Substance Related Presentations to the Emergency Department in Winnipeg

from January 1/2011 until December 31/2013.

by

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ABSTRACT

The distorted illusion that drinking alcohol in excess and/or using drugs is fun, sexy, and accepted as the 'thing to do' has unfortunately become mainstream. The health effects associated with substance use and abuse in Canada have direct implications on health service utilization, especially when emergent services are required. The prevalence of substance related ED visits in Winnipeg have never been reported, so it was not known if the prevalence of such presentations in Winnipeg were consistent with those rates in other developed nations.

The overall aim of this study was to explore, using retrospective secondary analysis methodology and being guided by the Circle of Frequency, what the prevalence, patient profiles, and visit characteristics of substance-related ED presentations in Winnipeg from January 1, 2011-December 31, 2013. 14,255 substance-related ED visits were identified during this study time, accounting for 2.1% of the overall ED visits. Following frequency analysis, young-adult, unmarried men were identified as the ones most likely to arrive to the ED in Winnipeg with substance-related care needs arriving during inopportune times (on weekends and during the night when staffing levels and support are less), via ambulance, with acute CTAS scores secondary to substance misuse/intoxication, however not requiring admission. The significance of such presentations to the ED in Winnipeg has direct and indirect clinical implications which impacts clinical nursing practice, education, research, and patient care. Strategies to better identify and treat such care needs in the ED are evident and paramount to ensure best practice is provided, and optimal care is achieved.

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CHAPTER 1: INTRODUCTION

1.1. The Problem

The distorted illusion that drinking alcohol in excess and/or using drugs is fun, sexy, and accepted as the 'thing to do' has unfortunately become mainstream. We see the images of intoxicated leaders and role models displayed in the media, glamorizing their 'trips and highs' through lyrics of popular music, reported in magazines, newspapers, on TV shows, and in movies. As a society, have we become numb to the catastrophic effects and consequences that are a direct result of substance misuse? Are we not concerned that unfiltered and uncontrolled information regarding how to use, make, and sell illegal drugs is readily accessible to everyone via the internet, making this dangerous practice appear trendy, accepted, and without consequence?

Pictures of men and women, both young and old, are displayed throughout the internet, making light of this substance related global epidemic which is affecting our nation. It is not uncommon to view pictures of people who are "passed out drunk", so "high" they are unresponsive and without inhibition, with frivolous comments attached to these photos which are circulated via social media. However, what is not advertised in the media or on these social networks are the images and messages regarding those individuals whose 'drunken stupors' or 'drug induced highs' have resulted in the need for emergent care, and subsequently causing permanent cardiac anomalies, brain injury, coma, or even death. The images and stories related to the factual outcomes that are a direct result of substance use 'gone wrong' is not fun, sexy, nor is it what was intended by the individual; however what it is…is reality. This is the unfortunate reality that health care professionals who work in the Emergency Departments (ED) throughout Winnipeg experience daily. It is the ED professionals who care for these individuals and heart

broken families time and time again. It is the ED professionals who are left to clean up the emesis, feces, and urine which saturate these individuals while they thrash out, hitting, screaming, and swearing at these dedicated professionals. It is the ED professionals who are at the bedside, caring for these individuals, monitoring and treating their every symptom 24/7 in hopes that they make a full recovery. It is the ED professionals that continue to come to work every day, with dedication and optimistic, eager to make a difference in these patients' and their families lives.

1.2. Background on Substance Use

The use of alcohol and drugs to obtain an altered sense of reality has been practiced by mankind, worldwide, for thousands of years. Our Native American ancestors used such substances to achieve body and mind altering effects while on spiritual quests, and during religious ceremonies and traditions. Over the years, these once naturally occurring substances have become more dangerous, to the point of being 'lethal' given the fabricated composition, toxic ingredients, and routes to administer the black-market drugs of the 21st century. In Canada, the regular misuse of alcohol, licit, and illicit drugs has resulted in direct health and safety risks to individuals. The morbidity, mortality, and criminalization associated with alcohol, licit and illicit drug use in Canada continues to rise, resulting in a direct societal, cultural, and financial impact in Winnipeg (Butler-Jones, 2012; Statistics Canada, 2012).

1.3. Study Rationale

Alcohol along with tobacco use has been identified as one of the leading causes of preventable death and disability worldwide (Babor et al. 2010). The incidence of substance use in Canada has been increasing over the years, with 77% of individuals 15 years and older admitting to either alcohol or illicit drug use in the past year (Butler-Jones, 2012). The majority

of individuals who use alcohol, licit, or illicit drugs do so in moderation, and thus their use is in a controlled, safe, and appropriate manner (Health Canada, 2013). The short and long-term health effects associated with substance use and abuse in Canada have direct implications on health service utilization, especially when emergent services are required.

In 2013, there were over 221,000 visits reported to the ED in Winnipeg. The prevalence of ED visits identified as substance-related have never been reported for Winnipeg; however based on a pilot project conducted by the researcher, 4217 visits were identified as substance-related from October 1, 2012 until September 30, 2013 (pilot project, 2013). According to Addictions Foundation of Manitoba (2013), there is a growing need for addictions treatment services, with over 15, 000 admissions for either residential or community based addictions treatment in 2013. Given the incidence of substance related ED visits in Winnipeg plus the significant use of treatment programs for addictions, shows that substance use and abuse in Winnipeg is an emerging problem. Understanding that research is the foundation for providing optimal patient care in the ED, and is an expectation of the Emergency Nursing Association, therefore supports the need for conducting this research project (DeVon et al., 2013).

1.4. Conceptual Theory

Based on personal experience working in the ED, plus having a rich understanding of the theoretical knowledge regarding substance-related presentations in the ED, the Circle of Frequency is a model which was developed by the author to illustrate how individuals who misuse substances become frequent ED users. The Circle of Frequency is the conceptual theory which will be used to guide this study (see Figure 1).

Figure 1: Circle of frequency
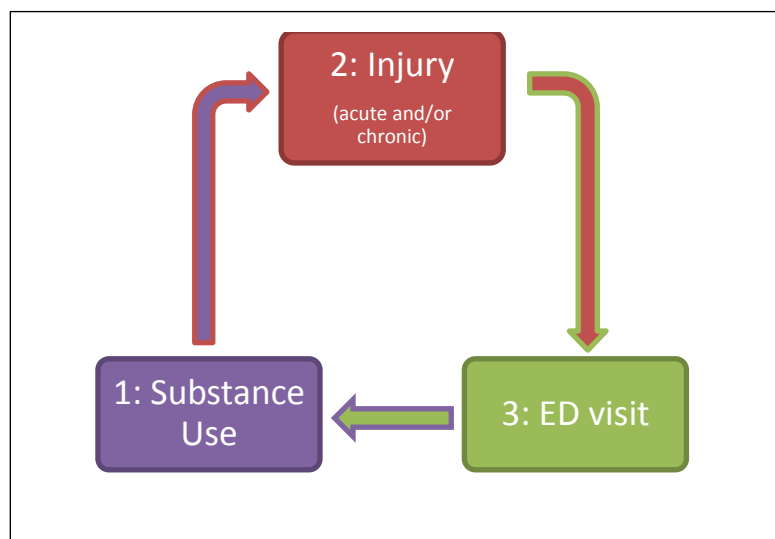
The circle of frequency is a three phase model. Phase one begins when an individual uses ETOH (alcohol), licit and/or illicit drugs. Given that substance users are at an increased risk for acute injury or trauma, and/or chronic morbidities secondary to substance use (McCabe, 2006), these individuals are more likely to progress to the second phase of the model: the injury phase. Traumatic injuries, whether intentional or unintentional, occur more often and more severely in those who are under the influence (Cherpitel & Ye, 2009; McCabe, 2006); therefore these individuals are more likely to require emergent care, thereby advancing to the third phase of the model: the ED visit. Without intervention, this cycle continues over time, resulting in continued substance use (phase one), which then results in the development of more acute and/or chronic injuries (phase two), and thus recurrent ED visits (phase three) (Roberts, 2010).

The variables which guide this study can easily be incorporated into each phase of The Circle of Frequency. *Phase one* of The Circle of Frequency occurs when the individual consumes ETOH and/or uses licit or illicit drugs, which for this study will be captured by assessing the patient profiles of those individuals who are identified as substance users. Although not all individuals who present to the ED for substance related presentations are captured at

triage, the patient demographics of those individuals who are identified will assist to answer questions regarding "who" this patient population is. *Phase two* of The Circle of Frequency occurs when those individuals who are under the influence are also suffering from a traumatic injury or associated medical emergency, which for this study will portray the individuals visit characteristics describing "when", "where", "how", and "why" these ED visits occurred. *Phase three* of The Circle of Frequency occurs when those individuals who are under the influence require emergent medical attention and therefore attend an ED, which for this study will be captured by assessing the prevalence of those individuals who have attended one of the seven EDs in Winnipeg with substance related care needs. The three variables which guide this study are comparable to the three phases identified by The Circle of Frequency.

1.5. Significance of the Study

The results of this study will be used for the following: 1) to be used as baseline data to describe the present incidence of substance related presentations in Winnipeg EDs; 2) to acknowledge the diversity of such presentations regarding those individuals who attend any one of the seven EDs in Winnipeg; 3) to plan for the availability of adequate services (for staff and patients) during peak presentation times overall and site dependent; 4) to inspire and encourage future research to be done on this topic. Using the data in these four ways will inform the management, care, and service availability to this patient population; which ultimately will lead to the promotion and management of optimal evidence-based nursing practice.

1.6. Research Questions

The objective of conducting this retrospective data-analysis study is to identify the prevalence, patient profiles, and visit characteristics of those individuals who have presented to one of the six EDs in Winnipeg with substance related health needs. The purpose of this

approach is to identify the incidence and characteristics of those individuals who were detected

at triage with primary substance related health needs, and to determine if these findings are

consistent with data from other Canadian and International studies. These findings will provide a

framework from which best practice strategies can be developed, implemented, and guided by

evidence informed nursing practice. The research questions generated by the investigator, which

are to be answered through conducting this study include:

1. What is the *prevalence* of individuals who present to an ED in Winnipeg, Manitoba with

    substance-related health needs from January 1 of 2011 to December 31 of 2013?

2. What are the *patient profiles* of those individuals who present to an ED in Winnipeg,

    Manitoba with substance-related health needs from January 1 of 2011 to December 31 of

    2013?

3. What are the *visit characteristics* of those individuals who present to an ED in Winnipeg,

    Manitoba with substance-related health needs from January 1 of 2011 to December of

    2013?

4. What are the statistical relationships amongst the *prevalence*, *patient profiles*, and *visit

    characteristics* for those individuals who present to an ED in Winnipeg, Manitoba with

    substance-related health needs from January 1 of 2011 to December 31 of 2013?

1.7. Basic Assumptions of this Study

The data utilized in this analysis came from one structured data-set; however the

information that was analyzed was collected from six tertiary and community hospital EDs in

Winnipeg. Given the diversity of each ED in Winnipeg, this study was based on the following

assumptions:

1. Triage nurses do not complete homogenous patient assessments, even though they are guided by the same computerized triage program. The questions asked by the triage nurse are influenced by extraneous variables (their prior knowledge, prior triage experience, comfort level with asking patients about substance use/misuse/abuse, history with caring for patients with substance related care needs, etc.).

2. The education level and experience of each triage nurse in not uniform, even though it is mandatory that all triage nurses in Winnipeg take the Winnipeg Regional Health Authority triage course, plus attend an annual refresher course.

3. The operational settings of each ED in Winnipeg vary significantly and are dependent on the following: acuity level, time restraints, instability, uncertainty, and unpredictable nature of the ED.

4. Each ED offers diverse departmental services (e.g. Psychiatric Emergency Nurse (PEN), Psychologist, or Social Work), plus they vary dependent on their in-house specialized departments (e.g. Psychiatric Unit or Medical Withdrawal Unit) or geographical proximity to other resources in Winnipeg (e.g. Crisis Response Centre or Main Street Project).

1.8. Study Limitations

The limitations included the following:

1. The information pertaining to the ED visits that are identified to be substance-related may be incomplete and thus result in an underrepresentation of the true significance of this problem in Winnipeg. This number is dependent on many factors including:

     a.   If the triage nurse asked any questions regarding the use of any substances before, during, or after the event which has caused the individual to come to the ED, this visit would be captured.

     b.   If the triage nurse identified in EDIS that the individuals visit reason, complaint category, or chief complaint was a result of substance use, this visit would be captured.

2. Individuals identified as presenting to the ED for substance-related health needs could be misrepresented at triage; however this could only be controlled by conducting a full chart review to find supportive data (i.e. blood tests, documented patient statements, nurses' assessments/notes, physicians' assessments/notes, or post-visit interviews) which is beyond the scope of this study.

3. Given that this study uses a retrospective data-analysis design, important data could potentially be missed because of incomplete medical records; therefore these findings will not be generalizable.

4. Given that this study looked at EDIS data from only the six EDs in Winnipeg, means that this study will lack external validity and not be representative of the prevalence, patient profiles, and/or visit characteristics of substance-related presentations outside of the WRHA (Winnipeg Regional Health Authority).

1.9. Operational Definitions

Emergency: is defined as any urgent condition defined by the patient that requires immediate medical evaluation or treatment: maybe an acute or chronic condition (Taber's Cyclopaedic Medical Dictionary, 1997).

Emergency Department: is defined as the portion of the hospital that treats patients experiencing an emergency. Similar terms that are often used interchangeably in the literature include, but are not limited to: accident and emergency department, trauma center, emergency room (ER), and emergency department (ED) (Taber's Cyclopaedic Medical Dictionary, 1997). ED is the term which will be used consistently throughout this paper.

Emergency department information system (EDIS): Is an electronic patient information system that is used in all ED's in Winnipeg. This system automates such functions as e-triage, patient tracking, orders/results, documentation, and discharge disposition. Information is entered into EDIS when the following events occur: 1) patient presents to the ED, 2) they are registered by medical records, 3) and then triaged; this is the beginning of the patient tracking process. To make this data usable, EDIS data is extracted via COGNOS (a decision support tool), and then reorganized into Excel for analysis purposes.

Injury: Is defined as 'trauma or damage to some part of the body' which may include external, internal, physical and/or psychological injuries. Symptoms vary depending on the nature, extent, and severity of the injury (Taber's Cyclopaedic Medical Dictionary, 1997).

Substance: Is defined as a chemical with potential for abuse; which may include alcohol, licit drugs (nicotine, caffeine, and prescribed sedatives and hypnotics), and illicit drugs (cannabis, heroin, cocaine, and an array of other street drugs). Almost any substance may be abused, even though its clinical use is approved when used as prescribed (Taber's Cyclopaedic Medical Dictionary, 1997).

Use: to consume or expend something; often until nothing is left (Taber's Cyclopaedic Medical Dictionary, 1997).

Substance use: Is used in discussing issues pertaining to patterns of alcohol, licit, and/or illicit drug use associated with trauma (McCabe, 2006). Similar concepts that are used interchangeably in the literature and throughout this thesis are: substance abuse, substance misuse, substance dependence, or substance-use disorder. Some associated terms include, but are not limited to: alcoholic, addict, or intoxicated. To maintain consistency, substance use and misuse are the terms which will be used consistently throughout this paper.

Substance misuse: The use of a mood- or behaviour-altering substance in a maladaptive manner that often compromises health, safety, and social and occupational functioning and causes legal problems (Lilley, Harrington, & Snyder, 2011).

Triage Nurse: The ED nurse who performs the initial brief history, rapid physical assessment including vital signs, and provides emergent first aid (when necessary), which determines the severity of the individual's illness. Once the patient is triaged, they are reassessed frequently (dependent on acuity) while in the waiting room, until such time that they are transferred to the appropriate place of care.

CHAPTER 2: LITERATURE REVIEW

The purpose of this study is to identify the prevalence, patient profiles, and visit characteristics of substance-related presentations to the ED in Winnipeg. This literature review focuses primarily on nursing research; however pertinent literature from other medically related disciplines is included. This review is focused on examining the existing literature regarding the prevalence of such presentations to the ED, an analysis of the identified patient profiles of those who presented to the ED with substance related presentations, and an examination of the visit characteristics of the substance-related presentations to the ED.

2.1. Search Strategy

With advice and guidance from a professional Librarian, and an expert researcher, searches using the PubMed and CINAHL databases were conducted using four key concepts: "emergency department", "substance abuse", "screening", and "demographics/numbers" (Appendix A). The search in both databases using all four key concepts yielded a total of 1749 sources. The sources included journal publications, conference/general meeting proceedings, letters to the editor, and theses. Credited sources were from health care, epidemiology, and information sciences. Given the number of sources identified, the searches were limited to include only those articles published in English within the past 10 years (from 2003-present), thereby yielding 1068 articles. Records from each database were exported into a PubMed account and duplicate articles were excluded. All sources were viewed in Abstract form, and each source was hand selected based on relevancy to the topic, yielding 83 articles. Each article was read thoroughly and the total number of pertinent articles was reduced and separated into themes. The two themes emerged from the readings and include: 1) the prevalence of substance use presentations to the ED, and 2) the use of screening and brief intervention in the ED. Given

that the aim of this paper was to identify the prevalence of substance related presentations in the

ED, only those articles meeting this criterion were included, thus yielding 52 articles. Following

an extensive analysis of each article, 12 more articles were removed, thus yielding 40 articles

(Appendix B). All articles were thoroughly reviewed, and data saturation was achieved as no

new evidence or themes were emerging (Melnyk & Fineout-Overholt, 2011). The articles

selected in this review comprise of studies that were conducted in nine countries including:

Canada, USA, Australia, the UK, Germany, Belgium, Brazil, Netherlands, Switzerland, with one

article using data from seven countries (including the USA) and another utilizing data from 17

countries.

Thematic Synthesis

After separating articles into two theme groups, and then reading and analysing all

relevant sources from theme group one, the author began to see the emergence of new themes.

This process is identified in the literature as thematic synthesis. Thematic synthesis coincides

with the conceptualisation of thematic analysis, using different methodologies in order to

formalise the identification and development of themes (Thomas & Harden, 2008). A

spreadsheet using Microsoft Excel 2007 was developed and a structured review of each article

was conducted (Table 3). Through a constant compare and contrast approach, the emergence of

three themes was identified (1-prevalence, 2-patient profiles, and 3-visit characteristics), and thus

will be discussed in depth throughout this chapter.

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2.2. Prevalence of Substance Related ED Presentations

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The total cost of substance abuse in Canada in 2002 was estimated at $39.8 billion or

$1,267 per Canadian (Canadian Centre on Substance Abuse, 2013). However, the prevalence of

substance related ED presentations are difficult to quantify, as this number is often dependent on

diverse extraneous variables which are specific to the research studies. The prevalence of such

visits to the ED range anywhere from 3%-60% of patients seen, either as their primary,

secondary, or associated complaint (Baune et al., 2005; Boniatti et al., 2009; Cherpitel & Ye,

2008b; McCabe, 2006; Peterson, Desmond, & Cunningham, 2010). The variation in prevalence

is evident and vastly dependent on the investigated substance(s), along with the diverse

methodologies which were utilized in the various studies (Brubacher et al., 2008; Cherpitel, Ye,

2008b; Roche, Freeman, & Skinner, 2006; Vitale et al., 2006).

