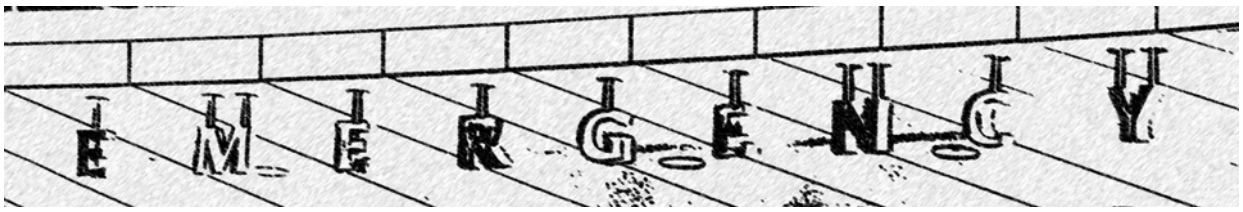


# A First Portrait of Drug-Related Overdoses in Waterloo Region

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Region of Waterloo

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The Community Safety & Crime Prevention Council's (CS&CPC) community engagement program recognizes, as others across Canada have, the close link between the use of psychoactive substances and issues of crime and victimization. The impact on publicly funded services can be seen in the criminal justice system, where half of the costs of police, courts and corrections are related to licit and illicit drugs (*The Costs of Substance Abuse in Canada 2002, Canadian Centre on Substance Abuse, 2006)*. Other systems - health, social and the private sectors among them - also experience a significant financial burden. Since the potential solutions to this issue go beyond the capacity of any one neighbourhood or any one system, the CS&CPC passed a motion in November 2006 to develop an integrated drug strategy that can provide a strategic framework for action to address critical issues of substance use and abuse across multiple sectors in Waterloo Region. Through preparation for the Integrated Drug Strategy and collaboration with community members and service providers, the CS&CPC became aware that a number of people in Waterloo Region had experienced drug-related overdoses and that some of those people died or sustained injury as a result.

While the use of psychoactive substances does not in itself lead to criminal behaviour, there is a clear link between certain crimes (e.g. property crimes) and people who use drugs. In this regard, the criminal justice system has limitations, with many experts noting that society cannot incarcerate its way out of a health problem. Effective strategies include linking marginalized people to services that meet them "where they are at."

A strategy to integrate efforts related to substance use needs to be based in reliable evidence about the current situation and knowledge of drug-related issues, as recently provided in the "Baseline Study of Substance Use, Excluding Alcohol" (2008) completed by Waterloo Region Public Health. Overdose incidents and deaths are a measure of the prevalence of substance use in our community and an important additional piece of knowledge upon which the development of prevention and harm reduction efforts can be based.

## *Introduction*

Overdoses are the leading cause of death and often cause significant harm to people who use legal or illegal drugs (Fischer et. al. 2004; Warner-Smith et al, 2002; Kerr et al., 2007; Zed et al. 2008; Fielden & Marsh, 2007) and yet little is known about the prevalence of overdoses at a geographic or population specific level. While there are data, programs and policies that are specific to many other health issues the same is not available when it comes to the life, death and injury for people who use drugs.[1] No

[1] In this report, drug(s) refers to illicit drugs, prescription and over-the-counter medication and alcohol.

system is currently in place to measure what the families and friends of those who use drugs already know: overdoses happen far too often and far more often than most communities realize. Across Canada, in health settings and elsewhere, there are few overdose-related programs that seek to prevent and/or provide intervention options for people who use drugs.

The purpose of this study is to take a first look at the extent of drug-related overdose incidents and deaths occurring in Waterloo region. Only overdose incidents where a 911 call was made and/or hospital services were accessed have been included in this study. Data from the provincial coroner's office, Emergency Medical Services, and three of the local hospitals were consulted to create an understanding of drug-related overdoses in Waterloo Region.

Overdoses can be *intentiona*l or *accidental.* Intentional overdoses can be the result of a person's attempt to end their life, thus making the overdose a suicide or attempted suicide. Intentional overdoses can also be the outcome of a person *intending* to take a substance in a specific quantity, without knowing that this quantity would cause them harm. Because of the subjectivity involved in determining the type of intent, the data in this study do not distinguish between the types of intentional overdoses. Overdoses for "unknown/undetermined intent" are classified as such because there is not enough information to ascertain the purpose of the overdose. Overdose *deaths* are also classified as "accidental." This is when there is not sufficient information to determine that the individual did or did not intend to take their own life when ingesting the drug and no foul play is identified. The hospital data, therein, does not report an "accidental" classification.

This study shows that over the last four years there was an average of 26 overdose deaths and 667 overdose incidents annually in Waterloo Region. In addition, from 2005-2007 Regional Emergency Medical Services (EMS) received an average of 507 calls annually to respond to drug overdoses. The literature shows that there is reluctance among people who use drugs to call for emergency medical help because of a fear that they will face criminal or other sanctions, or be labeled as a drug user and as a result be treated poorly and/or looked down upon (Tobin, 2005). This study also found that 20% more people end up in hospital for an overdose incident than emergency medical call records show. This finding highlights the efficacy of peer based overdose intervention training because immediate intervention can prolong life until the person reaches medical help.

Illicit drugs are not solely responsible for the harm and death experienced by members of our community. Over the counter, prescription, and legal substances such as alcohol are significant contributors to fatal and non-fatal overdoses. In fact, the category of drugs that was most frequently cited as being the cause of an overdose is legal psychotropic drugs, such as benzodiazepines, often used for treating mood disorders. When these drugs are combined with alcohol it can overwhelm the body and cause an

overdose. This situation points to the opportunities for proactive measures including education around the danger of overdosing as a result of mixing substances.

