt service. Should you have any further enquiries regarding this matter, you are welcome to contact me, by email at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz) or by telephone on 921 9999 at extension 8860.

On behalf of the AUTEC and myself, I wish you success with your research and look forward to reading about it in your reports.

On behalf of Madeline Banda, Executive Secretary  
**Auckland University of Technology Ethics Committee**

Cc: Rachel Mattock [rachel.mattock@gmail.com](mailto:rachel.mattock@gmail.com)