Prevalence Based on Substance Use

The overall prevalence of ED visits for alcohol, drugs, or both substances varied within

the 40 sources included in this review. Of the 20 articles which investigated the prevalence of

individuals who attended the ED with alcohol specific needs, the incidence ranged from 1%-

32.4%, averaging 11.3% of the total ED visits (Baune et al., 2005; Boniatti et al., 2009; Browne

et al., 2013; Cherpitel & Ye, 2009; Elder et al., 2004; Flynn et al., 2006; Havard et al, 2011;

Heise, 2010; Hoskins & Benger, 2013; Indig, Copeland, & Conigrave, 2009; Indig et al., 2010;

Johnson, 2009; MacLeod & Hungerford, 2011; Merrick et al., 2011; Muscatello et al., 2009;

Peterson, Desmond, & Cunningham, 2010; Roche, Freeman, & Skinner, 2006; Roudsari,

Caetano, & Field, 2011; Verelst et al., 2012; Vitale et al., 2005). The two articles which

investigated the prevalence of individuals presenting with drug related needs only resulted in

3.9%- 60% of the total ED visits (Binks et al., 2005; Kerr et al., 2005). However, of the 18

articles which investigated the prevalence of individuals presenting to the ED with drug and

alcohol related needs were identified in 2%- 55% of the total ED visits (Blank et al., 2005; Blow

et al., 2011; Brubacher et al., 2008; Cherpitel & Ye, 2012; Cherpitel & Ye, 2008b; Dent, Hunter

& Webster, 2010; Fleming et al., 2007; Geurts et al., 2012; Jelinek et al., 2008; McCabe, 2006;

Patton et al., 2007; Reis, Figlie, & Laranjeira, 2006; Rockett et al., 2006; Schildhaus et al., 2013; Trillo et al., 2012; Vitalle et al., 2006; Wadsworth & Smith, 2007; Youmans et al., 2010). The fluctuation in the identified rates of individuals who presented to the ED with either alcohol, licit, and/or illicit drug related care needs was due to the specific substance(s) which were under investigation in each study. The rates for individuals who presented to the ED with specifically drug related care needs is significantly greater than the rates of individuals who attended the ED with drug and alcohol, or strictly alcohol related care needs. It is hypothesized that this is because the inclusion criteria for the illicit drug studies was so selective and narrow, resulting in greater selection bias and thus skewing the overall results.

Prevalence Based on Methodology

The overall prevalence of substance related ED presentations varied significantly depending on the methodologies used to collect the data in each study. Of the 40 articles included in this review, 12 articles used a quantitative retrospective data-analysis format to analyze the prevalence of substance related ED visits. Of these articles, 0.2%- 31.1% of the overall ED population were identified as presenting to the ED with substance related health needs (Baune et al., 2005; Blank et al., 2005; Brubacher et al., 2008; Dent, Hunter, & Webster, 2010; Elder et al., 2004; Geurts et al., 2012; Indig et al., 2010; Jelinuk et al., 2008; Muscatello et al., 2009; Peterson et al., 2012; Schildhaus et al., 2013; Verelst et al., 2012;). Given that the retrospective data-analysis approach uses patient information (i.e. entrance complaints and/or discharge diagnoses) to identify individuals with substance related care needs, it detects only 60% of presentations thus resulting in an under-representation of the actual incidence of such ED visits (Brubacher et al., 2008; Elder et al., 2004; Havard et al., 2011; Peterson et al., 2012).

Twenty-five articles utilized a subjective (i.e. self-reports) or a combination of both subjective and objective (toxicology results) measures to analyze the prevalence and significance of substance related ED presentations. Of the 12 articles which utilized only subjective measures to assess the prevalence of substance related ED presentations, 2.85%-60% (mean of 22.6%) of ED visits were identified to be substance related (Baune et al., 2005; Binks, Hoskins, & Benger, 2005; Cappelli et al., 2012; Cherpitel & Ye, 2008b; Flynn et al., 2006; Hoskins & Benger, 2012; Indig, Copeland & Conigrave, 2009; Kerr et al., 2005; Merrick et al., 2011; Vitale et al., 2005). Although not all articles using subjective methods identified prevalence rates of substance related ED presentations using numbers, they did discover that a strong correlation existed between the use of alcohol, licit and/or illicit drug use with the utilization of the ED (Blow et al., 2011; Boniatti et al., 2009; Cherpitel & Ye, 2008a, 2009; Fleming et al., 2007; Heise, 2010; Patton et al., 2007; Roudsari, Caetano, & Fields, 2011; Wadsworth & Smith, 2007; Youmans et al., 2010). Of the remaining articles included in this review, three articles utilized a combination of both subjective and objective measures to assess the prevalence of substance related ED presentations. Subjective measures correlated strongly with objective measures when assessing for alcohol use in ED patients (Reis, Figlie, & Laranjeira, 2006; Vitale et al., 2006) independent of sex (females-25.1%:25.5%; males-45.9%:46.6%) (Rockett et al., 2006). However, under-reporting of illicit drug use was significant (Reis, Figlie, & Laranjeira, 2006; Vitale et al., 2006), especially among female ED patients (females-27%; males-13%) (Rockett et al., 2006). Given that alcohol is a legal drug, it is expected that individuals presenting to the ED would be more likely to admit and declare its use versus illegal drugs. This finding was supported through combining both subjective and objective measures to analyze the presence of licit and/or illicit drug use in individuals presenting to the ED.

Based on this analysis, there is an obvious variation in the number of individuals who were identified as presenting to the ED with substance related health needs. This variation in prevalence is dependent on both the investigated substance(s), along with the diverse methodologies which were utilized in the various studies. Although all articles included in this review sought to investigate the prevalence for substance related presentations in the ED, the exact relationship which exists between these two variables remains unclear.

2.3. Patient Profiles of Substance Related ED Presentations

The demographics of patients attending the ED with drug and/or alcohol related complaints are diverse and ill-defined in the literature, making it difficult for clinicians to identify these individuals based on appearance alone (Johnson, 2009; Verelst et al., 2012). A previous Canadian study identified that abusive alcohol consumption accounted for over 3% of all deaths, and nearly 3% of hospitalizations (Boniatti et al., 2009), with alcohol related injuries being the number one cause of death in young men, (Fleming et al., 2007) and young women (MacLeod & Hungerford, 2011). Because the prevalence of substance related ED presentations are difficult to quantify, it is imperative that we understand 'who' these people are that are presenting to the ED for care.

Patient Profiles Based on Gender

An analysis of the 40 articles included in this review was conducted to identify the patient profiles of those individuals who had presented to the ED with substance related health needs. Given that the inclusion criteria for individual participation in each study was inconsistent, made identifying the patient profiles for these presentations less clear and defined. Although only one study excluded participants based on sex alone (Flynn et al., 2006), overall, males were identified as the ones more likely to attend the ED following the use of alcohol

(Baune et al., 2005; Boniatti et al., 2009; Browne et al., 2013; Cherpitel & Ye, 2009; Havard et al., 2011; Heise, 2010; Hoskins & Benger, 2013; Indig, Copeland & Conigrave, 2009; Merrick et al., 2011; Muscatello et al., 2009; Roche, Freeman & Skinner, 2006; Verelst et al., 2012; Vitale et al., 2005), licit or illicit drugs (Brubacher et al., 2008; Kerr et al., 2004) or both (Blow et al., 2011; Cherpitel & Ye, 2012; Dent, Hunter & Webster, 2010; Fleming et al., 2007; Geurts et al, 2012; Indig et al., 2010; Jelinek et al., 2008; Reis, Figlie & Laranjeira, 2006; Rockett et al., 2006; Roudsari, Caetano & Field, 2011; Schildhaus et al., 2013), whereas females were identified as higher users of both substances in two studies (Fidela et al., 2005; Trillo et al, 2012). The remaining nine studies, three alcohol (Elder et al., 2004; MacLeod & Hungerford, 2011; Peterson, Desmond & Cunningham, 2010), one illicit drug (Binks et al., 2005) plus five drug and alcohol (Cherpitel & Ye, 2008; McCabe, 2006; Patton et al., 2007; Wadsworth & Smith, 2007; Youmans et al., 2010), related studies did not identify a gender difference in their findings. One study found an equal gender distribution among alcohol and illicit drug users (Vitale et al., 2006). Unfortunately the representation of male participants outweighed the number of female participants in the majority of studies, thus leading to an uneven distribution of males screened over females. This imbalance of male versus female participation among the 40 studies included in this review, resulted in a potentially inaccurate gender representation.

Patient Profiles Based on Age

Identifying the individuals most likely to present to the ED with substance related presentations based on age alone was not an easy task. Although the majority of studies found 'middle-aged' individuals were more likely to use alcohol, licit and/or illicit drugs plus utilize the ED (Baune et al., 2005; Blank et al., 2005; Binks et al., 2005; Blow et al., 2011; Boniatti et al., 2009; Browne et al., 2013; Brubacher et al., 2008; Cherpitel & Ye, 2008a, 2008b, 2009 &

2012; Dent, Hunter, & Webster, 2010; Fleming et al., 2007; Flynn et al., 2006; Geurts et al, 2012; Havard et al., 2011; Heise, 2010; Hoskins & Benger, 2013; Indig, Copeland, & Conigrave, 2009; Indig et al., 2010; Jelinek et al., 2008; Kerr et al., 2004; MacLeod & Hungerford, 2011; McCabe, 2006; Muscatello et al., 2009; Patton et al., 2007; Peterson, Desmond, & Cunningham, 2012; Reis, Figlie, & Laranjeira, 2006; Roche, Freeman, & Skinner, 2006; Rockett et al., 2006; Roudsari, Caetano, & Field, 2010; Schildhaus et al., 2013; Verelst et al., 2012; Vitale et al., 2005 & 2006; Wadsworth, & Smith, 2007; Youmans et al., 2010), these findings are not without bias. Given that the middle-aged age group was screened more often, meant this age group was represented in all but three studies (Elder et al., 2004; Merrick et al., 2011; Trillo et al., 2012) thereby increasing the probability that this age-group could be identified as the ones most likely to present to the ED with substance related health needs. Based on the studies included in this review, 40 years of age was the average age for when individuals were most likely to attend the ED with such care needs.

Although participant's age was a common predictor for participation in the majority of the studies, there were considerable variations in the inclusion criteria as dependent on the specific age cohort. Given that eighteen plus was the most common age cohort for inclusion (Blow et al., 2012; Browne et al., 2013; Cherpitel & Ye, 2008a, 2008b, 2009 & 2012; Fleming et al., 2007; Geurts et al, 2012; Heise, 2010; Indig, Copeland, & Conigrave, 2009; Schildhaus et al., 2013; Youmans et al., 2010) makes it difficult to understand the breadth of substance related ED presentations in those who are under the legal age (Boniatti et al, 2009; Elder et al., 2004; Hoskins & Benger, 2013; Verelst et al, 2013; Vitale et al., 2005). Fortunately there were an equal number of studies which had no age restriction and included *all* ED patients with substance related health needs in their studies (Binks et al., 2005; Blank et al., 2005; Brubacher et al., 2008;

Havard et al, 2011; Indig et al., 2010; McCabe, 2006; Peterson, Desmond, & Cunningham, 2010; Reis, Figlie, & Laranjeira, 2006; Roudsari, Caetano, & Field, 2011; Vitale et al., 2005 & 2006) and therefore offered a more realistic representation of who these individuals might be. The studies which included data from *all* ED patients versus only those 18 plus, identified a younger mean age. Both of these age cohorts (all ED patients and those 18 years of age plus) consistently identified the middle-aged population to be the most common age group to frequent the ED with substance related presentations. Although the inclusion criteria for most of the studies included in this review were dependent on age, eight studies chose diverse criteria for participant inclusion, which included: parental role (Flynn et al., 2006), having positive physiologic findings (MacLeod & Hungerford, 2011; Roche, Freeman, & Skinner, 2006), their geographical location (Havard et al., 2011; Kerr et al., 2005; Rockett et al., 2006), and the frequency of ED use (Dent, Hunter, & Webster, 2010; Jelinek et al., 2008). Given that the inclusion and exclusion criteria of similar studies varied by age or age cohorts, therefore age cannot be deemed a predictor of individuals who are most likely to attend the ED with substance related health needs.

Patient Profiles Based on Dialect

Although not all studies identified language parameters in their inclusion criteria, having the ability to converse with staff (at triage, through survey/questionnaire, interview, or for consent purposes) may have been an assumed requirement. Inclusion based on language was identified in seven studies, with participants having the ability to speak and understand English appearing most often (Binks et al., 2005; Flynn et al., 2006; Indig, Copeland, & Conigrave, 2009; Youmans et al., 2010); however English or Spanish (Cherpitel & Ye, 2008a), French (Fleming et al., 2007), and Dutch (Vitale et al., 2005) languages were also identified. Unfortunately, restricting participants based on their ability to speak and understand one

language is limiting, especially given the number of immigrants who have migrated into the developed countries where much of this research is done.

Patient Profiles based on Health Disparities

The majority of studies identified specific features and characteristics of substance related ED visits based on the individuals' social status and disparities. Numerous studies suggested that individuals of visible minority (Merrick et al., 2011; Roudsari, Caetano, & Field, 2011) with lower education (Boniatti et al., 2009; Browne et al., 2013; Merrick et al., 2011), and income levels (Heise, 2010; Merrick et al., 2011; Reis, Figlie, & Laranjeira, 2006), and having no health insurance were more likely to present to the ED with substance related health needs. Also, the literature identified that those individuals who smoked (Blow et al., 2011; Boniatti et al., 2009; Browne et al., 2013; Fleming et al., 2007; Indig, Copeland, & Conigrave, 2009; Merrick et al., 2011; Youmans et al., 2010), had a history of a mental health disorders (Blow et al., 2011; Browne et al., 2013; Flynn et al., 2006; Havard et al., 2011; Heise, 2010; Indig, Copeland, & Conigrave, 2009; Indig et al., 2010; Merrick et al., 2011; Verelst et al., 2012;), or known substance related disorders (Blow et al., 2011; Cherpitel & Ye, 2009; Indig, Copeland, & Conigrave, 2009; Verelst et al., 2012) had higher rates of substance related ED presentations.

Understanding who these people are that present to the ED with substance related health needs is imperative. Based on the findings of this review, we can suggest that English speaking, middle-aged males are the ones most likely to present to the ED with substance related health needs; however this patient profile is not without limitations. Knowing that the inclusion criteria for each study included in this review was so diverse, has resulted in an inability to truly define the patient profiles for these individuals who are presenting to the ED with substance related health needs based on their sex, age, ethnicity, or health disparities.

2.4. Visit Characteristics of Substance Related ED Presentations

The epidemic nature of licit and illicit drug use and abuse has resulted in more admissions and ED visits worldwide than ever before (Cherpitel & Ye, 2008a, 2012). ED nurses can expect to see anywhere from one to five individuals per shift with health related complications as a result of co-occurring substance use and abuse (Johnson, 2009; McCabe, 2006). However getting a clear picture of what these visits look like is challenging and ill-defined in the literature, and is therefore the focus of this part of the review.

Patient's Visit Characteristics

Understanding what the actual physical and psychological appearance is of patients who presented to the ED for substance related health care is significant; however this is difficult to do especially when studies have limiting inclusion criteria for participation. Understanding the acuity of these presentations are constrained when participants are excluded from participation because of their instability (Baune et al., 2005; Binks et al., 2005; Fleming et al., 2007; Reis, Figlie & Laranjeira, 2006; Vitale et al., 2005), level of consciousness (Cherpitel & Ye, 2012; Rockett et al., 2006), inability to answer questions (Binks et al., 2005; Boniatti et al., 2009; Rockett et al., 2006; Vitale et al., 2005), or provide informed consent (Indig, Copeland, & Conigrave, 2009; Rockett et al., 2006), and/or if they are being held in police custody (Indig, Copeland, & Conigrave, 2009; Rockett et al., 2006). By restricting the individuals who did not fit into the 'perfect patient' mold provides a false image of what the true patient profile is for these ED patients who are under the influence and requiring care. As literature describes, individuals who present to the ED with substance related health needs are more acute and present greater challenges to staff as the uncertainty regarding the morbidity and mortality rates exceed those of the general population (Brubacher et al., 2008; Geurts et al., 2012). Understanding the morbidity and mortality association with the effects of alcohol, licit and illicit drug use, abuse, and

overdose is paramount given the acuity and unpredictability of these conditions (McCabe, 2006).

Such morbidities frequently seen in the ED include acute and chronic mental and behavioural

disorders, Wernicke-Korsakoff syndrome, liver cirrhosis, cancer (liver, throat, esophageal and

colon), ischemic heart disease, and stroke resulting in coma or even death (Fleming et al., 2007;

Harvard et al., 2011; Heise, 2010; Hoskins & Benger, 2013; Johnson, 2009). The acute nature of

these presentations not only results in heavy workloads for staff, but also places a significant

economic burden on the health care system (Geurts et al., 2012) given the potential morbidity

and mortality associated with substance use and misuse.

Individuals with a substance related admission are more than twice as likely to return to

the ED for assistance in the future (Baune et al., 2005; Cherpitel & Ye, 2008a; Geurts et al.,

2012; MacLeod & Hungerford, 2011; Patton et al., 2007; Reis, Figlie, & Laranjeira, 2006;

Roudsari, Caetano, & Field, 2011) and be a result of more severe and more life-threatening

causes (Brubacher et al., 2008; Dent, Hunter, & Webster, 2010; Indig et al., 2010; Jelinek et al.,

2008; McCabe, 2006). Therefore by not including the unstable, unconscious, or incoherent

individuals in these studies is a limitation given that the findings are then not reflective of the

actual visit characteristics of those individuals who are utilizing the ED for substance related

care.

Environmental Characteristics of the Visit

Of the forty articles included in this review, there were a number of environmental

characteristics which emerged that were consistent in substance related ED presentations. The

identified burden caused by such ED visits has resulted in higher hospital admission rates (Baune

et al, 2005; Binks et al., 2005; Brubacher et al., 2008; Dent, Hunter, & Webster, 2010; Jelinek et

al., 2008; Roudsari, Caetano, & Field, 2011; Schildhaus et al., 2013; Verelst et al., 2012) in

conjunction with an increased use of radiology services and ED treatment (Cherpitel & Ye, 2008a, 2008b, 2009 & 2012; Patton et al., 2007; Reis, Figlie & Laranjeira, 2006; Roudsari, Caetano, & Field, 2011; Verelst et al., 2012; Wadsworth & Smith, 2007; Youmans et al., 2010). Unfortunately, individuals with substance related needs are more likely to present to the ED in the early morning (Dent, Hunter, & Webster, 2010; Indig, Copeland, & Conigrave, 2009) and on weekends (Baune et al., 2005; Elder et al., 2004; Hoskins & Benger, 2013) when staffing levels and support are reduced (Havard et al., 2011; Indig et al., 2011; Peterson, Desmond, & Cunningham, 2010). A number of studies found that a higher proportion of individuals with substance related health needs arrived to the ED via ambulance (Dent, Hunter, & Webster, 2010; Geurts et al., 2012; Indig, Copeland & Conigrave, 2009; Indig et al., 2010; Jelinek et al., 2008; Verelst et al., 2012), had less urgent triage scores (Binks et al., 2005; Geurts et al., 2012; Jelinek et al., 2008; Reis, Figlie, & Laranjeira, 2006; Rockett et al., 2006), and were more likely to leave without treatment (Brubacher et al., 2008; Geurts et al., 2012; Indig et al., 2010; Jelinuk et al., 2008; Schildhaus et al., 2013); thereby demonstrating an inappropriate use of emergency services and resources.