A Portrait of Drug Related Overdoses in Waterloo Region begins with an overview of similar research across the country at local and national levels. The methods used to gather the data, as well as the limitations are explained. The descriptive data from the Provincial Coroner's office, Waterloo Region Emergency Medical Service (EMS), and three local hospitals follow. Finally, there is a discussion of the data and its implications for our community. The study concludes with two key recommendations that were endorsed by the Waterloo Region Community Safety & Crime Prevention Council at its regular meeting on June 13, 2008.

### *Background*

Recently, researchers from organizations such as Centre for Addiction and Mental Health (CAMH); Canadian Centre on Substance Abuse; the B.C. Centre for Excellence in HIV/Aids; and others have actively sought to understand the extent of drug overdoses in specific geographic areas over time. Some of these studies were restricted to overdose deaths while others also explored overdose incidents. In 2000, the Public Health Agency of Canada studied medical examiner reports for drug overdose deaths in Halifax, Nova Scotia. They extracted medical examiner charts for all deaths involving drugs in Halifax from 1993-1995. Of the 636 deaths examined in the three-year period, 42 (or 6.7%) were the result of a drug overdose (Poulin, 2000). Further, they noted that the vast majority of drug overdose deaths in Halifax were the result of overdoses from legal substances, primarily alcohol and prescription psychotropic medication; only two deaths were attributed to an illicit drug (cocaine). Although this study is groundbreaking, there are a number of methodological limitations. First, only 46% of deaths seen by the medical examiner's office had toxicology reports. Second, the toxicologists and medical examiners who individually reviewed the reports often disagreed about the role the substance played in the death. Finally, the study only evaluated overdose deaths and excluded overdose incidents, thus significantly underestimating the extent of harm associated with problematic substance use. However, the Halifax study is particularly informative to the overdose research in Waterloo Region because it is the first to look at overdoses from a local, rather than national, perspective.

In 2006, Popova and colleagues collected data from Provincial Coroners' Offices across Canada to estimate the number of overdose deaths that occurred in 2002 from illegal drugs. The coroner information was supplemented by mortality data available through Statistics Canada. These researchers found that across Canada, 1,695 deaths were attributed to illegal drug use; that is 0.8% of all deaths in Canada for 2002: 1,183 deaths were male and 512 were female. As with the Halifax research, these data provide important insights into the number of people dying of overdoses in Canada, but they do not indicate how many people are harmed by overdose incidents. Additionally, Popova's research is limited to illicit drugs and while the findings overall provide great insight into the frequency of illicit drug overdoses across Canada, they do not speak to local trends

in drug use. The recommendations from Popova's research are thus too broad in scope to allow for geographically based prevention and intervention options. For example, while one community may be troubled by easy access to heroin calling for specific interventions and treatments the substance most frequently used in another community may be cocaine which requires different approaches. Therefore geographic specific data are essential to lead successful community interventions and prevention efforts.

In 2004 a study by Fischer and colleagues went beyond looking at overdose deaths to include overdose incidents. Interviewers used a standard questionnaire to gather information from known drug users about their demographic characteristics, drug use, mental health, infectious disease and criminal involvement. The study found that 17.2% of the 651 responders had overdosed in the preceding six months. The largest predictors of an overdose included homelessness, non-injection use of hydromorphone in the past 30 days and involvement in drug treatment in the past 12 months. Another study with Vancouver injection drug users (Kerr, 2007) found through an analysis of 1,587 responses that the following risk factors were significant predictors for overdose incidents: age, heroin injection, benzodiazepine use, cocaine injection, requiring help injecting, binge drug use, being denied addiction treatment, alcohol use, public injecting, poly drug use, incarceration and non-injectable opiates. Conversely, being young and having access to a methadone treatment program were protective factors. None of these studies have the capacity to be generalized to the larger population of people who use substances because they lack equal representation of people who use drugs and those who do not. Nonetheless, they establish criteria to aid in targeting prevention and intervention programs.

While death is an extreme outcome of an overdose, a non-fatal overdose can also cause significant harm to the individual. A study of 198 non-fatal heroin overdoses in Australia found that in a 12-month period, people typically overdosed three times (Warner-Smith, 2002). Kerr and colleagues in 2008 estimated that 30% of injecting drug users had overdosed in the preceding year. Fischer and others in 1999 found that 50% of their 114 participants had overdosed in the previous six month period. Each time someone overdoses, they are at risk for experiencing peripheral neuropathy (numbing of the extremities), vomiting, temporary paralysis of the limbs, chest infections, seizures, overdose-related pneumonia, palsy, rhabdomyolysis (rapid break down of muscle tissue), pulmonary edema (fluid in the lungs), and cardiac arrhythmias as well as physical assaults, injuries from falling and burns. Given the estimated prevalence of overdose incidents and the potential harms to the individual, overdose incidents have a significant social impact and as such are a critical area for research.

While there have been great strides made in understanding both fatal and non-fatal overdose incidents, particularly in Vancouver, British Columbia, there are still many questions that remain unanswered because of the type of data available. Drug use varies in terms of the prevalence of a particular drug from community to community, which is why it is important to have geographically specific drug overdose studies. Many of the existing studies were limited in their information gathering techniques, for three

reasons: First, drug users are often part of a "hidden" population, therefore studies cannot be conducted using random samples. Second, secondary sources of information are limited, especially with regard to the International Codes for Disease because the categories by which information is tracked are not mutually exclusive. Third, coroner data is not reliable because autopsies are conducted on a fraction of people who die, and only a fraction of those involve toxicology reports. When drug use is not suspected as the primary cause of heath but is a secondary cause of the death, is not noted in the data. For example, if someone dies from cocaine overdose, the cause of death is likely to be reported as cardiac arrest and not a cocaine overdose. This study shares some of these limitations and compensates for others to provide the most comprehensive picture of local overdose incidents and deaths that is possible at this time with secondary data sources.

## ***Methods***

### *Study Population*

This study is based on data provided by Grand River Hospital (GRH), St. Mary's Hospital (SMH), Cambridge Memorial Hospital (CMH), Waterloo Region Emergency Medical Services, and the Office of the Chief Coroner for the Province of Ontario. It includes both accidental and intentional incidents of reported drug overdoses. However, because "intent" is determined subjectively the line between accidental and intentional overdoses may be blurred.

The population of this study consists of those people who live in Waterloo Region and use substances. The sample is people who seek medical attention or require coroner services for a drug overdose. It should be noted that not everyone who experiences a drug overdose will seek medical attention and not all those who sought medical attention will be included in the data collected here. For example, someone who resides in Grand Valley Institute may have sought medical attention for an overdose within the institution but did not need to go to the hospital. Additionally, street involved people who do not have an Ontario health card or access to a phone are unlikely to go to a hospital. Consequently, the estimates provided in this report are likely lower than what is really occurring within Waterloo region.

### *Data Collection*

Requests were made to the information and privacy offices at Grand River Hospital, St. Mary's Hospital, and Cambridge Memorial Hospital. Overdose information was also gathered from the Canadian Institute for Health Information (CIHI) that holds all the data gathered by hospitals across the country on the International Codes of Disease, ICD-10A. Since the CIHI is a national database, all three hospitals provide consistent information. The codes also allow information to be separated into intentional overdose and undetermined overdose intent and further provide data on the type of drug used in

these instances (see Appendix one for the codes). The information within the codes was aggregated by age, sex, month, and year.

Data was also obtained from Waterloo Region Emergency Medical Services (EMS), which records the number and type of calls received and was able to provide monthly overdose data for a three year period spanning 2005-2007. This data could not be separated into demographic characteristics because it is a tally of calls for service and EMS does not report on the specifics of each call.

The coroner's office provided summary statistics of deaths examined from 2004-2006. This data was grouped by gender and intent (accident, suicide, and unknown). It is our understanding that only those individuals whose death is deemed "suspicious," do not have a family doctor and/or have died unexpectedly, are autopsied. Thus, the data represented in this study likely underestimate the actual number of overdose deaths in Waterloo Region.

*Data Analysis*

The goal of this study is to examine the frequency of overdose incidents, including deaths, across Waterloo Region. The primary analysis is based on descriptive statistics such as frequencies, means, medians, and modes. The data was anonymous, so the identity of people who experienced an overdose was unknown.

*Hospital Data*

Each hospital used the same database for reporting the overdose incidents. However, one cannot reasonably assume that the reporting of categories was consistent within or between hospitals because the drug categories (notably intention and unknown intent) often rely on subjective interpretations. This information does, however, provide insight into the frequency of people who are seen by medical personnel for overdose incidents and assists us in determining where to focus prevention and intervention efforts. The hospital data also reveal the role different types of drugs play in overdose incidents as well as the characteristics of people most likely to experience an *incident* of drug overdose.

*Emergency Medical Services Data*

The data most readily accessible to this study was from EMS. The limitation to EMS data is that, like others, they do not classify the type of drug(s) used in the overdose. However the data allow for the proportion of EMS calls for service in response to an overdose to be determined. This information provided useful insight into the effect of fear and stigmas associated with calling 911 in overdose situations, whether the overdose was intended or not.

*Coroner Data*

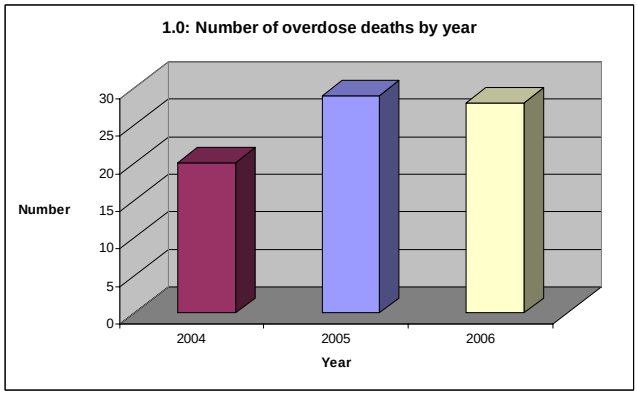
The coroner data was limited in many ways: (1) Toxicology reports are not completed for every death that occurs in the region, and thus, there are overdose deaths that go unreported. (2) The data is limited to a three year period. (3) The data for 2006 is preliminary because the statistical year had not been finalized at the time this report was generated. (4) There was no distinction made between types of drugs implicated in the death. Thus, the information based on the coroner's office data must be considered with caution and used only as an indication of what "may" be happening in Waterloo Region with respect to overdose deaths. Rigorous reporting standards across systems would aid in making mortality statistics more reliable. Despite the limitations, the Coroner data is helpful in developing a comprehensive view of drug overdoses in Waterloo Region by identifying characteristics of those most at risk of *dying* from a drug overdose.