Visit Characteristics based on Duration of Study

The inconsistencies in prevalence rates for when individuals who are under the influence are utilizing the ED have been shown to be related to the diverse methodology and inclusion criteria used in each study. However, these inconsistencies may also be due to more specific details regarding the data collection processes. The average length of study for the studies which utilized a retrospective data analysis design was 4.5 years (minimum =1 year, maximum=8 years). This method of study proved to be more consistent as the data was collected continuously (24/7) during the identified study period; therefore maintaining a higher level of rigor and

reliability. The average length of time that the studies which applied subjective and/or objective measures to collect their data was 1.25 years (minimum=1 week, maximum=10 years). However, these methods had very inconsistent and diverse study regimes regarding the days of the week (weekday and/or weekend), times of the day (days, evenings, and nights), month(s), and season(s) when data was collection. The inconsistent data collection regimes thereby provide a poor representation of what substance related ED visits look like, or when these presentations are likely to present.

2.5. Limitations of the Literature

The question lies: If males and females were equally represented in each study, across all age groups, without limitations pertaining to language, would the findings still identify middle aged males as the ones most likely to present to the ED with substance related presentations? Given that most ED's worldwide function under a similar mandate that offers care and service to all individuals who present, regardless of age, sex, language, or ethnicity, would suggest that ED's are not bound by such inclusion/exclusion criteria, so why is the research? In order to identify the actual prevalence of substance use in the ED, all individuals who attend the ED must be screened to get a true representation of the breadth and depth of this problem. The inconsistent study designs utilized in each article makes it impossible to identify if there are any statistically significant associations between the days of the week, time of the day, or time of year (season) when these individual are attending the ED.

As previously mentioned in this paper, the prevalence rate of individuals who present to the ED with substance related care needs vary and are inconsistent when compared between studies. This inconsistency results in limited generalizability of the research findings, and therefore makes it impossible to truly identify the depth and breadth of burden resulting from

substance use/misuse which faces EDs worldwide. This limitation is a direct result of the variety

of methodologies, inclusion criteria, and data collection practices utilized in each study.

According to the study findings, objective measures produced higher detection rates of substance

use (for alcohol, licit and illicit drug); however these methods are associated with increased

costs. Objective measures lack the ability to identify quantities, times, and patterns related to

substance use, which could only be detected through subjective analysis. Data-analysis studies

are also limited by the quality of the recorded information leaving large opportunity for bias and

missed data. Although each method of study offers both strengths and limitations, no consensus

has been identified regarding which methodology is best suited to identify this population. In

contrast, by not screening for, or not asking about substance use in the ED, suggests that these

individuals will go undetected by clinical staff, will not receive support, thus resulting in a

vicious circle that promotes the emergence of frequent ED users.

2.6. Conclusion

The incidence of individuals who present to the ED with substance related complaints

varies within the literature, making it difficult to understand the prevalence rates, patient profiles,

and visit characteristics for these ED presentations. Individuals with substance related disorders

present to the ED requesting care for diverse trauma, injury, psychological, and/or medical

emergencies (Baune et al., 2005; Hoskins, & Benger, 2013). Although health problems

associated with substance use are well recognized, they are often difficult to diagnose and

quantify (Binks, Hoskins, Salmon, & Benger, 2005; Hoskin & Benger, 2013).

The original aim of this literature review was to identify the prevalence of substance use

in the ED, and to be able to identify the patient profiles and visit characteristics of such visits

through synthesizing 40 of the most recent sources pertaining to this topic. This aim was

accomplished and the prevalence rate was identified. Based on a thorough review of these articles, an alarming 20% of all ED visits were found to be associated with the use of alcohol, drugs, or both. The prevalence rate identified in this review was calculated based on 36 previous studies (four sources were not studies). Although they generated similar findings, unfortunately they used diverse methodologies, inclusion criteria, and data collection processes and therefore they lack generalizability.

The limited understanding pertaining to the demographics and service utilization of substance misusers makes it impossible for the health professionals to predict how and when these individuals will arrive to the ED (Blow et al., 2011; Brubacher et al., 2008; Cherpitel & Ye, 2008b; Geurts et al., 2012; Roche, Freeman, & Skinner, 2006). As supported by this review, diagnosing substance use and misuse in the ED is often neglected, underreported, and difficult to quantify by clinicians (Heise, 2010) due to the chaotic nature of the ED (increased time constraints, overcrowding, unpredictable, and unstable conditions).

Based on the information identified in this review, it is apparent that a problem exists regarding substance use and the ED. This is not a problem that can be solved by one person, in one country, through one research project. This is a problem that has been escalating over time, worldwide, and is in urgent need of a solution. The literature consistently identifies the ED as an ideal setting for screening and brief interventions regarding substance misuse, however no policy exists in Canada enforcing ED staff to offer this service, therefore resulting in a missed opportunity (Peterson, Desmond, & Cunningham, 2010; Roche, Freeman, & Skinner, 2006; Verelst et al., 2013). A solution to overcome this inconsistency is to adopt a policy that will ensure all ED visits are screened for substance use, using the same tool, at all times of the day, every day throughout the year. Such interventions delivered in the ED would be noble seeing as

they are aimed at limiting the burden (morbidity, mortality, costs, and service utilization) associated with substance related disorders; thus fostering and improving the health promotion practices for these already at risk individuals (Brubacher et al., 2008; Jelinek et al., 2008; Peterson et al, 2012). Adopting a universal screening tool in the ED would increase the accuracy of the research findings, and help researchers and policy makers to identify statistically significant associations between substance use and the ED, to therefore assure that optimal care is maintained. Therefore it is apparent that additional research in this area is warranted.

CHAPTER 3: METHODOLOGY

This chapter will describe the methodology which was utilized to gain a better understanding of this study's phenomena. The rationale for why a non-experimental research design was selected will be discussed, and well as an in-depth explanation regarding how this method was implemented and utilized in this study. A description of the study population is provided, followed by a description of the data source and the statistical analysis that was used to answer the author's four research questions. Given that the aim of this research project is to identify the prevalence, patient profiles, and visit characteristics of substance related ED presentations in Winnipeg, the retrospective data-analysis design was the methodology utilized in this study.

3.1. Research Design

A retrospective data-analysis research design was selected to study the prevalence, patient profiles, and visit characteristics of substance-related ED visits in Winnipeg. A retrospective study is a clinical study that looks at patient's records *after* the patient has experienced a disease, condition, or received treatment (Taber's Cyclopedic Medical Dictionary, 2009). This methodology utilizes previously collected in an attempt to identify antecedents or independent variables (Polit & Hungler, 1995). Given that this study utilized a structured data-set consisting of data obtained from prior ED triage records that were recorded by ED triage nurses who were not aware that this data would be collected and used for this said research project, makes this methodology appropriate. Seeing as specific information pertaining to the prevalence of substance related ED visits was used in this study to identify this cohort of presentations, and knowing that this presentation is not universally screened for at triage, may result in missed data and an underrepresentation of this problem (Blank et al., 2005; Geurts et al, 2012). On the other

hand, since triage nurses were not aware that an analysis looking at the prevalence of substance related ED visits in Winnipeg was going to be conducted means that their reports are a true reflection of unbiased triage assessments, therefore making the data potentially more reliable.

3.2. Population of Study

The population selected to participate in this study are identified as: *all individuals who visited an ED in Winnipeg for substance related care needs from January 1, 2011 until December 31, 2013*. Since 2010, Emergency Department Information System (EDIS) has been adopted and used by all Winnipeg EDs to help improve and track the flow of patients through the ED. Therefore all ED visits from January 1, 2011 until December 31, 2013 are captured in this dataset thus making this data-set more rigorous and therefore is the reason why this timeframe was selected.

Winnipeg is the capital and largest city in Manitoba, Canada, with a population of 730,018, and a higher female to male ratio (Statistics Canada, 2013). Approximately 69% of the population in Winnipeg is classified as the working age group (15-64 years old), 17% are children (0-14 years of age), and the other 14% are seniors (65+). Manitoba is home to two official languages: English and French. Seventy-two percent of Winnipeggers identify English as their mother tongue, 3.6% identify French as their mother tongue, where 22.3% identify a non-official language as their mother tongue (Statistics Canada, 2013). This statistic is a reflection of the diversity and high number of immigrant and aboriginal people that reside in Winnipeg, Manitoba.

Winnipeg is central to many surrounding communities, with many rural inhabitants commuting to Winnipeg daily for work, school, leisure, and/or health services. Winnipeg is home to two tertiary hospitals (Health Sciences Centre, and St. Boniface Hospital) and four adult

community hospitals (Concordia Hospital, Grace Hospital, Seven Oaks General Hospital, and Victoria General Hospital), all offering ED service 24 hours a day, seven days a week (WRHA, 2013). As the aim of this study is to identify the prevalence, patient profiles and visit characteristics of substance related presentation to the ED in Winnipeg, EDIS data was obtained, analyzed, and included from all six adult Emergency Departments in Winnipeg. For the purpose of this study, the retrospective data-analysis design extracted three years of data (01/01/2011-31/12/2013) documenting substance related ED visits, in an attempt to identify the prevalence rates, patient profiles, and visit characteristics of such presentations.

3.3. Data Source

EDIS is a system that automates such functions as e-triage, patient tracking, orders/results, documentation, and discharge information. Information is entered into EDIS when the patient presents to the ED, is registered, and then triaged (which is the beginning of the patient tracking process). The EDIS data system is a structured database that contains specific patient information pertaining to all ED visits from all adult EDs in Winnipeg. This data base is secured and maintained by WRHA (Winnipeg Regional Health Authority), so approval to access and utilize this data was necessary.

Data are generated, identifying information regarding the patients ED visits, including: labs, consults, plan of care, triage records, length of stay in the department, and discharge disposition. EDIS data was then extracted into Excel using IBM COGNOS (which is a decision support tool) by the informatics emergency program team at WRHA. Data was then re-organized into SPSS for analysis purposes. Numerous categories of data were generated, and then selected based on relevance and the intent of the analysis.

The data that were selected for this study included the following:

1. All patients who presented to the ED with substance related health needs over three years (from 01/01/2011-31/12/2013).

2. Those ED visits with the visit reason, complaint category, or chief complaint indicating substance use/misuse.

The data obtained from this selection process are further analyzed to illustrate the significance and specifics regarding the use of the ED for substance related care in Winnipeg.

3.4. The Sample

Given that the goal of this study is to identify the prevalence, patient profiles, and visit characteristics of substance related ED visits in Winnipeg, *all* individual records from the identified substance related ED visits were included in this sample. The inclusion criteria of this sample is specific to language, as only those individuals who speak a language in which the triage nurse is fluent, or who has a translator present during their triage, will have a completed triage report. This study did not exclude the use of data based on specific patient demographics (age, gender, marital status, or culture) or visit characteristics (time restraints, mode of arrival, transfer, or consult status) as the goal of this study was to identify the most reliable and generalizable findings.

3.5. Ethics and Access

The data utilized and analyzed in this study did not contain any patient identifiers (name, address, PHIN, etc.), and therefore individual patient consent was not necessary. Ethics approval was sought and granted through ENREB (Education Nursing Research Ethics Board), as this is required by all masters' students who are completing a thesis and are enrolled in the Faculty of Nursing at the University of Manitoba. Given that this was a retrospective chart review, the researcher completed and was granted approval from the University of Manitoba: Bannatyne

Campus Research ethics board, as this application was more fitting for this research project (Appendix C) . Since the data analyzed in this project is property of the WRHA, the researcher requested access approval from WRHA by completing the Standardized Institutional Research Committee Submission Form (Appendix B). Once ethics and access approval were obtained from the necessary ethics boards, the researcher was able to access the data and begin the data analysis process.

3.6. Data Analysis

When the data were obtained for analysis they were already extracted into an Excel spreadsheet. The data were then imported into SPSS by the researcher for scholarly analysis. Information pertaining to all ED visits, from all six Winnipeg EDs from January 1, 2011 to December 31, 2013 was included in this data-set resulting in 14,255 substance-related visits. Following a thorough examination of the data, the data were cleaned and then extracted into separate categories based on the individual's triage experience if their identified chief complaint, complaint category, or visit reason was for substance related health needs. Statistical analyses were conducted using SPSS version 22. Quantitative measures were at the ordinal and nominal levels. Frequency distributions of each variable (prevalence, patient profiles, and visit characteristics) were conducted in order to describe the data and answer the researchers' first three research questions.

1. What is the *prevalence* of individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31 of 2013?

2. What are the *patient profiles* of those individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31 of 2013?

3. What are the *visit characteristics* of those individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December of 2013?

Bivariate descriptive statistical analyses were conducted to identify if any statistical relationships existed in order to answer the researchers' fourth research question.

4. What are the statistical relationships amongst the *prevalence*, *patient profiles*, and *visit characteristics* for those individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31 of 2013?

Each research question was analyzed and thoroughly discussed. One statistician was consulted to assist with the advanced data analysis.

Prevalence

The prevalence of substance-related ED visits was calculated based on the total number of ED visits meeting the inclusion criteria (as previously discussed).

1. The total number of ED visits was analyzed over the full three year study period to give an overall prevalence for Winnipeg.

2. The overall prevalence for Winnipeg was broken-down and further separated by each hospital/facility.

3. The investigator then separated these rates based on the year that the individual presented to each ED for care (2011, 2012, and 2013).

4. Frequency distributions and the measures of central tendencies (mean, median, mode, and 90th percentile) were calculated based on the above findings.

The above analyses assisted the investigator to answer the first research question which states: *What is the prevalence of individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31 of 2013?*

Patient Profiles

The patient profiles of those individuals who have presented to the ED with substance-related health needs were calculated using a variety of descriptive analysis techniques. Specific categories that identified patient demographics were selected from the data-set to assist with identifying the patient profiles of substance related ED visits in Winnipeg.

1. The investigator was able to describe *who* these individuals were that presented to the ED in Winnipeg for substance-related care needs based on their gender (male or female), age range (0-17, 18-30, 31-45, 46-60, 61-75, 76-100), and marital status (married, not married, widowed, unknown).

2. The above patient profiles were analyzed and then broken down based on each facility, and by year of presentation.

3. Statistical relationships were assessed based on the findings of the above analyses. Statistical relationships were assessed based on the patient profiles (gender, age-range, and marital status) and comparing those with the prevalence (overall rates, by facility, and by year of presentation).

Through conducting the above analysis, the investigator was able to answer the second research question: *What are the patient profiles of those individuals who have presented to an ED in Winnipeg, Manitoba with substance-related health needs from January 1, 2011 to December 31, 2013?*

Visit Characteristics

The visit characteristics which were specific to substance-related ED presentations in Winnipeg were analyzed and the frequency distributions were assessed for such visits. This allowed the investigator to have a better understanding of *what* these individuals are presenting with (visit category, complaint category, and visit reason), *where* they are presenting (based on each facility), *when* they arrive at the ED for care (day of the week, time, month, season, year, and length of hospitalization), and *how* they are arriving at the ED (CTAS score, mode of arrival, and discharge disposition).

1. The investigator was able to describe the visit characteristics based on the: what, where, when, and how these individuals presented to the ED.

2. An analysis that separated the data by facility and year of presentation to the ED was conducted.

3. Given that there are so many variables in this section of the analysis, the investigator displayed these findings in a variety of tables, cross tabulations, graphs, and charts to assist the investigator and readers with making sense of the findings.

By performing the above analysis, the investigator was able to identify what the ED visits of those who have presented for substance-related care look like in Winnipeg, and therefore is able to answer the investigators third research question: *What are the visit characteristics of those individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 23 of 2013?*

Statistical Relationships

Based on the findings from the investigator's pilot study, there were a number of statistically significant relationships that were identified given the variables regarding the

prevalence, patient profiles, and visit characteristics for the substance related ED visits in Winnipeg which included:

1. The prevalence of substance-related ED presentations in Winnipeg were consistent with the literature for other developed nations, accounting for 2% of all ED presentations with more visits presenting to the core hospital (HSC) in Winnipeg.

2. The patient profiles of individuals presenting to the ED in Winnipeg with substance-related presentations were English speaking, middle-aged males; which was also consistent with the existing literature.

3. The visit characteristics for substance-related ED presentations in Winnipeg indicated that such individuals were more likely to present to the ED on weekends, in the summer, via ambulance/stretcher service/or in police custody, with more acute CTAS scores.

4. Although substance-related presentations were identified as more acute, there were a large number of substance related ED presentations who arrived via ambulance/stretcher service/or in police custody, and left without being seen (LWBS)/or who left against medical advice (LAMA).

However, since this study is working with three years of data (thesis) versus one year of data (pilot-project), the investigator could not assume that these relationships were the same. Therefore, hypothesis tests were performed to assess if such relationships exist, and has assisted to answer the investigator's fourth research question: What are the statistical relationships amongst the *prevalence*, *patient profiles*, and *visit characteristics* for those individuals who have presented to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31of 2013? And, have these relationship changed over time, or based on the findings from each facility?

The strengths of conducting this study are supported by: the high identification rate of substance-related ED presentations that were included in this review, the availability of databases such as EDIS which assists with the validation of such ED presentations, the utilization of a standardized computerized data collection program which is adopted throughout Winnipeg, and having data that can easily be re-organized into SPSS for statistical analysis.

CHAPTER 4: STUDY FINDINGS

Following the process for data analysis (as described in the methodology chapter of this study) of the identified study population (substance-related ED presentations in Winnipeg), and based on the inclusion criteria for participation (all ED presentations in Winnipeg from 01/01/11-31/12/2013) the four research questions have been examined and will be discussed.

4.1. Prevalence

In order to identify the prevalence of substance-related ED presentations in Winnipeg from 01/01/11-31/12/2013, the information from ALL ED visits during this study period was obtained and analyzed. Of the 687,118 visits that were triaged in Winnipeg during this study time, 14,255 were identified (based on the identified complaint category) as 'substance misuse': totalling 2.1% of the total ED presentations in Winnipeg.

ED presentations identified as 'Substance misuse' was among the 12 most common complaints verbalized at triage during this study time. 5,274 presentations for 'substance misuse' were identified in 2011 (2.3%), 4,839 in 2012 (2.1%), and 4,142 in 2013 (1.9%); indicating that the complaint category of 'substance misuse' has been trending down in Winnipeg over the last three years. This distribution is displayed in figure 2.

Figure 2: Proportion of substance-related ED visits in Winnipeg by year of presentation.

Substance Misuse Presentations by Year

	2011	2012	2013
substance misuse	5274	4839	4142
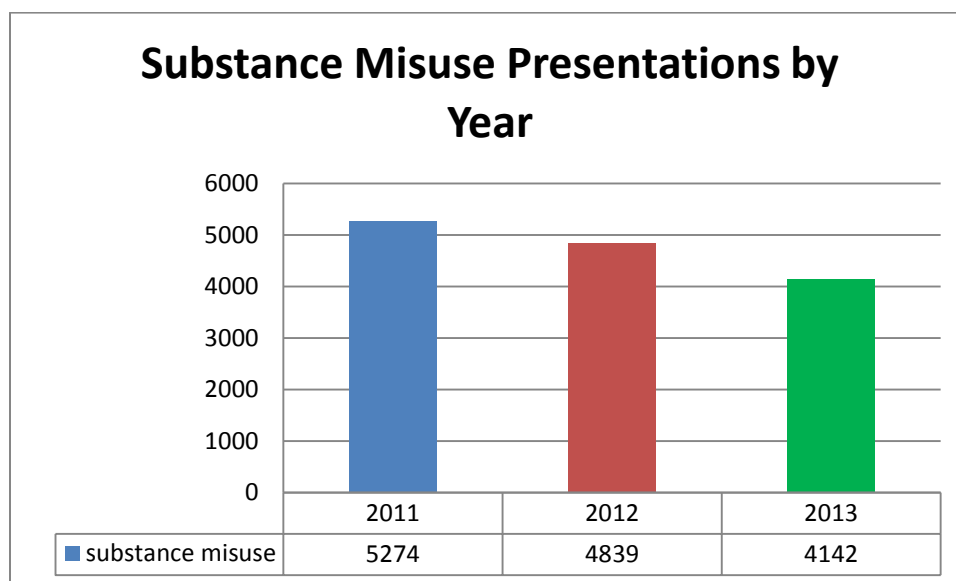
The proportion of ED visits identified as 'substance misuse' for each facility were examined, however were not equally distributed between the six Winnipeg facilities. Prevalence suggests that 46% of substance-related ED visits in Winnipeg were to HSC. This distribution is displayed in figure 3.