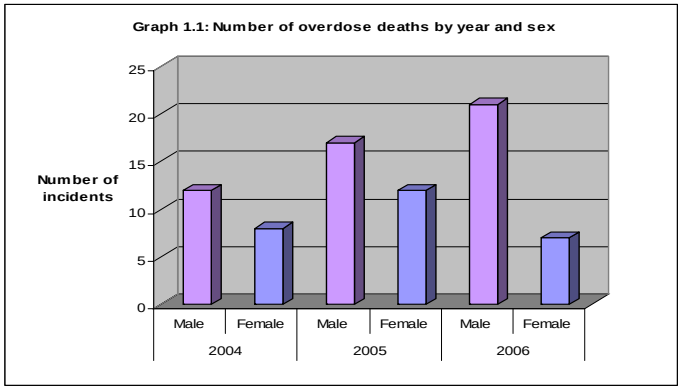
## ***Results***

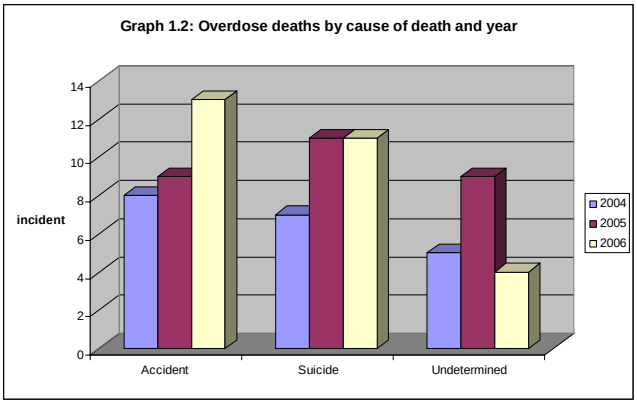
*Coroner*

In 2004, there were a total of 20 deaths due to drug or alcohol overdoses (hereafter referred to as deaths). Twelve (60%) of those deaths were male and eight (40%) were female. 2005 saw an increase to 29 deaths, 17 (59%) of those male and 12 (41%) female. The preliminary data for 2006 indicated that of the 28 projected deaths, 21 were (75%) male and 7 (25%) female. As shown in graph 1.1, the numbers of males has increased each year over the three years reported while the number of females has varied.

Of the 20 deaths in 2004, 8 (40%) were classified as "accidental", 7 (35%) as "suicide" and 5 (25%) were "undetermined." In 2005, 9 (31%) of the 29 deaths were "accidental," 11 (38%) were "suicide," and 9 (31%) were "undetermined". The preliminary data from 2006 suggested that of the 28 expected deaths, 13 (46%) were "accidental," 11 (39%) were the result of "suicide" and 4 (14%) were "undetermined". These results are illustrated in graphs 1.0, 1.1 and 1.2.

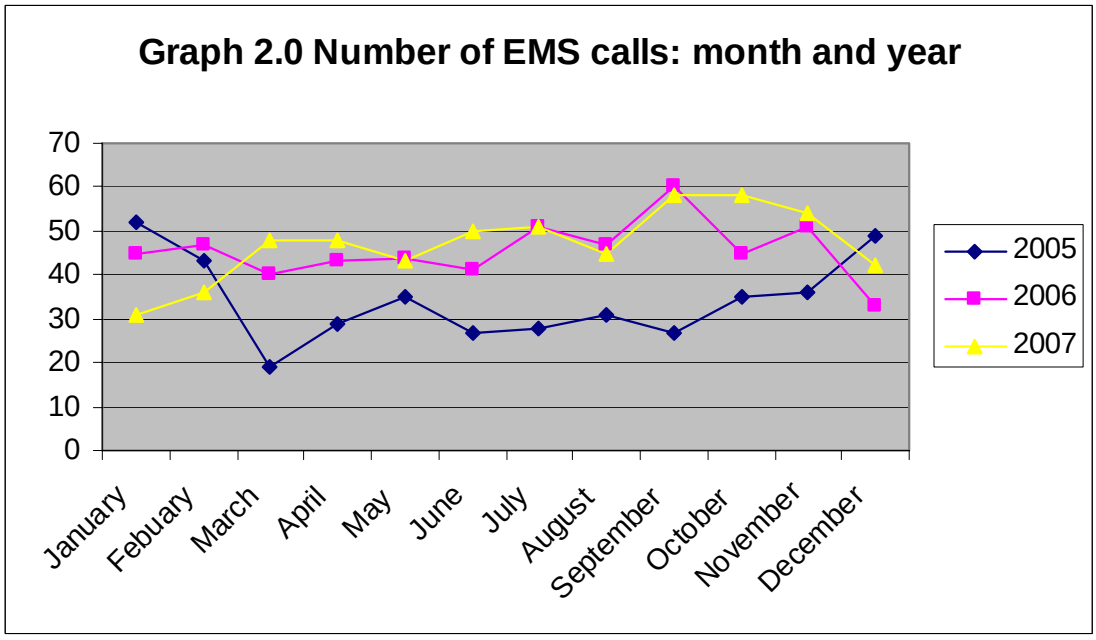





*Emergency Medical Services (EMS)*

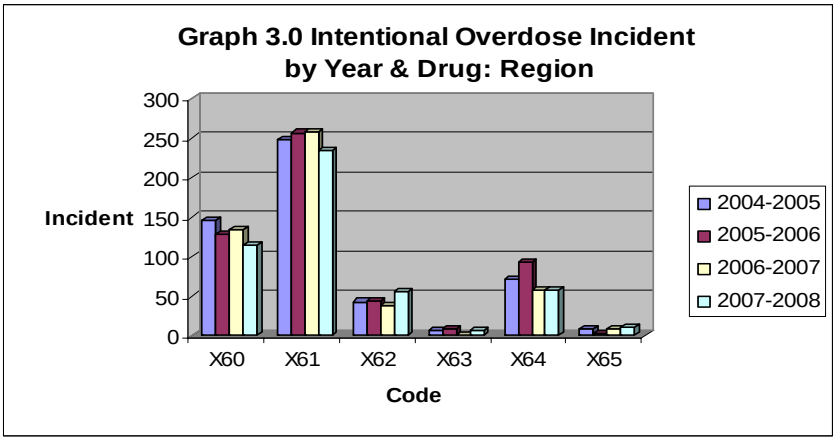
In 2005, Waterloo Region EMS received approximately 33,000 calls for service (ROW Public Health, 2005) of which 411 calls for service related to an overdose. In 2006, this increased to 547 and in 2007, it increased again to 564 calls. This is a 14% increase from 2005 to 2006 and a 1% increase from 2006 to 2007. As shown in the graph below, there is not only a difference in frequency of overdose calls for service, but also a difference in the pattern. In 2005 the largest number of overdose calls for service was received at the beginning and end of the year; the summer months saw the lowest numbers. In 2006 and 2007 there was a steady increase in the number of calls for service until October and then the numbers started to fall again before January of the following year. This inconsistency in patterns of calls for service makes it difficult to draw conclusions about the best timing for overdose prevention and intervention programs. The data are illustrated in graph 2.0.

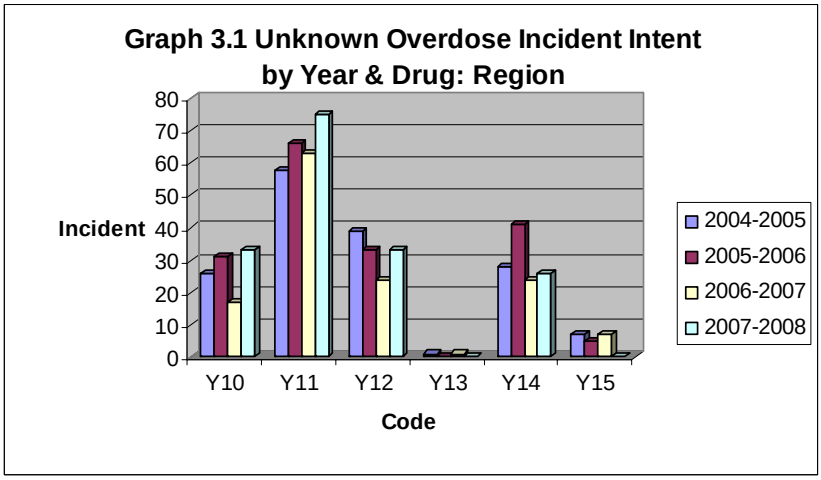


*Regional Hospital Data*

Between 2004 and 2008, 2,670 overdose incidents were reported at three local hospitals. Of these, 1,720 (64%) were seen at GRH, 816 (31%) at CMH and 197 (7%) were treated at SMH. The difference in frequencies at these hospitals can be attributable to the specialization of services at each. GRH is the regional "hub" for mental health services and has specialized departments such as the Withdrawal Management Centre. EMS staff are often redirected to GRH when people are suffering from an overdose.

For every male, 1.6 females are seen at local hospitals because of an overdose incident. The most prevalent drug category was X61 & Y11, followed by X60 & Y12 (see Appendix one for classification codes) whereby "Y" categories refer to "unknown intent" and "X" categories refer to "intentional." Region wide data show the most frequently treated males and females to be between the ages of 11 and 20. For males, incidents tend to be fairly equally distributed between all age categories. For females, the incidents tend to be concentrated between 11 and 20. Total results for drug type and year are illustrated below in graphs 3.0 and 3.1.