Figure 3: Proportion of substance-related ED visits to each facility in Winnipeg.

Substance Misuse Presentations by Facility

VGH 8%
CGH 9%
GGH 10%
SOGH 17%
SBGH 10%
HSC 46%
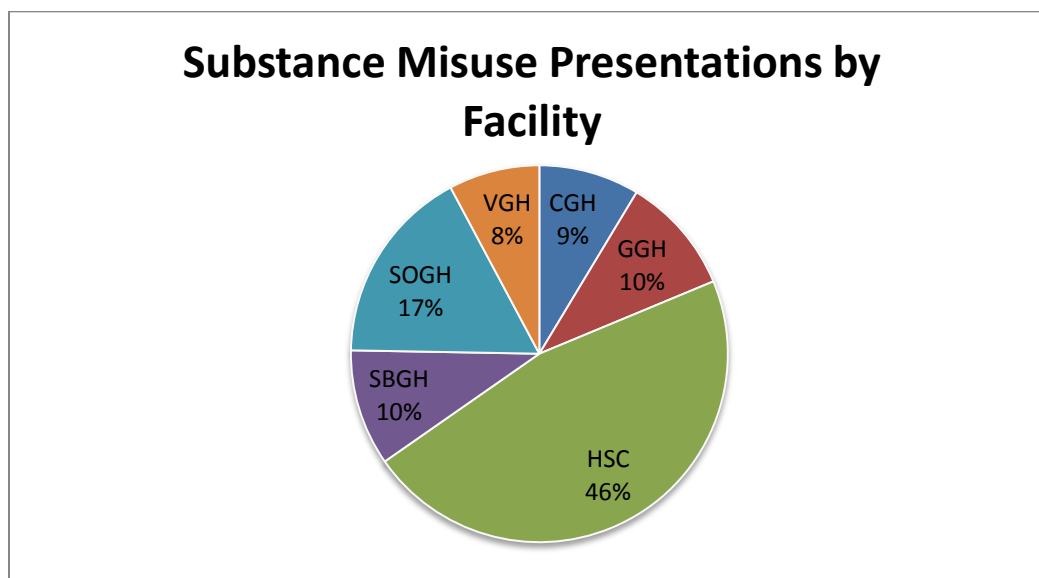
The proportion of ED visits was substantially greater at HSC representing 6,640 visits or 4.2% of the total visits identified as substance-related during this study time. This was expected given that HSC is the largest Hospital in Winnipeg and is located in the inner city. SOGH is the second most prevalent hospital of choice to see this type of presentation, seeing a total of 2,410 patients or 1.8% of the total ED visits for substance-related health needs. GGH is the next highest, seeing a total of 1,439 substance misuse visits equating to 1.9% of the total ED presentations. The fourth most common centre for substance-related presentations in Winnipeg is the SBGH, seeing a total of 1,422 visits or 1.2% of the total ED presentations. Next is CGH, which had 1,231visits identified at triage as 'substance misuse', or 1.2% of their total ED visits for such presentation during the study period. The hospital that sees this presentation least frequently is VGH seeing 1,113 visits, which represents 1.2% of the total ED presentations for 'substance misuse'. This distribution is displayed in figure 4.

Figure 4: Proportion of substance-related ED visits to each facility by year of presentation.

Substance Misuse Presentations by Year and Facility

	2011	2012	2013
CGH	378	463	390
GGH	522	511	406
HSC	2603	2183	1854
SBGH	475	463	484
SOGH	918	842	650
VGH	378	377	358
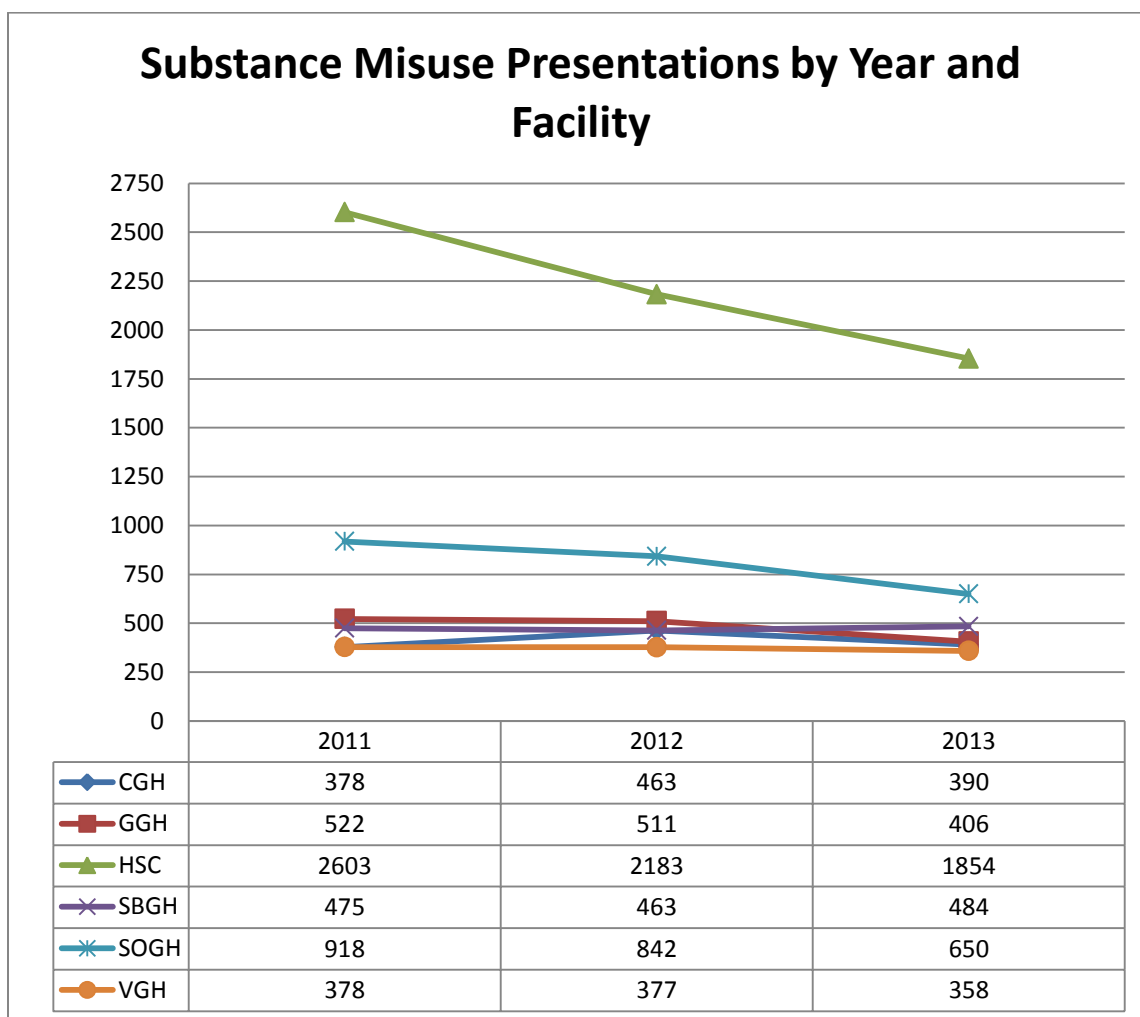
4.2. Patient Profiles

The patient profiles of those individuals identified at triage as presenting to the ED for substance-related health needs was calculated based on the variables gender, age, age-range, and marital status. The gender distribution for all ED visits during this study time identified that females (364,603 or 53%) utilized the ED overall more than males (322,447 or 47%) although 68 ED visits identified the gender as unknown. Based on the 14,255 individuals who met the inclusion criteria for this study, 7,497 or 53 % were male, and 6,757 or 47% were female (one visit did not identify gender as either male or female). The distributions of male to female ratios

were consistent with the above findings in 2011, 2012, and 2013; however differed by facility over the years. The three facilities that found the incidence of 'substance misuse' to be higher in women were CGH, SBGH, and SOGH, where the other two facilities (HSC and GGH) found the incidence of such presentation to be higher in men. VGH received an equal gender distribution of 'substance misuse' presentations to their ED. Frequencies for these gender distributions are displayed in figure 5 and table 3.

Chi-square test was completed to assess if a relationship existed between gender and substance misuse ED presentations in Winnipeg. The Chi-Square indicated a statistically significant relationship existed between these variables as the probability level for his test was less than .05 (p=<.05); actually, the probability is reported as .00 (Sig.=.000).

Figure 5: Prevalence of substance-related ED visits based on gender by facility in Winnipeg
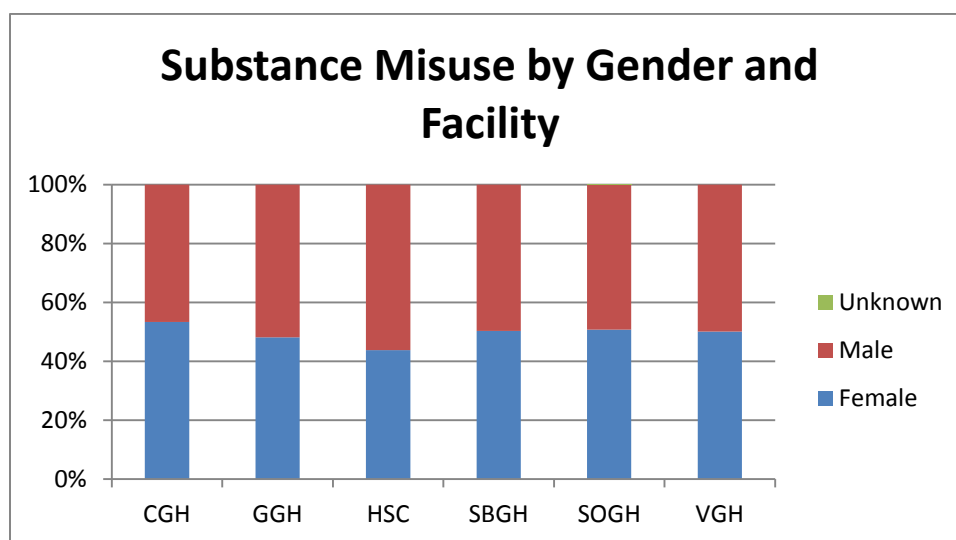
Table 1   *Patient profiles for 'substance misuse' based on gender distribution: overall, per year of study, and based on facility.*

Facility			Gender			Total	Percent (%)	
			Female	Male	Unknown		Female	Male
CGH	Year	2011	197	181		378	52%	48%
		2012	252	211		463	54%	46%
		2013	207	183		390	53%	47%
	Total		656	575		1231	53%	47%
GGH	Year	2011	256	266		522	49%	51%
		2012	241	270		511	47%	53%
		2013	196	210		406	48%	52%
	Total		693	749		1439	48%	52%
HSC	Year	2011	1148	1455		2603	44%	56%
		2012	963	1220		2183	44%	56%
		2013	799	1055		1854	43%	57%
	Total		2910	3730		6640	44%	56%
SBGH	Year	2011	235	240		475	49%	51%
		2012	241	222		463	52%	48%
		2013	240	244		484	50%	50%
	Total		716	706		1422	50%	50%
SOGH	Year	2011	466	451	1	918	51%	49%
		2012	429	413	0	842	51%	49%
		2013	329	321	0	650	51%	49%
	Total		1224	1185	1	2410	51%	49%
VGH	Year	2011	201	177		378	53%	47%
		2012	189	188		377	50%	50%
		2013	168	190		358	47%	53%
	Total		558	525		1083	52%	48%
Total	Year	2011	2503	2770	1	5274	47%	53%
		2012	2315	2524	0	4839	48%	52%
		2013	1939	2203	0	4142	47%	53%
	Total		6757	7497	1	14255	47%	53%

Patient Profiles by Age

  Understanding who these individuals are who are presenting to the ED in Winnipeg with substance-related health needs was assessed by examining the age and age-range for such presentations. ED's in Winnipeg have no age restrictions for who they will treat, and therefore they will see individuals of all ages with various health needs. Given the Health Science Centre and Children's Hospital are part of the same centre in Winnipeg, those individuals who are 17 and under are seen at Children's Hospital, and those 18 and over are seen at Health Sciences Centre. Of the 687,118 individuals seen during this study time, the data from 410 visits had an unknown age or their identified age exceeded the normal human lifespan (over 100 years of age) and was thus excluded from this analysis. The modal age of ED visits in Winnipeg was 22 (n=12,702 or 1.8%) followed by 21 years of age (n=12,601 or 1.8%) during this study time. The modal age of ED visits were similar in 2013 to the above findings, but were not consistent when analyzed by individual year of presentation, resulting in more 19 (n=4,415 or 1.9%) and 20 (n=4,314 1.8%) year olds presenting in 2011, more 21 (n=4,416 0r 1.9%) year olds with 20 and 22 year olds having similar rates (n=4,372 or 1.9%) in 2012. The median age of ED visits was 46 with a 90th percentile of 80 years of age.

  Modal age of substance-related ED presentations were analyzed in those with a stated age between 0-100; 38 visits were excluded because their stated age was beyond this range or had no stated age. The modal age for when individuals with substance-related health needs utilized the ED during the study time was 17 (n=566 or 4%), with individuals 18 years of age (n=494 or 3.5%) being the second most common age to present. The modal age was consistent over the three study years; although once again differed by facility. HSC was the only facility which consistently saw more substance-related presentations that were older, outside of the 17 and 18

year old modes. The median age of substance-related ED visits was 34 with a 90th percentile of 56 years of age.

Given that the age range of this population is so large, the prevalence for such presentations were broken down into specific age ranges for ease of analysis, consisting of: 0-17, 18-30, 31-45, 46-60, 61-75, 76-100. Based on this analysis, the individuals most likely to present to the ED in Winnipeg with substance-related health needs were individuals between 18-30 years of age (4,885 or 34%), followed by those in the 31-45 age range (4,237 or 30%) (see figure 6). When an analysis using age ranges was completed based on year of presentation for those individuals triaged as 'substance misuse', findings indicated similar results throughout the 2011, 2012, and 2013 data. However, these findings were not consistent among the six Winnipeg facilities. CGH, GGH, SOGH, SBGH, and VGH all found the most prevalent age range to be 18-30, where HSC found individuals between 31-40 years of age presented more often with substance-related care needs during the study time.

Figure 6: Prevalence of substance-related ED visits in Winnipeg by age-range.
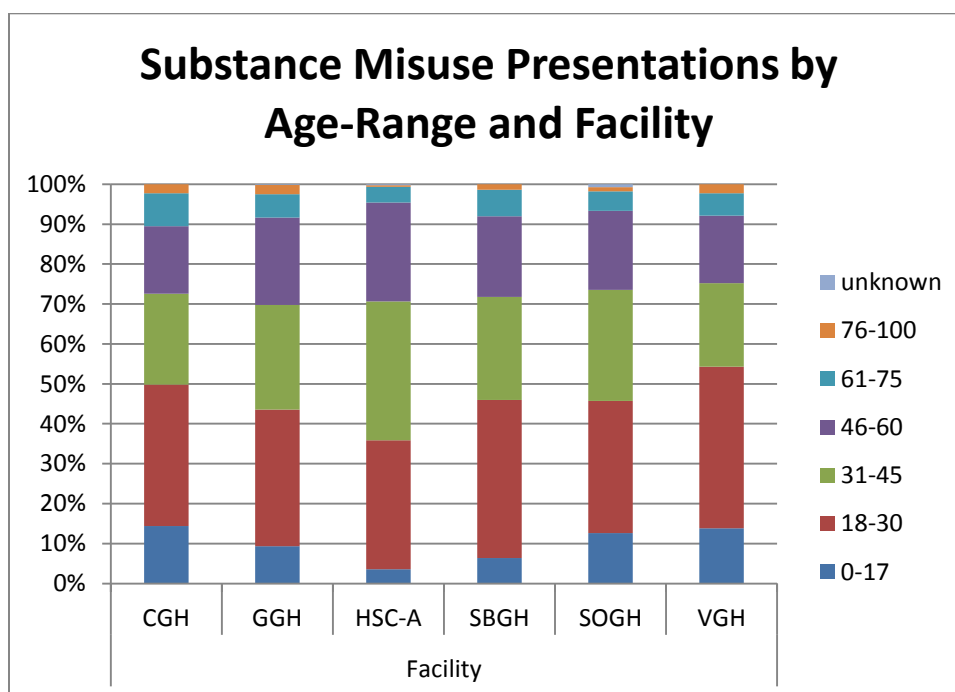
Chi-square test was completed to assess if a relationship existed between age-range and substance misuse ED presentations in Winnipeg. The Chi-Square indicated a statistically significant relationship existed between these variables as the probability level for his test was less than .05 (p=<.05); actually, the probability is reported as .00 (Sig.=.000). Cramer's V reflected that substance misuse presentations in Winnipeg (the independent variable) evidenced a small effect size (Phi=.079) upon age-range (dependent variable).

Patient Profiles by Marital Status

To thoroughly identify the patient profiles for individuals who have utilized the ED for substance-related health needs, an analysis of marital status was calculated. Four categories were identified to describe marital status: married, not married, widowed, and unknown. Based on the data for all ED visits, individuals categorized as 'not married' were slightly more likely to present to the ED during this study time (264,022 or 38%) followed by individuals categorized as married (236,979 or 34%), widowed (4,8174 or 7%), or unknown marital status (137,943 or 20%) . These findings were consistent when these data were analyzed by year of presentation, however in 2011 there were higher rate of unknown marital status (68,494 or 30%).

Using frequency distributions, individuals categorized as 'not married' were 64% more likely to present to the ED for 'substance misuse' presentations, representing 9,140 visits. Individuals with 'substance misuse' complaints had an 'unknown' marital status 19% (2,681) of the time, those with a 'married' status presented 16% (2273) of the time, where those who were 'widowed' presented 1% (161) of the time. Although the averages changed slightly based on each individual year of presentation, the findings for marital status were consistent identifying those who were 'not married' were more likely to present with substance-related health needs; as displayed in figure 7.

Figure 7: Prevalence of substance-related ED visits in Winnipeg by marital status.