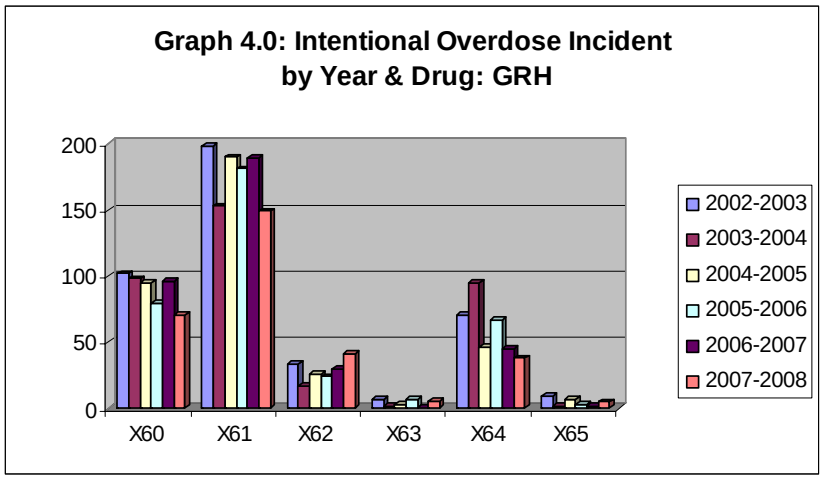


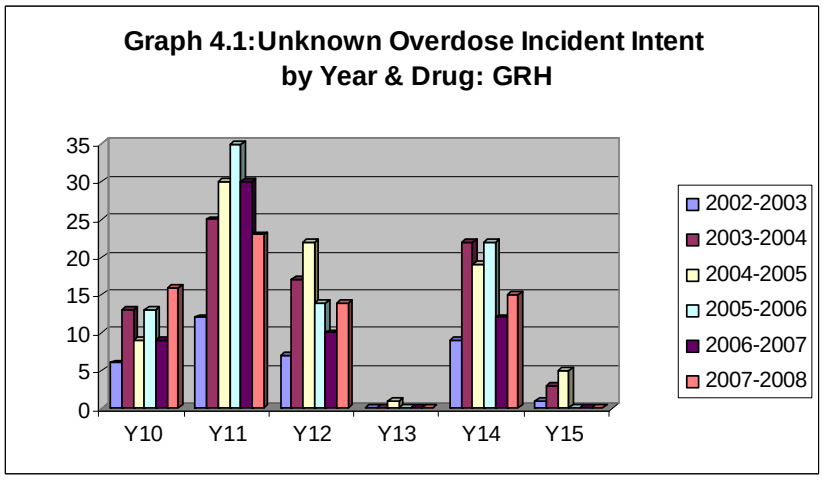



*Grand River Hospital*

From April 2002 to February 2008, GRH had 2,603 patients admitted in the emergency department for drug related overdose incidents. There is a striking difference between males and females in these data with 1,623 or 61% of the above admissions were female. Over these six years, the most prevalent type of overdose incidents involved drugs on the code X61 which includes: antiepileptic, sedative-hypnotic, anti-parkinsonism, and psychotropic drugs that were not classified in any other drug code (See Appendix one, for examples of common drug names).

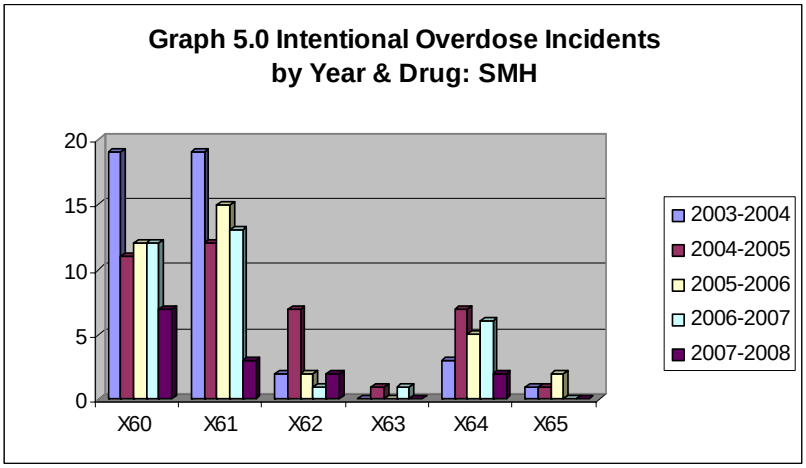
Overall, women who were seen at GRH for an overdose incident tended to be younger than men. The most frequent age for women was 11-20 across all drug classifications, whereas the most frequent ages for men were older, at 21-30 and 31-40. The patterns that are seen in the category "intentional overdose" for GRH are also visible in the category "unknown overdose intent" with Y61 remaining the most frequently reported drug category (35 for "unknown intent" and 200 for "intended"). Graphs 4.0 & 4.1 illustrate these results.

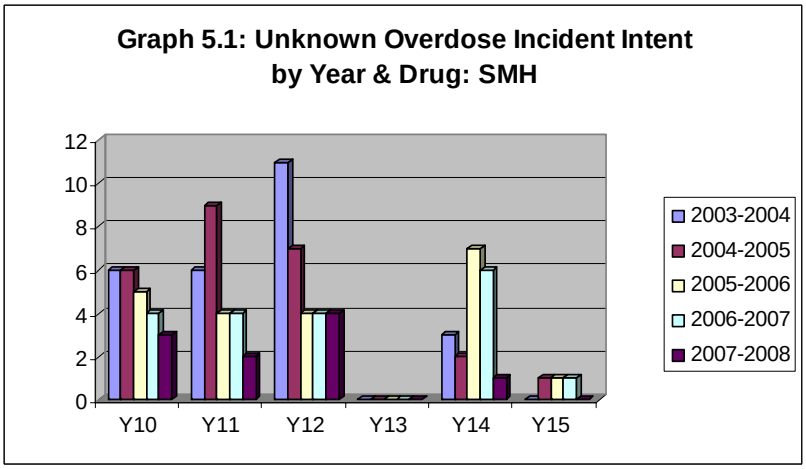


*St. Mary's Hospital*

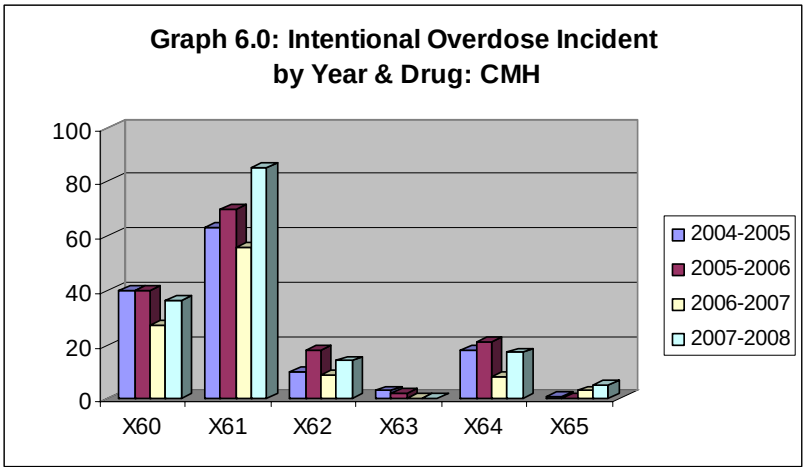
In the five years between 2003 and 2008, SMH saw 267 people in the emergency room for both intentional and unknown intent overdose incidents. Although the number of overdose incidents seen in the emergency department of SMH are significantly lower than those for GRH, the trends in the data remain similar. There is still a large difference between males and females with 164 (61%) females and 103 (39%) males having received treatment at the emergency room for overdose incidents respectively. Over the five years the most prevalent type of overdose involved drugs that were included on the X61/Y11 code with X60 coming as a very close second. As with the GRH data, the females who were seen for overdose incident at SMH tended to be younger than males. The intentional overdose incidents are shown in the chart below. The pattern between GRH and SMH are fairly consistent, with the exception of X60. See graphs 5.0 & 5.1 for illustrations of the above trends.

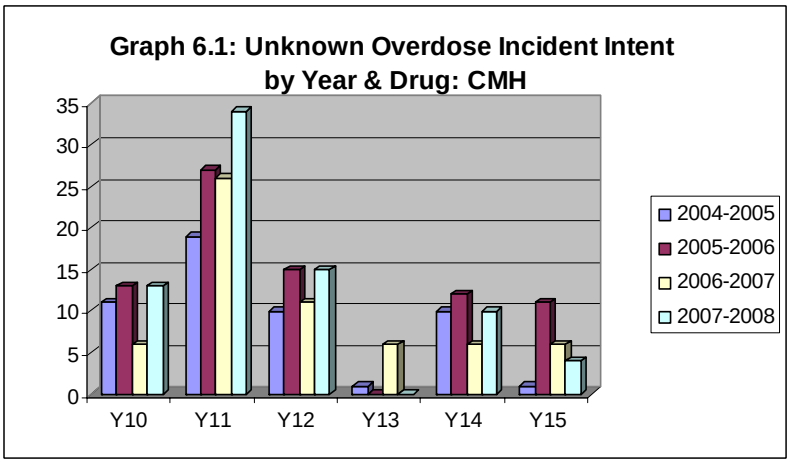


*Cambridge Memorial Hospital*

From 2004-2008 Cambridge Memorial Hospital (CMH) had a total of 858 patients visit the emergency room for an overdose incident. As with, GRH and SMH, females represented the majority of those seen at CMH, with 505 (59%) being female and 353 (41%) being male. Overdoses from drugs on the X61 code were the most prevalent. Females who experienced an overdose incident tended to be younger than their male counterparts. Females most frequently were between 11-20 years of age, while males were between 21-30 years old. The yearly distributions for intentional overdose incidents are shown in graph 6.0 and the unknown intent overdose incidents are shown in 6.1. The patterns of overdose incidents over the four years across the three hospitals are very similar.



## *Discussion*

This report speaks to the frequency and impact of overdose incidents in Waterloo Region and provides insight into some characteristics of those who are most at risk for overdosing. The preliminary results reveal some interesting patterns, but further analysis is needed to say with confidence that these patterns have implications for prevention, treatment, and community responses to drug overdoses.

The drug codes X61 & Y11 had the most incidents reported in all of the hospital data, as well as when aggregated to create a regional picture. In this drug code, benzodiazepines are represented. Kerr et al. (2007) found that a person who uses drugs is twice as likely to overdose when they use benzodiazepines in combination with another kind of drug. One possible explanation for the number of overdose incidents in this category is that many patients who are in some distress prior to the overdose see their family doctor and convey this distress to them. A common intervention by family doctors for mixed anxiety/depression or general "upset" is to prescribe Ativan, or another kind of benzodiazepine, which can be helpful in dealing with anxiety and depression but also carries the risk of harm, especially when combined with drugs or alcohol (Heintzman, June 2008).

It was a consistent finding in the hospital data that approximately 60% of persons admitted to an emergency room for an overdose incident were female. However, the coroner reported that just over 60% of the overdose deaths were male. Similar trends are replicated in suicide attempts: females account for the majority of suicide attempts while the majority of deaths by suicide occur in males. The research suggests that males use more aggressive measures to commit suicide and are less likely to seek help. While there is a strong correlation between overdose incidents and gender the exact reasons for this are unknown and pose interesting questions for future research. For instance: Are males more aggressive in their drug use? When females overdose, are they more likely to have someone with them to seek help? Does gender affect the type, method and context of drug use? Is there a common denominator for suicide attempts and drug overdoses? If there is, what is it? How can it be addressed pro-actively? These questions are not in the scope of this research project, however, they could be essential starting points in preventing overdose incidents (and suicides) in Waterloo Region.

In 2004, for every overdose death there were 34 overdose incidents recorded in Waterloo Region hospitals. In 2005, there were 25 overdose incidents for every overdose death and in 2006 there were 31 overdose incidents for every overdose death. Though the number of persons dying from a drug overdose is certainly troubling, the higher number of overdose incidents shows that overdose deaths are only one measure of drug use and that many more people are injured by overdoses without dying.

In many cases, death from a drug overdose does not happen immediately. There is a critical opportunity where a bystander could potentially intervene to save a person's life. Research shows that the majority of overdose incidents occur in the presence of other people (Powis, 1999), however, the likelihood of someone calling EMS ranges from only 20-45% (Tobin, 2005). A study by Hickman and colleagues (2006) of overdose deaths in London, England, noted that in more than 60% percent of overdose incidents, there was a witness who was capable of calling for help, but did not. Across Waterloo Region in 2005, there were 411 EMS calls for service and 715 people admitted into hospital emergency rooms for drug overdose; that is one call to EMS for every 1.7 hospital admissions. In 2006, the ratio dropped to 1 EMS call for every 1.2 hospital admissions; this ratio remained constant in 2007.