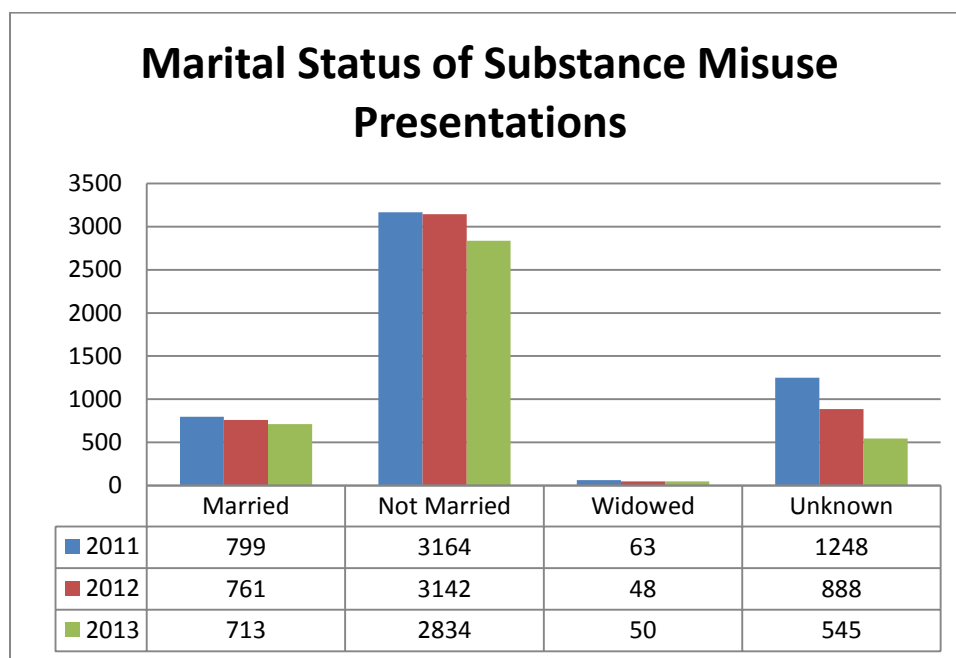|	Married	Not Married	Widowed	Unknown
Marital Status of Substance Misuse Presentations				
2011	799	3164	63	1248
2012	761	3142	48	888
2013	713	2834	50	545

Chi-square test was completed to assess if a relationship existed between marital status and substance misuse ED presentations in Winnipeg. The Chi-Square indicated a statistically significant relationship existed between these variables as the probability level for this test was less than .05 (p=<.05); actually, the probability is reported as .00 (Sig.=.000). Cramer's V reflected that substance misuse presentations in Winnipeg (the independent variable) evidenced a small effect size (Phi=.083) upon marital status (dependent variable).

4.3. Visit Characteristics

The visit characteristics for those individuals identified at triage as presenting to the ED for substance-related health needs was calculated based on numerous variables to describe what, where, when, and how these individuals presented to the ED. Substance-related presentations are among the top 12 most common complaint categories identified for all ED visits in Winnipeg. 'Substance misuse/intoxication' was the most common substance-related chief complaint identified over the study time representing 6,668 (47%) such visits, followed by

'overdose/ingestion' (4,935 at 35%), 'substance withdrawal' (2,624 at 20%), and unknown (28 at

0.2%) presentations. Based on the four chief complaints identified for 'Substance misuse'

presentations, the proportion of visits for each complaint per individual year (2011, 2012, and

2013) were consistent with the above findings (as represented in Figure 6). 'Substance misuse/

Intoxication' was the most common chief complaint at all facilities throughout the study time,

except for SBGH which had overdose/ingestion as their primary chief complaint. These findings

are represented in figure 8.

Figure 8: Prevalence of substance-related ED visits in Winnipeg by chief complaint.

Substance Misuse Presentations by Chief Complaints

	Overdose	Substance misuse/ Intoxication	Substance withdrawal	Unknown
2011	1683	2542	1049	0
2012	1726	2319	766	28
2013	1526	1807	809	0
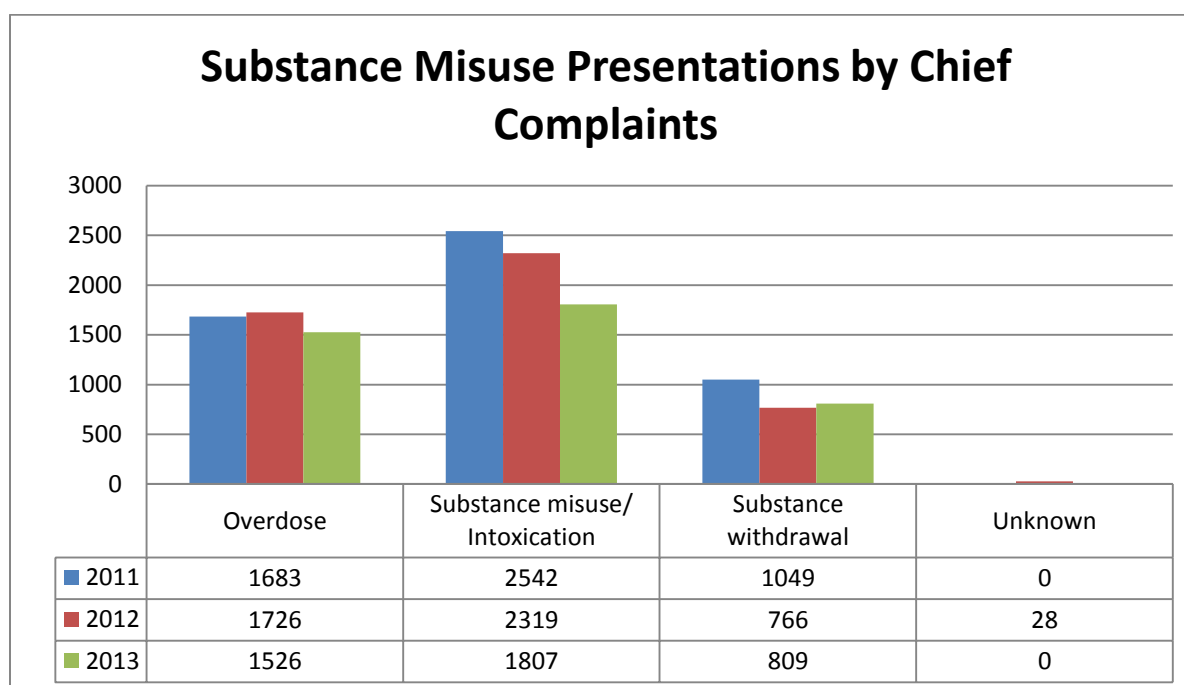
Visit Characteristics Describing *When*

To explain *when* these individuals arrived at the ED in Winnipeg for substance-related

care, the day of the week, time, month, season, and length of hospitalization were examined.

When ED visits were analyzed based on the day of the week, slightly more individuals presented

on a Monday (105,135 or 15%) versus any other day of the week, Tuesday (99,314 or 14%),

Wednesday (97,594 or 14%), Thursday (96,122 or 14%), Friday (96,054 or 14%), Saturday

(95,074 or 14%), and Sunday (97,825 or 14%). However, when a similar analysis was conducted that assessed when individuals with substance-related health needs presented more often, weekend visits were more prevalent versus during the week (Monday through Friday). When assessing prevalence based on days of the week by facility and year of presentation, CGH, GGH, SBGH, and the VGH consistently had more substance-related ED visits on the weekend in 2011, 2012, and 2013; while SOGH had the majority of such visits on the weekend in 2011 only, with Saturday in 2012 and 2013. HSC had more substance-related presentations on Wednesday in 2011, on the weekend in 2012, and on Thursday in 2013.

The most common time that individuals with substance-related health needs presented to the ED was between 0000-0059, followed by 2300-2359, with the least likely time to present being 0500-0559. Given that health care staff in the ED work shift work (either 8 or 12 hour shifts), it only seems appropriate to assess the prevalence of such presentations based on the following shifts: days (0800-1559), evenings (1600-2359), and nights (0000-0759) for 8-hour shift workers, and then days (0800-1959) and nights (2000-0759) for 12-hour shift workers. Based on such parameters for 8-hour shift workers, individuals for 'substance misuse' care needs were more likely to present to the ED during the evening shift (5,731 equivalent to 40%), followed by the day shift (4,214 or 30%), and only slightly less during the night shift (4,310 or 30%). When assessing the prevalence of substance-related ED presentations based on the 12-hour shift parameters, the data indicated these individuals were slightly more likely to present during the day (7,315 equivalent to 51%) versus during the night (6,940 or 49%) (see figure 9). These findings are significant given that staff and support in the ED are less during the night shift, however the rates of substance-related ED visits differed minimally (by 2%) from the day to night shift.

Table 2: Visit characteristics for 'substance misuse' based on day of the week: overall, per year of study, and based on facility.

			Week Day						
			Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2011	Facility	CGH	64	41	49	56	51	44	73
		GGH	86	65	61	75	77	61	97
		HSC-A	346	344	385	408	354	389	377
		SBGH	94	52	55	62	59	64	89
		SOGH	147	99	105	132	115	114	206
		VGH	70	46	44	45	41	47	85
	Total		807	647	699	778	697	719	927
2012	Facility	CGH	94	64	42	62	55	67	79
		GGH	85	56	65	63	73	71	98
		HSC-A	336	285	289	315	297	330	331
		SBGH	82	62	64	61	60	53	81
		SOGH	124	95	130	104	110	113	166
		VGH	63	45	49	48	55	54	63
	Total		784	607	639	653	650	688	818
2013	Facility	CGH	75	50	50	53	46	48	68
		GGH	71	64	62	59	40	70	40
		HSC-A	222	276	263	267	284	275	267
		SBGH	81	61	55	76	63	64	84
		SOGH	92	87	75	102	95	83	116
		VGH	64	50	57	40	49	40	58
	Total		605	588	562	597	577	580	633
Total	Facility	CGH	233	155	141	171	152	159	220
		GGH	242	185	188	197	190	202	235
		HSC-A	904	905	937	990	935	994	975
		SBGH	257	175	174	199	182	181	254
		SOGH	363	281	310	338	320	310	488
		VGH	197	141	150	133	145	141	206
	Total		2196	1842	1900	2028	1924	1987	2378

Figure 9: Prevalence of substance-related ED visits in Winnipeg based on time of arrival and shift.
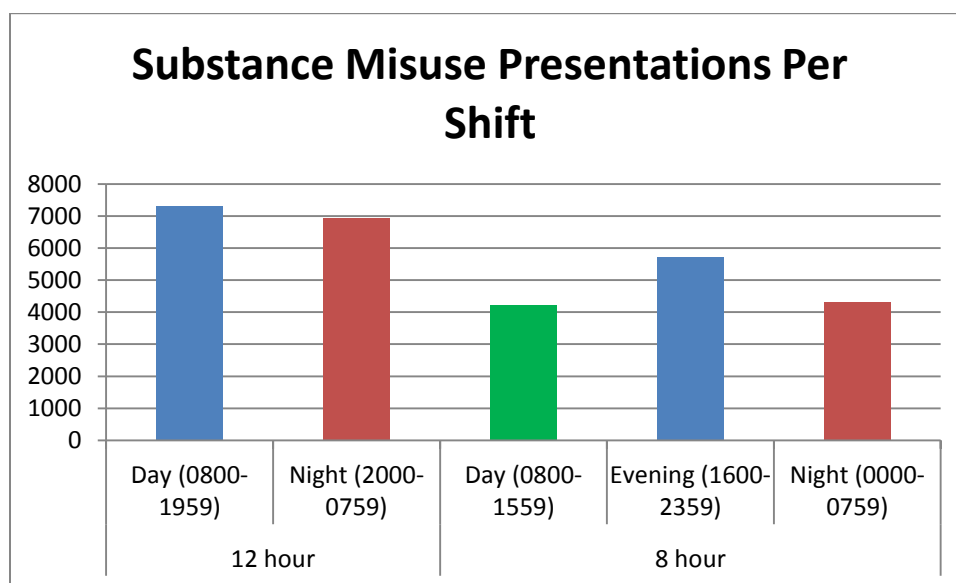
When assessing *when* these individuals were most likely to present to the ED, the month of presentation was assessed indicating that March (1,266 or 8.9%) and July (1,262 or 8.9%) were the most prevalent months for 'substance misuse' presentations (see table 5). When such presentations were assessed based on the 'season of the year' that they presented, the following parameters were used: spring (March, April, and May), summer (June, July, and August), fall (September, October, and November), and winter (December, January, and February). Based on such parameters, summer (3,732 or 26%) was identified as the most common season during which substance-related ED presentations were seen in Winnipeg, followed by spring (3,696 or 26%), fall (3,432 or 24%), and winter (3,395 or 24%); overall resembling similar rates. These findings are represented in figure 10.

Table 3: Prevalence of 'substance misuse' based on season of presentation: overall, per year of study, and based on facility.

Year	Facility	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	CGH	27	20	45	38	25	28	38	35	35	33	26	28
	GGH	42	38	28	47	44	57	57	49	40	54	35	31
	HSC	221	231	257	244	202	235	266	211	198	195	164	179
	SBGH	35	35	29	37	51	30	37	43	46	42	49	41
	SOGH	63	53	74	75	86	77	83	85	85	85	73	79
	VGH	32	26	39	32	23	26	29	38	31	35	35	32
	Total	420	403	472	473	431	453	510	461	435	444	382	390
2012	CGH	38	36	49	44	31	39	51	30	29	26	38	52
	GGH	38	51	51	39	41	42	51	41	39	48	29	41
	HSC	187	235	210	183	162	199	158	189	166	160	168	166
	SBGH	41	53	38	41	42	43	33	39	30	34	29	40
	SOGH	83	56	71	73	84	76	81	73	61	71	55	58
	VGH	27	35	33	36	37	29	39	27	33	22	21	38
	Total	414	466	452	416	397	428	413	399	358	361	340	395
2013	CGH	38	26	37	35	25	34	33	36	33	37	29	27
	GGH	31	25	39	42	37	34	33	30	38	38	32	27
	HSC	175	128	151	154	167	171	157	162	154	159	155	121
	SBGH	36	32	46	40	48	34	38	41	39	44	49	37
	SOGH	46	45	46	53	54	64	46	65	61	59	56	55
	VGH	36	22	23	29	29	24	32	34	31	26	35	37
	Total	362	278	342	353	360	361	339	368	356	363	356	304
Total	CGH	103	82	131	117	81	101	122	101	97	96	93	107
	GGH	111	114	118	128	122	133	141	120	117	140	96	99
	HSC-A	583	594	618	581	531	605	581	562	518	514	487	466
	SBGH	112	120	113	118	141	107	108	123	115	120	127	118
	SOGH	192	154	191	201	224	217	210	223	207	215	184	192
	VGH	95	83	95	97	89	79	100	99	95	83	91	107
	Total	1196	1147	1266	1242	1188	1242	1262	1228	1149	1168	1078	1089

Figure 10: Prevalence of substance-related ED visits in Winnipeg by season of presentation.
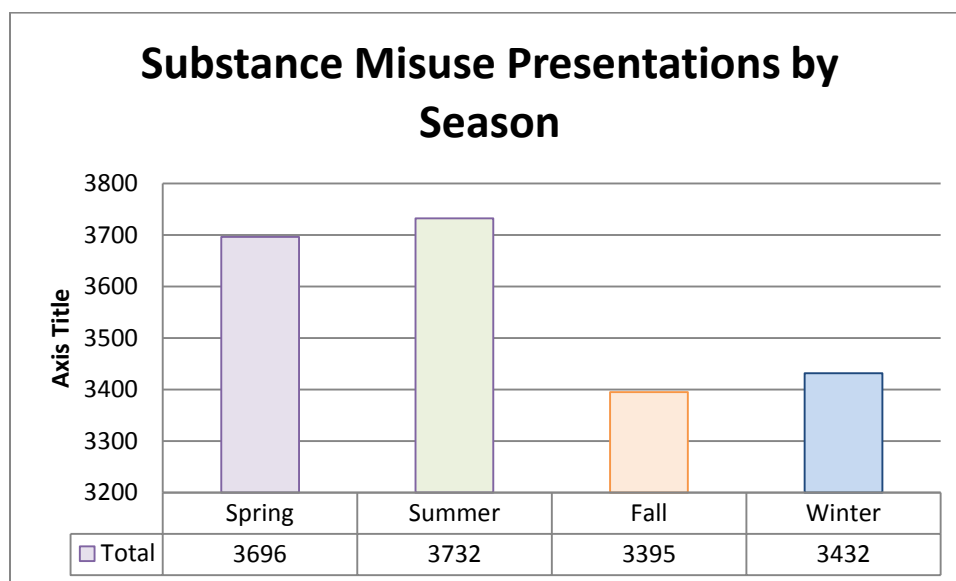
The length of time that substance-related ED presentations spent in the hospital was assessed and ranged from 3-minutes to 22-days, averaging 8-hours and 45 minutes per visit (90th percentile=18.69 hours) with a median time= 5-hours and 36 minutes. The length of hospital stay for all ED visits ranged from 0-minutes to 501 days and , averaging 8-hours and 21 minutes per visit (90th percentile=18 minutes) with a median time of 4-hours and 57 minutes.

Visit Characteristics Describing *How*

An analysis was conducted to explain *how* 'substance misuse' presentations arrived to the ED based on CTAS scores, the documented mode of arrival, and discharge disposition. CTAS scores indicate the level of acuity for each individual ED visit, ranging from 1 (very acute) to 5 (less acute). According to the data-set, individuals who attended an ED in Winnipeg during this study time were more likely to be given a CTAS level 3 (n=260,841 or 38%) or 4 (n=250,293 or 36%), and were less likely to be a CTAS level 2 (n=114,561 or 17%), 5 (n=42,378 or 6%) or 1 (n=9,194 or 1%); 9851 (1%) had unknown CTAS scores documented. These results suggest that almost half of substance related ED presentations in Winnipeg during this study time were

triaged as a level 4 (n=4,104 or 43%), 29% of such visits were given a CTAS level 3 (n=4,104), followed by 26% a CTAS level 2 (n=3,652), 2% a CTAS level 1 (n=335), with less than 1% of such presentations being a CTAS level 5 (n=69) (see Figure 11). This data identifies that substance related ED presentations are deemed more acute (CTAS 1-3, 57%) at triage.

Figure 11: Prevalence of substance-related ED visits in Winnipeg by CTAS level.
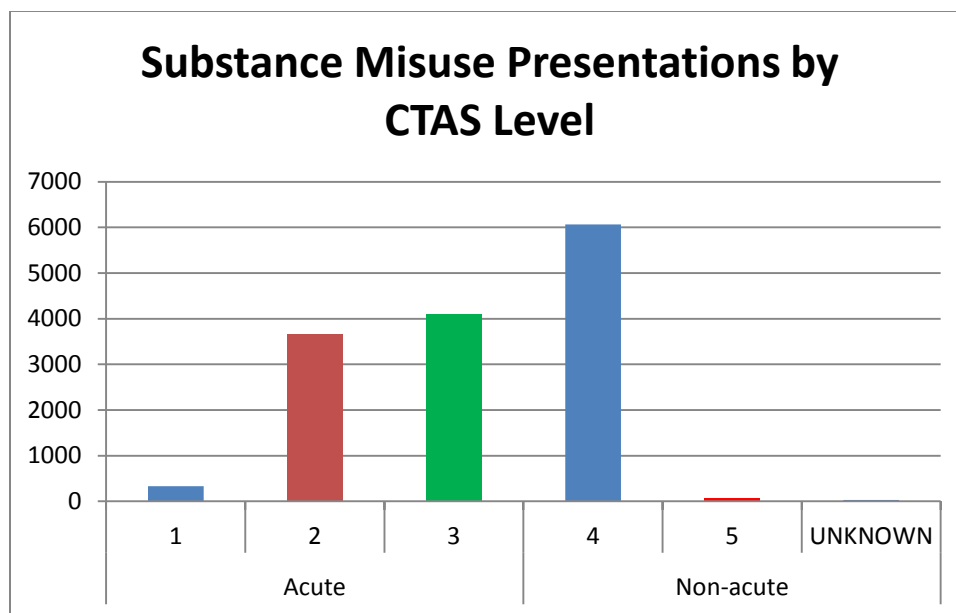
Chi-square test was completed to assess if a relationship existed between level of acuity and substance misuse ED presentations in Winnipeg. The Chi-Square trends towards but does not reach significance between these variables (p=<.055).

Mode of Arrival

The documented mode of arrival to the ED was examined. According to the data-set, individuals who attended the ED in Winnipeg during this study time arrived to the ED via 1354 different modes, thus making it challenging to categorize this data. After careful analysis of the data, the data was separated into seven specific categories: per self, via ambulance, via stretcher service, via police, via transport, unidentified (if left blank), and unknown (miss-spelled or uninterpretable data). Based on the data for *all* ED visits in Winnipeg during the study time, the

most prevalent mode of arrival to the ED was unknown (488,333 or 71%), followed by via

ambulance (143,023 or 21%), per self (30,134 or 4.4%), unidentified (1,754 or 2.6%), via

stretcher service (4,152 or 0.6%), via police (3,162 or 0.5%), and via transfer (772 or 0.1%). The

documented mode of arrival for substance-related ED presentations consisted of 125 different

modes of arrival, which were categorized into the same seven specific categories. Based on the

following categories, significantly more individuals with substance-related care needs arrived to

the ED via ambulance (7,903 or 55%) than any other mode of arrival. The second most prevalent

mode of arrival to the ED for substance-related health needs was unknown (5,581 or 37%),

followed by per self (366 or 2.6%), unidentified means (167 or 1.2%), via police (166 or 1.2%),

via stretcher service (63 or 0.4%), with the least amount of people arriving via transfer (9 or

0.06%). Figure 12 displays the above findings.

Figure 12: Prevalence of substance-related ED visits in Winnipeg by mode of arrival.

Substance Misuse ED Visits by Mode of Arrival

	per self	ambulance	stretcher service	police	transfer	unidentified	unknown
Substance Misuse	366	7903	63	166	9	167	5581
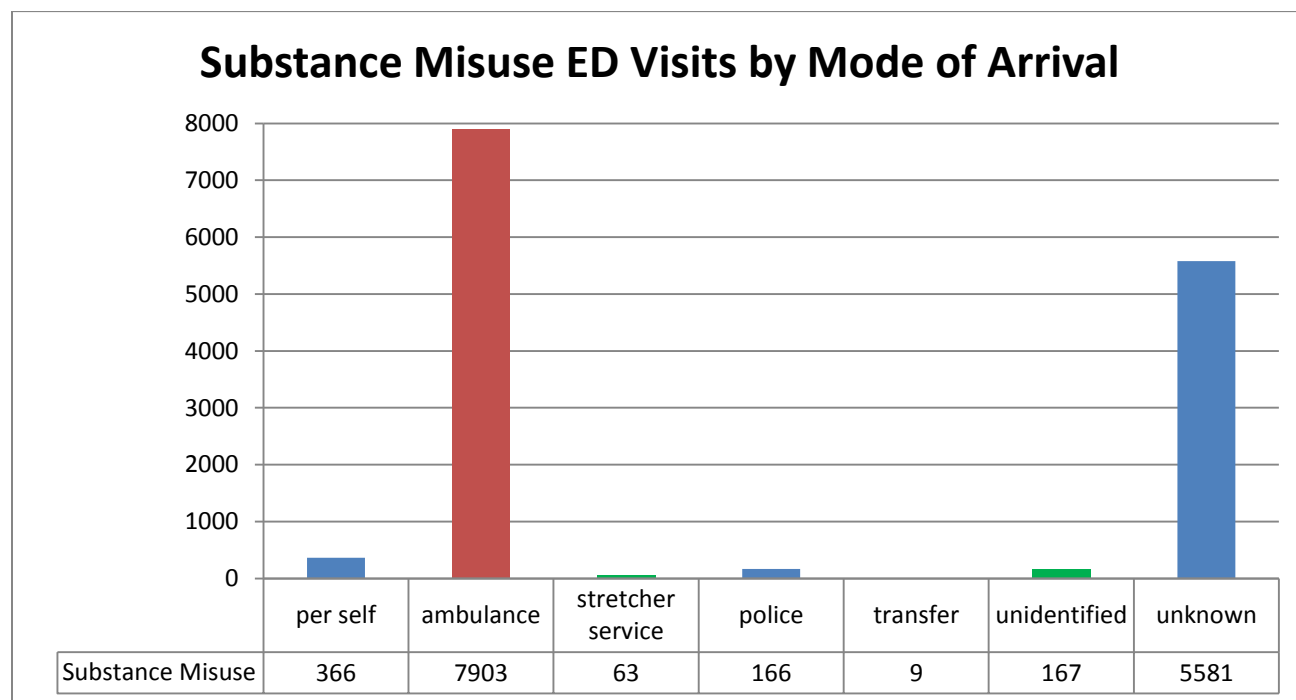
Discharge Disposition

The discharge disposition of the 'substance misuse' ED visits was also assessed. Twenty categories that described the discharge dispositions of all 14,255 substance related ED visits were identified, and further categorized into 5 categories which includes: death (3), home (10,748), left without being seen (LWBS) (1,695), left against medical advice (LAMA) (172), and admitted (1,637). Following being treated in the ED, over 75% of substance related ED visits are discharged home, with 12% of such individuals being admitted to either the visiting hospital or transferred to another hospital. Interestingly, nearly 13% of such individuals either LWBS by an ED physician (12%) or LAMA (1%) from the ED, thus resulting in no care or treatment being provided for their care needs (see Figure 13).

Figure 13: Prevalence of substance-related ED visits in Winnipeg by discharge disposition.
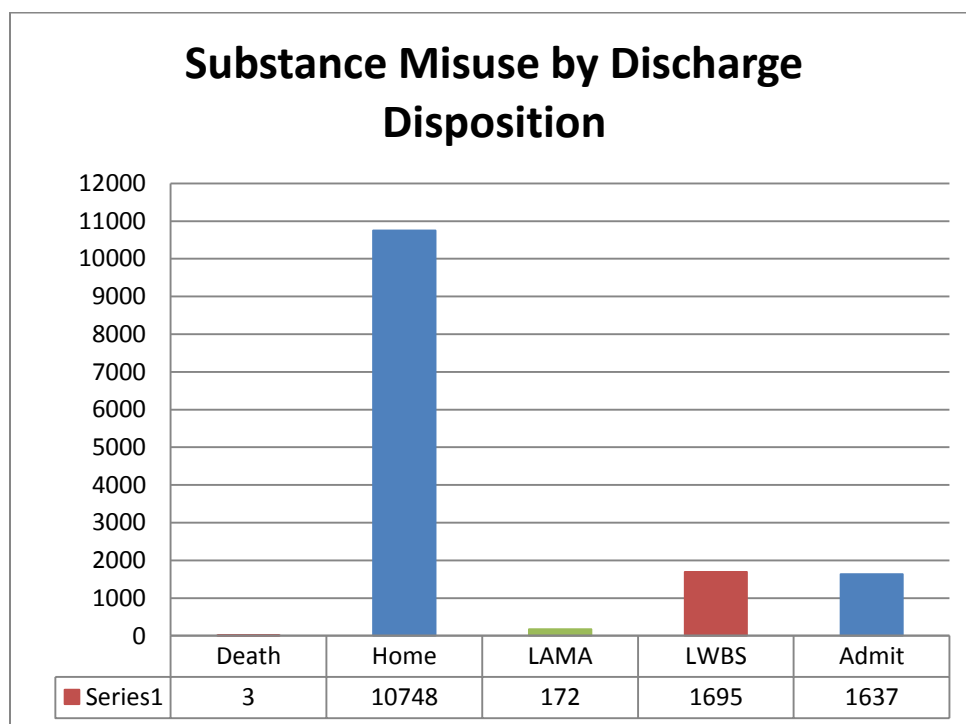
By performing the above analysis, the visit characteristics for those individuals identified at triage as presenting to the ED in Winnipeg for substance-related health needs was calculated

based on *what*, *where*, *when*, and *how* these individuals presented to the ED, and therefore is able to answer the investigator's third research question.

4.4. Validation

Based on the findings from the above analyses there were a number of statistically significant relationships that were identified given the variables regarding the prevalence, patient profiles, and visit characteristics for the substance-related ED visits in Winnipeg. Similarly, these findings were consistent with those which were identified during the writer's pilot study, which included:

1. The prevalence of substance-related ED presentations in Winnipeg were consistent with the literature from other developed nations; accounting for 2.1% of all ED presentations with more visits presenting to the core hospital (which is HSC in Winnipeg).

2. The patient profiles for those individuals presenting to the ED in Winnipeg with substance-related presentations were 'not married' young adult males. These finding were also consistent with the findings from the writer's pilot study.

3. The visit characteristics for substance-related ED presentations in Winnipeg indicated that such individuals were more likely to present to the ED in the evening, on the weekend, in the summer month, and arrive via ambulance with more acute CTAS scores (CTAS 1, 2, & 3 versus 4 & 5). These findings were reflective of those identified in the writer's pilot study.

The writer's pilot study identified there was a significant relationship among substance-related presentations that were male, had more acute CTAS scores, and arrived via ambulance, and then LWBS or who LAMA. A similar pattern was identified using a larger data-set (three years versus one year) of the same population (substance related ED presentations in Winnipeg)).

Furthermore, in order to confirm the patterns identified did not occur by chance, assessing the significance of male substance-related ED visits, which arrived via ambulance with acute CTAS scores that were admitted to hospital were measured. The data was transformed to reflect only two characteristics per variable, so significance testing could be performed.

Chi-square analysis tests were conducted to assess if statistical relationships existed among and between different variables from the Winnipeg ED data-set. The following variables were transformed into categorical variables, thereby making chi-square an appropriate statistical procedure to measure relationships among presentation, acuity, gender, admissions, mode of arrival, and LWBS rates.

Chi-square analysis identified that a statistically significant relationship existed between the presentation (substance use, non-substance use), acuity level (acute, non-acute) and gender (male, female) as the probability level for this test was less than .05 (p<.05). In terms of directionality, there was an association between females presenting to the ED with acute substance related care needs (61%; 4,079 of 6,744 visits), relative to males that presented to the ED with acute substance related care needs (53.6%; 4,012 of 7,479 visits). In terms of magnitude, Cramer's V reflected that the covariate predictor variable *gender* evidenced a small effect upon the level of acuity for both non-substance related (Cramer's V=.069) and substance related presentations (Cramer's V=.021).

Chi-squared analysis was conducted to assess the relationship between the presentation, acuity level, and admission to hospital. The probability level for this test was less than .05 (p<.05) indicating that a statistical relationship existed between these variables. When directionality was assessed, a significant association was identified among acute non-substance-related ED presentations that resulted in admissions (79.9%; 75,407 of 94,322 visits), relative to

acute substance-related ED presentations that resulted in admissions (69.4%; 1,132 of 1,632

visits). Cramer's V was used to assess the magnitude of the relationship which indicated a small

effect size among admitted substance-related ED visits in Winnipeg (Cramer's V=.091),

however a small/medium effect size was evidenced among non-substance-related admitted visits

in Winnipeg (Cramer's V=.190) upon the dependent variable, *acuity*.

Chi-square analysis was used to assess if a statistically significant relationship existed

between the presentation (substance use, non-substance use), acuity level (acute, non-acute) and

ambulance use (ambulance, no ambulance) indicating a probability level of less than .05 (p<.05).

The probability is reported as less than .001 (p<.001). In terms of directionality, there is an

association between non-substance-related acute ED visits that arrive via ambulance (72.3%;

98,008 of 134,738 visits), relative to acute substance-related ED visits that arrive to the ED via

ambulance (62.2%; 4903 of 7882 visits). In terms of magnitude, Cramer's V reflected that the

covariate predictor variable *ambulance* use evidenced a small/medium effect upon the level of

acuity for both non-substance related (Cramer's V=.163) and substance related presentations in

Winnipeg (Cramer's V=.120).

Chi-squared analysis was conducted to assess the relationship between the presentation,

acuity level, and LWBS rates. The probability level for this test was less than .05 (p<.05)

indicating that a statistical relationship existed between these variables. When directionality was

assessed, a significant association was identified among non-acute substance-related ED visits

that LWBS (62.9%; 1,063 of 1,691 visits), relative to non-acute not substance-related ED visits

that LWBS (56.5%; 30,842 of 54,547 visits). Cramer's V was then used to assess the magnitude

of the relationship indicated a small/medium effect size among *LWBS* substance-related ED

visits in Winnipeg (Cramer's V=.146), and a small effect size was evidenced among non-

substance-related visits that LWBS in Winnipeg (Cramer's V=.080). Table 6 displays the above findings.

Table 4: Chi-square analysis of 'substance misuse' based on gender, admissions, mode of arrival, and LWBS rates by acuity and entrance complaint.

		Substance Use		Non-substance Use	
		Acute	Non-acute	Acute	Non-acute
Gender	Male	4012 (53.6%)	3467 (46.4%)	172749 (55.7%)	137415 (44.3%)
	Female	4079 (60.5%)	2665 (39.5%)	203708 (57.7%)	149105 (42.3%)
	p-value	<.05		<.05	
Admit	Admit	1132(69.4%)	500 (30.6%)	75407 (79.9%)	18915 (20.1%)
	Non-admit	6959 (55.3%)	5633 (44.7%)	301098 (52.9%)	267623 (47.1%)
	p-value	<.05		<.05	
Mode of Arrival	Ambulance	4903 (62.2%)	2979 (37.8%)	98008 (72.7%)	36730 (27.3%)
	Non-ambulance	3188 (50.3%)	3154 (49.7%)	278497 (52.7%)	249808 (47.3%)
	p-value	<.05		<.05	
Discharge status	LWBS	628 (37.1%)	1063 (62.9%)	23705 (43.5%)	30842 (56.5%)
	Non-LWBS	7463 (59.5%)	5070 (40.5%)	352496 (58%)	255638 (42%)
	p-value	<.05		<.05	

In summary, statistical tests were performed and revealed significant relationships existed among acute substance-related ED visits among females who presented to the ED via ambulance. Statistical relationships were also evidenced among non-acute substance-related ED visits that LWBS by an emergency physician. Therefore, the investigator's fourth research questions was answered.

CHAPTER 5: DISCUSSION, IMPLICATION, SUMMARY, AND

RECOMMENDATIONS BASED ON THE FINDINGS

The content of this chapter will include an integrative analysis based on the investigator's professional knowledge, the findings from this research study, as well as other theories and findings derived from similar research studies. The implications of the research findings on nursing practice, policy, and key stakeholders will be identified and discussed. This chapter will conclude with a discussion describing the importance of the researcher's research findings to facilitate understanding the nature of this problem in Winnipeg. Further research endeavors that will facilitate with the identification, management, and reduction of such visits in the ED will be discussed.

5.1. Discussion

The findings presented in chapter four are analyzed within the context of the four research questions, the findings from the literature review, and the researchers' personal ED nursing experience.

1. **What is the *prevalence* of individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31 of 2013?**

As identified in the literature, substance-related ED presentations were predominant among those who spoke English (Binks et al., 2005; Flynn et al., 2006; Indig, Copeland & Conigrave, 2009; Youmans et al., 2010). Although language was not specified as an inclusion or exclusion factor for this study, one can only assume that as long as the triage nurse was able to triage the individual (with or without a translator), they were captured in this study. Based on personal ED experience, when an individual presents to the ED who is not fluent in English or

another language fluent to the triage nurse, a translator in requested (internally-ED staff, or

individual's family/friend/support; or externally-paged overhead throughout the hospital

requesting a translator in the individuals fluent language present to the ED). This allows the

individual to be triaged appropriately and the breadth of their individual health needs captured,

and thus captured in the current dataset.

Analysis using frequency distributions found that 2.1% of ED presentations in Winnipeg

were for substance-related care needs. As shown in figure 3 (p. 41), the proportion of substance-

related ED visits were substantially greater at HSC representing 6,640 visits or 4.2% of the total

ED visits, which accounted for almost half of the total substance-related ED visits in Winnipeg.

Given that HSC is in the core of Winnipeg, plus the fact that the chemical withdrawal unit is

housed within HSC, it is logical that the proportion of such visits to HSC exceeds the number of

visits to all other facilities in Winnipeg. In the most recent literature, the prevalence of such visits

to the ED ranged anywhere from 3-59% of the total ED population, either as their primary,

secondary, or associated complaint (Baune et al., 2005; Boniatti, Passamani, Almeida &

Cardoso, 2009; Cherpitel & Ye, 2008; McCabe, 2006; Peterson, Desmond & Cunningham,

2012); however, when utilizing a retrospective data-analysis methodology 0.2%- 31.1% (mean of

11%) of the overall ED population are captured (Baune et al., 2005; Blow et al., 2005; Brubacher

et al., 2008; Dent, Hunter, & Webster, 2010; Elder et al., 2004; Geurts et al., 2012; Indig et al.,

2010; Jelinuk et al., 2008; Muscatello et al., 2009; Peterson et al., 2012; Schildhaus et al., 2013;

Verelst et al., 2012). Given that this study captured only those visits that identified 'substance

misuse' as the primary reason for attending the ED and utilized the retrospective data-analysis

methodology to analyze the prevalence of substance-related ED presentations in Winnipeg;

having a rate of 2.1% of the total ED population is a significant finding and consistent with

findings from other developed nations. Support from the literature suggests that the prevalence of such ED visits would be significantly higher if secondary and associated substance-related complaints were captured, thus indicating the need for additional research to be conducted based on such variables (Brubacher et al., 2008; Elder et al., 2004; Havard et al., 2011; Peterson et al., 2012).

2. **What are the *patient profiles* of those individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31 of 2013?**

This study's analysis found that although females frequented the ED (53%) over males for *all* ED visits, males were identified as the gender that attended more often for substance-related care needs (53%). This finding was supported by the literature, as a number of studies found that males attended the ED more often for substance-related care needs (Baune et al., 2005; Blow et al., 2011; Boniatti et al., 2009; Browne et al., 2013; Brubacher et al., 2008; Cherpitel, & Ye, 2009; Cherpitel, & Ye, 2012; Dent, Hunter, & Webster, 2010; Fleming et al., 2007; Geurts et al, 2012; Havard et al., 2011; Heise, 2010; Hoskins, & Benger, 2013; Indig, Copeland, & Conigrave, 2009; Indig et al., 2010; Jelinek et al., 2008; Kerr et al., 2005; Merrick et al., 2011; Muscatello et al., 2009; Reis, Figlie, & Laranjeira, 2006; Roche, Freeman, & Skinner, 2006; Rockett et al., 2006; Roudsari, Caetano, & Field, 2011; Schildhaus et al., 2013; Verelst et al., 2012; Vitale et al., 2005).

An analysis of the age and age-range for substance-related ED visits indicated that 4% were 17 year olds, being the most frequent age for such ED visits. This is a significant finding given that the legal age to consume alcohol in Canada is 18 and knowing that illicit drug use is

illegal in Canada, means the events that caused these 17 year olds to attend the ED were a result of illegal practices.

The modal age for all ED visits in Winnipeg was 22. According to the literature, the most prevalent age-range for individuals to attend the ED with substance-related care needs was 31-45 or termed 'middle-aged'. A frequency distribution analysis found that the most prevalent age-range of substance-related ED visits in Winnipeg was between 18-30 or termed 'young adult'. Substance use at an early age increases the risk for substance-related dependency, frequency, and results in the use of more dangerous substances later in life (AACP, 2014). This finding is significant given that the most prevalent age-range for such presentations in Winnipeg is 18-30 and without implementing early interventions, substance-related dependency, frequent use, and misuse will be imminent. Therefore without intervention, substance-related ED presentations in Winnipeg will result in increased morbidity and mortality, increased service utilization, and financial burden.

The author speculates that the age-related findings from this study differ from what was identified in the literature because the author had no age restrictions for inclusion of data for this study, and included all individuals (0-100 years of age) who attended any ED in Winnipeg during the study time, where many studies identified an age restriction of 18 plus (Blow et al., 2011; Browne et al., 2013; Cherpitel, & Ye, 2008a, 2008b, 2009 & 2012; Fleming et al., 2007; Geurts et al, 2012; Heise, 2010; Indig, Copeland, & Conigrave, 2009; Schildhaus et al., 2013; Youmans et al., 2010) thus limiting the generalizability of their findings.

The majority (64%) of substance-related ED presentations in the Winnipeg sample were identified as 'not married'. Although marital status has not been identified as a factor in the ED literature, unmarried men are more likely to smoke, drink excessively, and engage in more risky

behaviours verses married men who are mentally and physically healthier, with fewer premature deaths (Harvard Men's Health Watch, 2010; Monin & Clark, 2011).

Therefore, the above research findings suggest that Winnipeg has a younger population of single adult males who frequent the ED for substance-related care needs, than what is generally seen in the ED in Winnipeg, or with what was identified in the literature.

3. **What are the *visit characteristics* of those individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December of 2013?**

Cross tabulation identified that individuals with substance misuse/intoxication were more likely to present to the ED on the weekends versus during the week, with 0000-0059 being the most common time of presentation. The research findings suggest equal numbers of presentations during the day (51%) and night (49%) shifts. Understanding that staffing levels, supportive resources, and patient and staff support are less during the night shift and on weekends, presents challenges for the ED with the potential for critical patient outcomes during these peak presentation times (Baune et al., 2005; Dent, Hunter, & Webster, 2010; Elder et al., 2004; Havard et al., 2011; Hoskins & Benger, 2013; Indig, Copeland ,& Conigrave, 2009; Indig et al., 2010; Peterson, Desmond & Cunningham, 2012).

The proportion of ambulance services utilized among substance-related ED presentations was substantially greater (55%) when compared with ambulance use by the general ED population in Winnipeg (21%). This finding is consistent with what is presented in the literature (Dent, Hunter, & Webster, 2010; Geurts et al., 2012; Indig, Copeland, & Conigrave, 2009; Indig et al., 2010; Jelinek et al., 2008; Verelst et al., 2012). Understanding that ambulance services

were utilized by over half of substance-related visits is a significant finding, and identifies the breadth of service utilization, and financial cost associated with such ED visits in Winnipeg.

As shown in figure 11 (p. 56), 57% of substance-related ED presentations were deemed more acute (CTAS 1-3) at triage. This is a significant finding, given that such individuals are presenting with highly acute care needs, posing a greater challenge for ED staff given the uncertainty regarding the morbidity and mortality associated with the unpredictable effects of alcohol, licit and illicit drug use, abuse, and overdose (Brubacher et al., 2008; Geurts et al., 2012; McCabe, 2006). Knowing that such presentations arrive to the ED during inopportune times (when staffing levels and support are less), in addition to the fact that they are deemed more acute at triage, may result in a harmful ED experience with potentially negative patient outcomes.

It would make sense that since substance-related presentations are arriving to the ED via ambulance, with more acute care needs, that they would have higher admission rates for such presentations; however this was not the case for substance-related ED visits in Winnipeg. The literature identified more admissions for substance-related ED visits versus the general ED population (Baune et al, 2005; Binks et al., 2005; Brubacher et al., 2008; Dent, Hunter & Webster, 2010; Jelinek et al., 2008; Roudsari, Caetano & Field, 2011; Schildhaus et al., 2013; Verelst et al., 2012); however figure 13 (p.58) demonstrates how 75% of substance-related ED visits in Winnipeg were discharged home following treatment, which is substantially higher than the rates from the overall ED population (21%). What is even more significant is the fact that 13% of such visits in Winnipeg were not seen by a physician (LWBS), or left before the warranted treatment regime was completed (LAMA). This is consistent with what has been identified in the literature for substance-related ED presentations that LWBS (Brubacher et al.,

2008; Geurts et al., 2012; Indig et al., 2010; Jelinuk et al., 2008; Schildhaus et al., 2013) suggesting that the ED may have failed to treat or provide adequate care to those individuals with medically recognized care needs.

4. **What are the statistical relationships amongst the *prevalence*, *patient profiles*, and *visit characteristics* for those individuals who present to an ED in Winnipeg, Manitoba with substance-related health needs from January 1 of 2011 to December 31 of 2013?**

Analysis at the multivariate analysis found that all predictors (males, arrival via ambulance, with acute care needs, which resulted in hospital admission) demonstrated a statistically significant relationship ($p<.05$) with 'substance misuse' presentations in Winnipeg. Although such tests were not consistently identified within the literature from similar studies; however based on the identified *p*-values, one can assume that the findings from this study did not occur by chance.

Chi-square analysis identified a positive relationship existed among substance-related ED presentations that were male, arrived via ambulance, were admitted, and LWBS. The level of acuity was higher in those with substance-related presentations, however was not an indication of being admitted to hospital in Winnipeg. What was significant is the magnitude of service utilization associated with substance-related ED presentations in Winnipeg. Non-acute substance-related visits presented to the ED more frequently via ambulance, suggesting that there is an excess use of ambulance and paramedic services for non-emergent care needs resulting in fewer ambulances and paramedic services being available for individuals experiencing acute medical emergencies. The prevalence of LWBS visits were more frequent in both acute and non-acute substance-related visits in Winnipeg; therefore no medical treatment was provided, thus

resulting in missed treatment opportunities. As supported by the Circle of Frequency model, without providing intervention to those individuals with known substance-related care needs will result in the development of more acute and/or chronic care needs and thus recurrent ED visits, which further perpetuates the burden associated with such presentations in Winnipeg. These findings are significant and illustrate the burden associated with the inappropriate and frequent service utilization of substance-related ED visits in Winnipeg which is also supported in the literature (Binks et al., 2005; Dent, Hunter, & Webster, 2010; Geurts et al., 2012; Indig, Copeland, & Conigrave, 2009; Indig et al., 2010; Jelinek et al., 2008; Reis, Figlie, & Laranjeira, 2006; Rockett et al., 2006; Verelst et al., 2012).

5.2. Clinical implications and Next Steps

The aim of this research project was to identify the prevalence, patient profiles, and visit characteristics for substance related ED presentations in Winnipeg from January 1, 2011 to December 31, 2013. Although this information was not previously known for the Winnipeg population, the author believed it was essential that such findings be used to guide nursing practice towards the delivery of optimal care and management of such presentations in the ED. However, the clinical implications associated with caring for individuals who present to the ED with substance-related care needs is very complex, diverse, and unpredictable given the morbidity and mortality associated with such presentations, and will be the focus of this section.

The clinical implications associated with the overall burden of substance misuse presentations in Winnipeg is a direct result of frequent ED use and excess service utilization. The findings included in this study are just the 'tip of the iceberg' in that they represent data from those visits which identified substance misuse as their primary complaint, thus all secondary and associated substance-related care needs were not captured. Given that ED staff in Winnipeg have

identified an increase in substance-related visits, and have recognizing an influx in use and

demand for addictions treatment programs throughout Winnipeg; unfortunately these same

findings were not captured in this study. The risk of not identifying the true extent and

significance of substance-related ED visits in Winnipeg means that services will not adjust and

expand to meet the true health needs of Winnipegger's.

A solution to overcome the lack of identification of substance-related ED visits is to

adopt a policy that will ensure *all* ED visits are being screened using the *same* tool, at *all* times

of the day, every day throughout the year. Given that triage nurses are already guided by a

uniform computerized triage program, adopting a more advanced system of screening for and

identifying substance related visits is ideal. This study suggested that individuals with substance

related care needs cannot be identified based on gender, age, or physical appearance, therefore

such visits will only be identified if questions regarding the individuals use of these substances

are asked. An example of a question to assess substance use includes: 'Have you used alcohol,

licit, or illicit drugs in the last 6 hours'. If they answer 'yes' to this question, their chart is

flagged. The benefit of flagging substance related ED presentations at triage would prompt a

more thorough assessment from the PEN regarding the individuals' substance use/misuse. In less

acute presentations this assessment could be implemented and completed prior to the individual

seeing the emergency physician. It is hypothesized that by screening for such care needs at

triage, the prevalence of recurrent visits, LWBS, and LAMA rates would be reduced as the

individual's substance related health needs are addressed and individualized support options

discussed and implemented.

The overall goal of screening for such presentations at triage is aimed at limiting the

burden (morbidity, mortality, costs, inappropriate service utilization, and frequent visits)

associated with substance-related disorders, thus fostering and improving health promotion practices for these already at risk individuals (Brubacher et al., 2008; Jelinek et al., 2008; Peterson et al, 2010). Adopting screening at triage would increase the accuracy of such research findings and help ED staff, researchers, and policy makers identify the true extent of such visits in Winnipeg thus leading to the promotion and management of best nursing practice. Having an accurate representation of substance-related ED visits would justify the need for additional support services (for patients and staff) in the ED, resulting in improved overall health and safety of Winnipeggers.

5.3. Conclusion

The media and celebrities have trivialized the overuse of alcohol and drugs to achieve an altered sense of reality. The unfortunate repercussions of such dangerous behaviours have become one of the leading causes of preventable death and disability worldwide (Babor et al., 2010). Winnipeg is not immune to the harmful health related effects that are a direct result of substance use and misuse gone wrong. Over 2.1% of all ED visits in Winnipeg from January 1, 2011to December 31, 2013 were a direct result of 'substance misuse'. Although such presentations cannot be identified based on appearance alone, the incidence of such presentations to the ED in Winnipeg were more prevalent among younger-adult, un-married males. Substance-related ED visits in Winnipeg had higher acuity rates, with these individuals arriving during inopportune times (on weekends and during the night when staffing levels and support are less), thus presenting greater challenges to staff given the acuity and unpredictability of such presentations (McCabe, 2006). The increased cost and burden attributed to such ED visits in Winnipeg is due to the overuse of ambulance services among non-acute substance-related visits

that have high LWBS rates. Strategies to better identify and treat such care needs in the ED are essential to ensure best practice is provided, and optimal care is achieved.

5.4. Suggestions for Further Studies

Seeing as this is the first time such research has been conducted using this dataset, the writers goal is that the findings from this study will inspire further research which will better describe the prevalence, patient profiles, and visit characteristics of substance-related ED visits in Winnipeg. The writer proposed the introduction of a universal strategy which will better capture all substance-related ED visits at triage, facilitate the delivery of evidence-based nursing practice in the ED, allow policy makers to better understand and meet the care-needs of such ED visits in Winnipeg, and promote future research in this area (in Manitoba and globally).

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Appendix A: Search Terms and Concepts

Concept	MeSH OR	Keywords OR
Emergency department	Emergency Service, Hospital"[Mesh]	"emergency department" "emergency ward" "emergency room" "emergency waiting room" "accident and trauma" "accident and emergency"
Substance abuse	**Alcohol-Related Disorders**"[Mesh]) (includes "Alcohol Drinking"[Mesh], Alcohol-intoxication, Alcoholism, Binge Drinking, Alcohol Withdrawal Delirium) **Street Drugs** Heroin Dependence Opioid-Related Disorders Marijuana Abuse Benzodiazepines Amphetamine-Related disorders Drug Overdose Substance withdrawal (?) Self-poisoning overdose	**alcohol** **substance abuse OR alcohol OR substance-related disorders OR alcohol-related disorders OR street drugs comorbid**
screening	Triage Mass Screening Substance Abuse Detection Patient Admissions Diagnostic Tests (maybe too much urine/blood?)	Questionnaire questioning query triage screening tool verbalizing? detecting
Demographics/numbers	Prevalence Incidence /epidemiology /statistics /utilization	Characteristics demographics prevalence incidence epidemiology demographics geographic population profile

Appendix B: 40 Articles included in the Literature Review

No.	Title	Author	Date
1	Frequent users of an inner-city emergency department	Geurts J, Palatnick W, Strome T, Weldon E.	2012
2	The HEADS-ED: a rapid mental health screening tool for pediatric patients in the emergency department	Trillo AD, Merchant RC, Baird JR, Liu T, Nirenberg TD	2012
3	What is the burden of alcohol-related injuries in an inner city emergency department?	Hoskins R, Benger J.	2013
4	Community hospital admission from the emergency department by persons with substance use disorders.	Schildhaus S, Stocks C, Santora PB, Smith MW	2013
5	Emergency department visits due to alcohol intoxication: characteristics of patients and impact on the emergency room	Verelst S, Moonen PJ, Desruelles D, Gillet JB	2012
6	Trends in alcohol- and drug-related emergency department and primary care visits: data from four U.S. national surveys (1995-2010)	Cherpitel CJ, Ye Y.	2012
7	Screening for harmful alcohol use in Australian trauma settings	Browne AL, Newton M, Gope M, Schug SA, Wood F, Allsop S	2013
8	Alcohol-related injury visits: do we know the true prevalence in U.S. trauma centres?	MacLeod JB, Hungerford DW	2011
9	Alcohol and drug use among patients presenting to an inner-city emergency department: a latent class analysis	Blow FC, Walton MA, Barry KL, Murray RL, Cunningham RM, Massey LS, Chermack ST, Booth BM	2011
10	Use of an administrative data set to determine optimal scheduling of an alcohol intervention worker	Peterson TA, Desmond JS, Cunningham R	2010

11	Older adults' inpatient and emergency department utilization for ambulatory-care-sensitive conditions: relationship with alcohol consumption	Merrick ES, Hodgkin D, Garnick DW, Horgan CM, Panas L, Ryan M, Blow FC, Saitz R	2011
12	The prevalence and characteristics of alcohol-related presentations to emergency departments in rural Australia	Havard A, Shakeshaft AP, Conigrave KM, Sanson-Fisher RW	2011
13	Healthcare system use by risky alcohol drinkers: A secondary data analysis	Heise B	2010
14	Prevalence of alcohol, tobacco and drug misuse among Rhode Island hospital emergency department patients	Youmans Q, Merchant RC, Baird JR, Langan TJ 4th, Nirenberg T	2010
15	Characteristics and comorbidity of drug and alcohol-related emergency department presentations detected by nursing triage text	Indig D, Copeland J, Conigrave KM, Arcuri A	2010
16	*Last call: ethanol metabolism and the implications for emergency department clinicians managing patients with extreme ethanol intoxication*	*Johnson JM*	*2009*
17	Alcohol intoxication/dependence, ethnicity and utilisation of health care resources in a level I trauma center	Roudsari B, Caetano R, Field C	2011
18	The impact of frequent attenders on a UK emergency department.	Dent A, Hunter G, Webster AP	2010
19	What can public health surveillance of emergency department presentations for acute alcohol problems tell us about social trends in drinking behaviour?	Muscatello DJ, Thackway SV, Belshaw DA, McGrath D	2009
20	Comparing methods of detecting alcohol-related emergency department presentations	Indig D, Copeland J, Conigrave KM,	2009
21	Alcohol and injury in the United States general population: a risk function analysis from the 2005 National Alcohol Survey	Cherpitel CJ, Ye Y	2009

22	Prevalence and record of alcoholism among emergency department patients	Boniatti MM, Diogo LP, Almeida CL, Cardoso MO	2009
23	Substance-related problems in patients visiting an urban Canadian emergency department	Brubacher JR, Mabie A, Ngo M, Abu-Laban RB, Buchanan J, Shenton T, Purssell R	2008
24	Frequent attenders at emergency departments: a linked-data population study of adult patients.	Jelinek GA, Jiwa M, Gibson NP, Lynch AM	2008
25	Drug use and problem drinking associated with primary care and emergency room utilization in the US general population: data from the 2005 national alcohol survey	Cherpitel CJ, Ye Y	2008
26	Substance use among those attending an accident and emergency department	Wadsworth E, Smith A	2007
27	Substance use among patients attending an accident and emergency department	Patton R, Smythe W, Kelsall H, Selemo FB	2007
28	At-risk drinking and drug use among patients seeking care in an emergency department.	Fleming EA, Gmel G, Bady P, Yersin B, Givel JC, Brown D, Daeppen JB	2007
29	Prevalence of substance use among trauma patients treated in a Brazilian emergency room	Reis AD, Figlie NB, Laranjeira R	2006
30	Substance use and abuse in trauma: implications for care	McCabe S	2006
31	Detection of maternal alcohol use problems in the pediatric emergency department.	Flynn HA, Cain SA, O'Mahen HA, Davis MM	2006
32	Declared and undeclared substance use among emergency department patients: a population-based study	Rockett IR, Putnam SL, Jia H, Smith GS	2006

33	Substance use among emergency room patients: Is self-report preferable to biochemical markers?	Vitale SG, van de Mheen, van de Wiel A, Garretsen HF	2006
34	From data to evidence, to action: findings from a systematic review of hospital screening studies for high risk alcohol consumption	Roche AM, Freeman T, Skinner N	2006
35	Prevalence and healthcare burden of illegal drug use among emergency department patients.	Binks S, Hoskins R, Salmon D, Benger J	2005
36	A 6-months assessment of the alcohol-related clinical burden at emergency rooms (ERs) in 11 acute care hospitals of an urban area in Germany	Baune BT, Mikolajczyk RT, Reymann G, Duesterhaus A, Fleck S, Kratz H, Sundermann U	2005
37	Self-reported alcohol use among Dutch emergency room patients: variations in prevalence rates owing to methodological differences	Vitale SG, van de Mheen, Garretsen HF, van de Wiel A	2005
38	A descriptive study of heavy emergency department users at an academic emergency department reveals heavy ED users have better access to care than average users	Fidela S, Blank FS, Li H, Henneman PL, Smithline HA, Santoro JS, Provost D, Maynard AM	2005
39	High rates of primary care and emergency department use among injection drug users in Vancouver	Kerr T, Wood E, Grafstein E, Ishida T, Shannon K, Lai C, Montaner J, Tyndall MW	2005
40	Alcohol-related emergency department visits among people ages 13 to 25 years.	Elder RW, Shults RA, Swahn MH, Strife BJ, Ryan GW	2004

Appendix C: Thematic Synthesis of Each Article

No	Title	Methodology	Prevalence	Substance	Visit Characteristics	Incidence/ Prevalence
1	Frequent users of an inner-city emergency department	Retrospective	26.90%	Both	59% arrive by ambulance with less acute CTAS. LWBS 16%. More likely to not have family physician. Less admissions	Substance Abuse 26.9% entrance complaint (66% **male**, 42 year of age, no fixed address 27.2%, arrive by ambulance 59.3%)
2	The HEADS-ED: a rapid mental health screening tool for pediatric patients in the emergency department	Subjective	30.50%	Both	nothing specific noted	58% **female**; 14.3 year of age-with good inter-rater reliability
3	What is the burden of alcohol-related injuries in an inner city emergency department?	Subjective	14%	Alcohol	higher # especially on WE	14% ETOH related (3:1 **men**; 16-25 year of age, 48% on Friday, 39% sat.; 41% admitted to hospital.)
4	Community hospital admission from the emergency department by persons with substance use disorders.	Retrospective	4.40%	Both	higher rates in uninsured pt.'s. higher admitted and LAMA in SUD visits.	highest: 18-44 yoa; **males** (2/3). No difference based on income or rural vs metro. uninsured SUD ED visit are less likely to be admitted, regardless of personal or hospital characteristics
5	Emergency department visits due to alcohol intoxication: characteristics of patients and impact on the emergency room	Retrospective	1.20%	Alcohol	high hx. of substance use & psych disorder. High admit rates, ambulance use, and repeat ED users needing medical tx.. Equal distribution during time of day (less btw 7-9am), no daily or monthly difference, high use radiology services	1.2% due to ETOH, 67.5% **males**, 48% b/w 41-60 year of age; 63.8% history ETOH disorder; 60.3% history psych disorder. Estimated cost=$541.32/pt.

#	Title	Type	Value	Substance	Findings	Results
6	Trends in alcohol- and drug-related emergency department and primary care visits: data from four U.S. national surveys (1995-2010)	subjective	2.85%	Both	increase use of ED service	.6%-3.7% in drug use in 1995-2005; 2% increase in ETOH use from 1995-2005. highest in **males**
7	Screening for harmful alcohol use in Australian trauma settings	Subjective	77%	Alcohol	more single people, smokers, with MVAs, MH dx., lower level education	60% screened as harmful drinkers (41% hazardous; 7% harmful; 12% dependent) 76% **male**, 35.6 year of age
8	Alcohol-related injury visits: do we know the true prevalence in U.S. trauma centres?	Lit Review	26.2-62.5% (32.5%)	Alcohol	Incidence- 32.5%. Too many limitations of all studies to capture the characteristics of the population or visit specifically.	Prevalence: 26.2%-62.5%= average of 32.4% **NO GENDER INFO IDENTIFIED**.
9	Alcohol and drug use among patients presenting to an inner-city emergency department: a latent class analysis	Subjective	ED & SU correlation	Both	more patients with medical visits with drug use than injury visits with ETOH use. More had No insurance, poor MH, used tobacco, HX SU tx., not married,	increase use of ED for medical vs injury complaint secondary to SU. 5/6 classes highest for **male**; 54% african-american; 16% DSM-IV (abuse or dependence of ETOH or illicit drugs) 12.9 % ETOH abuse/dependence, 5.9% marijuana abuse/dependence; 3.7% cocaine abuse/dependence
10	Use of an administrative data set to determine optimal scheduling of an alcohol intervention worker	Retrospective	25%	Alcohol	higher on WE, with DC at 6am,	weekdays 45% (AIW works from 600-900=28% weekday ETOH related patient), weekends 55% visits (500-1100=54% weekend ETOH related patient) = 30hr total/week. **No mention of gender.**

11	Older adults' inpatient and emergency department utilization for ambulatory-care-sensitive conditions: relationship with alcohol consumption	Subjective	2.10%	Alcohol	fewer admissions. More smoke, are depressed, divorced/single, low income, less educated, visible minority	higher in **Males**. heavy episodic drinking heavily associated with higher likelihood of ambulatory care sensitive conditions in the ED visits with no admission
12	The prevalence and characteristics of alcohol-related presentations to emergency departments in rural Australia	subjective	9%	Alcohol	MH disorders, more urgent CTAS, on WE at night.	higher in **men**, 18-29 year of age with ETOH specific visits; mental disorders, more urgent triage scores, those on W/E and nights
13	Healthcare system use by risky alcohol drinkers: A secondary data analysis	Subjective	ED & SU correlation	Alcohol	more in those who live in rural areas, higher had poor physical and MH, with no insurance and low income	High risk-**3x male**, ↑Hispanic, rural , less than high school education, low income with poor health.
14	Prevalence of alcohol, tobacco and drug misuse among Rhode Island hospital emergency department patients	Subjective	ED & SU correlation	Both	more smoked, and needed tx.	**no mention of gender difference**. highest substance scores were tobacco, ETOH, marijuana, and pain killers=highest need in these patients for BI (51%) or intensive treatment. (10%) for their misuse. For drugs alone, BI (37%), intensive intervention (5.3%); ETOH & one or more drugs, BI (12.9%) intense intervention (1.8%).
15	Characteristics and comorbidity of drug and alcohol-related emergency department presentations detected by nursing triage text	Retrospective	7%	Both	higher male, middle aged, arrived by ambulance, more acute, afterhours and on WE, LAMA, with mental health hx.	5% ED visits were identified as ETOH related, 2% drug-related (1-unspecified-43%; 2-amphetamines-18%, 3-heroid & cannabis-14%), poly-drug use in 25% drug, 9% ETOH users with ecstasy related 68% visits

16	*Last call: ethanol metabolism and the implications for emergency department clinicians managing patients with extreme ethanol intoxication*	*Information*		*Alcohol*	*no specific details*	*treatment.& management of ethanol intoxication: imaging, fluid replacement, thiamine, anecdotes and resuscitation. Agents*
17	Alcohol intoxication/dependence, ethnicity and utilisation of health care resources in a level I trauma center	Subjective	SU & ED correlation	Both	higher in visible minority (Hispanic), radiology services, higher admission rates, with shorter hosp. stays, overutilization.	highest in **males, younger (mean 34), and Hispanic.** Length of stay was negatively associated with drinking status=shortest length of stay for I/D pt. I?D significantly association with higher chance of service utilization (abdomen u/s, head CT, urinary catheter) during first 24hr. Higher coded for Hispanics, but not shown thru service use.
18	The impact of frequent attenders on a UK emergency department.	Retrospective	15.90%	Both	high use of ambulance, admit rate, after hours, frequent users	64% FU **male**, 49 year of age, lived within 5 miles of ED. 60% arrived by ambulance. SU was reported in 15.9% pt., with higher admission rates= 38.5% vs. 22% average
19	What can public health surveillance of emergency department presentations for acute alcohol problems tell us about social trends in drinking behaviour?	Retrospective	0.15%	Alcohol	Peek in ETOH use and large scale social events=correlation	0.15% ED visits. ED visits rose **female** 100-150/100,000 population in 2000-2008, highest among 18-24 year of age of=**sex**, and 25-64 year of age **men**. Rate for females are higher between 10-17 yoa; incidence peaks with large public gatherings (new

					year's, etc.)
20	Comparing methods of detecting alcohol-related emergency department presentations	Subjective	20%	Alcohol	more arrived after hours, by ambulance, hx. abuse, smoker, MH issue	increase in **males**, under **40** yoa. 20% ED patients had ETOH presentations; 28% identified as risky drinkers by AUDIT. Triage codes detected 7% ETOH related visits, 34% through triage text, 60% thru medical records audit, and 69% self-report.
21	Alcohol and injury in the United States general population: a risk function analysis from the 2005 National Alcohol Survey	Subjective	SU & ED correlation	Alcohol	association btw alcohol use and ED visits due to injury	18-29 high. ↑risk of ED injury visits for both men and women with ↑use of ETOH in **males**. Prevention efforts to reduce ETOH injury aimed at moderate drinkers=greater impact.
22	Prevalence and record of alcoholism among emergency department patients	Subjective	SU & ED correlation	Alcohol	more male, illiterate, smokers	Interview: 28 (11.3%) alcoholics, more **male**, illiterate, and smokers. Medical records: 5 (20%) identified as alcoholics=under recognized by staff, and lost opportunity for early intervention
23	Substance-related problems in patients visiting an urban Canadian emergency department	Retrospective	11.60%	Both	longer ED visit; increase admit rate, LAMA, & frequent users	Substance problems=39 year of age, 60% **male** (younger than all visit age), higher admission rates 25% vs. 17.6%, longer visits 232 min vs. 164 min, and higher incidence of revisits

					to ED 26.8% vs. 21.3%
24	Frequent attenders at emergency departments: a linked-data population study of adult patients.	Retrospective	31.10%	Both	increase admit rates, LWBS, by ambulance, frequent users, less urgent	31.1% substance related visits. FU= ↑in **male**, mdl-late age, self-referred, have medical or behavior disorder and ETOH intoxicated, arrive by ambulance and LWBS. Small minority of patients (100 patients) attend 20+ times/year with mental & behavioural disorders, & ETOH intoxicated not requiring hospital admission.
25	Drug use and problem drinking associated with primary care and emergency room utilization in the US general population: data from the 2005 national alcohol survey	Subjective	SU & ED correlation	Both	more ED use,	**no mention of gender difference**. 30-39 yoa higher. higher in 9.2% ED use. ED showed 24% positive for risky drinking, 8% problem drinking, 3% alcohol dependent, 7% illicit drug use greater than monthly (problem drinkers and drug users seen more often in ED than primary care)
26	Substance use among those attending an accident and emergency department	Subjective	SU & ED correlation	Both	high ED injury visits	**no gender discusson.**1.5-5.4%. 33% hazardous drinkers of ETOH, 23% illicit drug use in last year, 14% illicit drugs in past month. This group reporting 3+ injuries to ED in past year for SU, which were not

						work related.
27	Substance use among patients attending an accident and emergency department	Subjective	SU & ED correlation	Both	increased people wanting Tx., FU of ED	**no gender discussion**.1.5-5.4%. 38% hazardous drinkers of ETOH (no link to Ed visits), 19% illicit substances (2/3 willing to accept help or advice); 1/3 showed signs of dependence. If positive SDS= 3X likely to have attended ED on 3+ times in last 12 months
28	At-risk drinking and drug use among patients seeking care in an emergency department.	Subjective	SU & ED correlation	Both	high use in smokers, would benefit from Tx.	higher in **males**. 13% women, 32.8% men at risk drinkers; 57.3% women,51.8% men low-risk drinkers; 29.6% women, 15.4% men abstinence. young adults= high rates of episodic heavy drinkers, older adults=at-risk drinkers daily. Those at risk drinkers=high use of tobacco and illicit drugs.
29	Prevalence of substance use among trauma patients treated in a Brazilian emergency room	Subjective & Objective	Sub: 13.36%; Obj: BAC-11% ETOH, labs-9.3%; 13.6% Cannabis, 3.3% Cocaine, 4.2% BNZ	Both	higher in low income, increase ED use, more injury visits	higher in **males**. screened positive BAC 11% with 10% level of intoxication; 13.6% positive cannabis, 3.3% cocaine; 4.2% positive for benzos. =a high prevalence of use, with frequency of ETOH and cannabis use comparable.E30

30	Substance use and abuse in trauma: implications for care	Systematic Review		Both	need screening and brief motivational interviewing interventions in ED to best identify these visits, and assure we provide appropriate care as have more complex and require additional/different care needs	**no gender discussion** 1/5 patients cared for by nurses have morbidity and mortalities because of SU problems; 7%-55% ED visits are d/t SU trauma=large burden (economic, health outcomes, personal problems)
31	Detection of maternal alcohol use problems in the pediatric emergency department.	Subjective	10%	Alcohol	higher with more depressed, younger maternal age.	**tested only women**. 1/10 at-risk for ETOHproblem;7% women had elevated TWEAK scores, had greater ED use. Increased ED use seen in those moms with elevated TWEAK scores, child with chronic illness, younger maternal age, higher depression symptoms.
32	Declared and undeclared substance use among emergency department patients: a population-based study	Subjective & Objective	Subjective: Female 44%, Males=61%. Objective: Female=56%, Males=69%	Both	higher in: those who have never sought tx., visit with injury complaint, with insurance.	highest in **males**. Self-report: highest for ETOH (26% female, 47% male) marijuana (6% f, 11% m)benzos (10% f, 7% m). Toxicology showed: overall use of substances rose from 44% to 56% f, 61%-69% male in benzos, marijuana, amphetamines, &/or meth; little change in ETOH
33	Substance use among emergency room patients: Is self-report preferable to biochemical markers?	Subjective & Objective	Subjective: ETOH-7.5%, illicit drugs-9%. Objective: ETOH-4.7%, illicit drugs-30%	Both	nothing specific noted	**no gender difference or age difference**. ETOH Self-report: 7.5% patients vs. 4.7% per Breathalyzer. Illicit drug use reported by 9% vs. urine toxicology

						30% positive; Self-report are preferable as provide accurate information on actual use.
34	From data to evidence, to action: findings from a systematic review of hospital screening studies for high risk alcohol consumption	Systematic Review	BAC 26%, subjective 16%	Alcohol	higher rates in males using objective measures to screen	Prevalence of ETOH screens varied by hospital., screening tool, patient characteristics. BAC (26%) nearly twice as likely to reveal positive screens in the ED as self-reports (16%). **Males** 2-4x more likely to screen positive. ED patients 20-40 year of age highest prevalence of positive screen.
35	Prevalence and healthcare burden of illegal drug use among emergency department patients.	Subjective	6.90%	Drugs	high rate of admissions, visits highest with injury, OD, medical complications	**no gender identified.** mean age **40**. #1: 36% lifetime drug users, 16% last month, 10% last 24 hrs., 5.7% injection drug use in life. 1/2 needing hospital admission. 3% ED visits directly , 3.9% indirectly related to drug use.
36	A 6-months assessment of the alcohol-related clinical burden at emergency rooms (ERs) in 11 acute care hospitals of an urban area in Germany	Retrospective	3%	Alcohol	higher admission, length of stay, increased visits for 20yoa with SU, FU, on WE	3% of all medical admissions 10.7 cases/1000 inhabitants, 10 days average hospital stay. Short stay higher in **males** (42 yoa)with ETOH misuse, trauma for medical specialty. First attenders with ETOH consumption=multiple visits for similar presentations.

37	Self-reported alcohol use among Dutch emergency room patients: variations in prevalence rates owing to methodological differences	Subjective	16.20%	Alcohol	ED staff identified more people with SU than researchers.	**no gender identified** Variations in self-reports from 4.6%-9.1%, ? If due to sample selection bias & patient characteristics. #1-16.2% (highest users identified and sample bias identified), #2-6.8% (no sample bias identified) therefore Ed staff more efficient at identifying ETOH users. #3-older sample with lower ETOH use.
38	A descriptive study of heavy emergency department users at an academic emergency department reveals heavy ED users have better access to care than average users	Retrospective	3%	Both	less likely to be employed	higher for **females**. 234 FU totalled 4633 ED visits. 84% HFU have insurance, 93% have primary care providers. 4% were mental health visits, 3% SU related visits; Indicating that this group is socially connected: have own homes (93%), have family or friends (94%), religious affiliation (74%). Pain #1 dx. for FU of ED and ambulatory care.
39	High rates of primary care and emergency department use among injection drug users in Vancouver	Subjective	60%	Drugs	no fixed address, physical assault and overdose, HIV +, poor ED treatment by staff	70% **male**, 78% used primary care, 60% ED from 2002-03. With abscesses, cellulitis, other skin infections for greatest proportion of ED use. Factors independently association with ED use: frequent crystal meth injectors, non-fatal O/D, HIV +, physical assault

| 40 | Alcohol-related emergency department visits among people ages 13 to 25 years. | Retrospective | 3.20% | Alcohol | high number of visits in underage people, on WE, higher in assault and self-harm visits, more severe injuries, | **higher in males**. 244,331 ETOH related visits among those 13-25 (3.2% total visits)49% involved people below the legal age limit (increasing throughout adolescents to young adults), higher on W/E, in males (with assault or self-harm). 38% of ETOH visits involved no external cause of injury (i.e.. drinking to excess). 4.3% more likely to end up in hospitalization or transfer. |

Appendix D: Inclusion Criteria Based on Participants' Age, and Other Factors

Specific Age	Study Number						
12+	37						
15+	22	24					
16+	5						
18+	1	6	20	21	25	28	32
65+	11						

1a: Inclusion criteria identified by specific age for specified study number.

Age Range	Study Number								
All adult	13	35							
All children	2								
All patients	3	10	15	17	18	23	30	36	38
ten-65	19								
13-25	40								
18-64	14								
18-65	4								
18-70	7								
19-60	9								

1b: Inclusion criteria identified by age range for specified study number.

Categories	Study Number	
Mothers of children age 4-7	31	
All non-trauma patients	29	33

All community members	39	
Community location	12	
Frequency of use: 10+ visits	18	
Frequency of use: 15+ visits	1	
Toxicology Studies	8	34
MH Presentations	2	

1c: Inclusion criteria identified by categories for specified study number.

Appendix E: Ethics Letter of Approval: Education Nursing Research Ethics Board

UNIVERSITY
OF MANITOBA | Research Ethics and Compliance
Office of the Vice-President (Research and International)

Human Ethics
208-194 Dafoe Road
Winnipeg, MB
Canada R3T 2N2
Phone +204-474-7122
Fax +204-269-7173

APPROVAL CERTIFICATE

May 29, 2014

TO: Krystal Boyce-Gaudreau (Advisor D. Clarke)
Principal Investigator

FROM: Lorna Guse, Chair
Education/Nursing Research Ethics Board (ENREB)

Re: Protocol #E2014:080
"Prevalence, Patient Profiles, and Visit Characteristics of Substance
Related Presentations to the Emergency Department in Winnipeg, Manitoba
from January 1, 2010 to December 31, 2013"

Please be advised that your above-referenced protocol has received human ethics approval by
the **Education/Nursing Research Ethics Board**, which is organized and operates according to
the Tri-Council Policy Statement (2). **This approval is valid for one year only**.

Any significant changes of the protocol and/or informed consent form should be reported to the
Human Ethics Secretariat in advance of implementation of such changes.

Please note:

- If you have funds pending human ethics approval, please mail/e-mail/fax
(261-0325) a copy of this Approval (identifying the related UM Project Number) to the
Research Grants Officer in ORS in order to initiate fund setup. (How to find your UM
Project Number: http://umanitoba.ca/research/ors/mrt-faq.html#pr0)

- if you have received multi-year funding for this research, responsibility lies with
you to apply for and obtain Renewal Approval at the expiry of the initial one-year
approval; otherwise the account will be locked.

The Research Quality Management Office may request to review research documentation from
this project to demonstrate compliance with this approved protocol and the University of
Manitoba *Ethics of Research Involving Humans*.

The Research Ethics Board requests a final report for your study (available at:
http://umanitoba.ca/research/orec/ethics/human_ethics_REB_forms_guidelines.html) **in order
to be in compliance with Tri-Council Guidelines.**

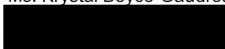# Appendix F: Ethics Letter of Approval: Winnipeg Regional Health Authorities

Winnipeg Regional   Office régional de la
Health Authority   santé de Winnipeg
Caring for Health   À l'écoute de notre santé

200 – 1155 Concordia Avenue
Winnipeg, Manitoba
R2K 2M9 CANADA

June 10, 2014

Ms. Krystal Boyce-Gaudreau

Dear Ms. Boyce-Gaudreau:

Re: "Prevalence, Patient Profiles and Visit Characteristics of Substance Related Presentations to the Emergency Department in Winnipeg from January 1, 2010 to December 31, 2013" – WRHA Reference No: 2014-012

We are pleased to inform you that your research access request for the above-named study has been approved by the Winnipeg Regional Health Authority (WRHA) Research Access and Approval Committee.

Your research access is also approved pending confirmation that the following conditions are met or agreed to:

- You, your co-investigators, and your research assistants comply with the relevant privacy legislation as indicated below.

    [X] *The Personal Health Information Act*

    [ ] *The Freedom of Information and Protection of Privacy Act*

    [ ] *The Personal Health Information Act* and *The Freedom of Information and Protection of Privacy Act*

- **In the event that your REB approval expires before the completion of this project, please copy us on your Application for Renewal and please send us an updated copy of the Renewal Approval once received by REB;**

- You complete and return the attached Confidentiality Agreement(s) to Judy Dyrland, Concordia Hip & Knee Institute, WRHA, 200 – 1155 Concordia Avenue, Winnipeg, MB R2K 2M9;

- You submit to our attention any significant changes in your proposal prior to implementation or any significant changes during the course of the study;

- You submit a summary of the final results of the study to the WRHA and provide us with a copy of any publications arising from the study;

- It is an expected courtesy that WRHA will be given a minimum of five working days advance notice of publication or presentation of results <u>with policy implications</u>, in order to be prepared for public response;

- You agree to be accountable for appropriate storage and elimination of material.

- You agree to acknowledge the WRHA and/or affiliated organizations in any peer-reviewed publications of the results of this study.

Thank you for selecting the Winnipeg Regional Health Authority as the site to conduct your research. Please let us know should you encounter any site-related difficulties during the course of your study.

We extend best wishes for successful completion of your study.

Yours sincerely,

Dr. Colleen J. Metge, BSc (Pharm), PhD
Director, Evaluation Platform, Centre for Healthcare Innovation/WRHA
Chair, Research Access and Approval Committee, WRHA

cc. Ms. Arlene Wilgosh, President and CEO, WRHA
     Dr. John Arnett, Chair, HREB

Encl: *PHIA Agreement*