The ratios show that less people access EMS services than hospital services. One explanation for this disparity, noted by Tobin and colleagues (2005), could be that the bystander fears police involvement and their subsequent arrest and, as such, are unwilling to call 911. Other common reasons for not calling 911 are that the bystander may not have access to a phone, or the person regained consciousness before seeking medical assistance. Additionally, some bystanders may delay calling 911 or not call them at all because they think they have control over the situation (McNally, 2005; Tobin, 2005). Common reactions from bystanders are to slap the person, walk them around, inject them with saline or other drugs, place ice on them, or put them in a cold shower (Darke, 1996; McGregor, 1998). Another explanation is that bystanders prefer to leave people who have overdosed in a public place such as emergency departments, rather than call 911 for assistance in a private place (Tobin, 2005). These findings show that overdose deaths can be prevented if peers and service providers base their interventions in solid knowledge and /or are provided with the right tools to intervene.

### *Implications*

*Costs*

According to the patient billing department at GRH (2008), an emergency room visit costs $450 per person, not counting medical supplies or professional fees of the doctor. Based on this cost, over the past four years, the three hospitals in Waterloo Region have spent more than $1.2 million on emergency room visits for drug-related overdoses, or an average of $300,375 a year.

In 2002, the Canadian Centre for Substance Abuse conducted a comprehensive cost analysis of substance use in Canada (Rehm et al. 2006). This report estimates that the cost of direct health care for overdoses is over $4 billion. This estimate includes acute care hospitalizations, psychiatric hospitalizations, inpatient specialized treatment, outpatient specialized treatment, ambulatory care, physician fees, family physician visits, and prescription drugs.

Waterloo Region has a three-tier response system for emergency service calls. When a call comes to 911, fire, ambulance and police services are dispatched to the situation. Thus, to get a sense of the overall cost for emergency service for an overdose incident, all three services must be included in the calculation. EMS estimates the cost of one call for service to be about $598.60 (Petendra, 2008). Therefore, based on the average number of calls for service in the case of an overdose incident or death over three years (507) the cost to Waterloo Region could be estimated at approximately $303,490 per year or $910,470 over the three year span for EMS alone. Cost estimates for police and fire were not available, however, using an hourly wage calculation for fire to send one response truck to an overdose incident, the cost is approximately $144 per hour. The cost for fire services in an overdose incident is thus estimated to be $73,008 per year.

Given the above estimates, more than $676,873 is spent on overdose incidents across the region's three hospitals and emergency services each year. There are also the additional costs of coroner reports to investigate suspicious drug related deaths, costs of federally-subsidized funerals and the loss of productivity at work -- not only by the individual who has overdosed but also by their family and friends.

Overdose prevention and intervention programs vary widely with regards to funding structures. In recent conversations, program directors from the United States and Canada estimate the cost for core funded programs to be $60-75,000 per year and time limited programs to cost approximately $20,000. If one quarter of current overdose incidents were prevented by a program costing $75,000 per year, there would be an average savings for medical responses of $94,218 per year. This does not include indirect savings such as gained productivity at work.

*Social Effect*

When people overdose there is harm, not only to themselves, but also to their friends and families. Some of the drug overdose incidents reported above indicate a suicide attempt because they were intentional and involved a drug that is not commonly used recreationally (drugs on the X60 code), while others reflect intentional or unintentional misuse of a drug. While the situations surrounding drug overdoses are diverse and complex, it is fair to say that there is significant drug related harm in Waterloo Region; 2,670 people overdosed between 2004 and 2008, and 77 people have died a drug-related death between 2004 and 2006.

While overdoses most directly affect the individual who has overdosed, they can and do emotionally affect others who care about that person. Suicide attempts and drug overdoses carry a heavy stigma in our society. The larger cost of social harm and human cost deserve due consideration and go far beyond the cost estimates provided here.

## *Recommendations*

The findings in this report suggest two areas for future focus: information gathering and programming to reduce drug-related overdoses. Each area should inform the other.

*Information Gathering*

To develop a comprehensive picture of overdoses in Waterloo Region, specific and consistent information should be procured from the Coroner's Office, area hospitals, Emergency Medical Services, and perhaps other service providers on an annual basis. Many studies note that due to recording difficulties, gathering data from all of the above sources is essential to developing a comprehensive view of drug-related overdose incidents and deaths (Landen, 2002; Galea &Coffin, 2003; Hickman, 2006; Tournier, 2006; Poulin, 2000).

Information from the hospitals could be extracted from the CIHI database using the International Classification of Diseases codes relating to both overdose incidents and deaths. The hospital data would be sorted by key demographic information such as age and gender. This data could be gathered and reflected by month and year and co-relational association could be used to intensify prevention and intervention efforts accordingly.

Emergency services data could be extracted from the call recording database and would indicate the number of people who called for help and the number of people who had a severe overdose where immediate medical attention was needed. As with the hospital data, this information could be divided by month to establish any patterns and cross reference these with experiences in other services. If type of drug and demographic characteristics could also be monitored, this data would provide current information to determine the common types of drugs leading to overdose incidents.

The coroner data as a source of information is more limited because the data are based in subjective categorization. The Coroner's Office does not conduct autopsies on all deaths, and only a very small number of deaths lead to a toxicology analysis and report. In a study of overdose deaths in New Mexico, Landen and colleagues (2002) examined certificates of death, not only for the immediate cause of death but also for underlying causes, or mitigating factors. This reporting methodology has shown to be effective in estimating the number of people who are dying of substance related causes. Thus examining certificates of death could be an effective strategy in Waterloo Region but it is resource intensive. However, because Waterloo Region lacks a coroner dedicated specifically to this area, content analysis would be the most reliable way to collect data related to drug overdose deaths. This would require privacy and ethical clearance.

Finally, qualitative and quantitative data should be gathered from service providers or organizations that directly work with at-risk populations in an effort to ascertain overdose deaths and incidents that are not captured by the data sets currently available. In conversations with service providers, it was routinely noted that they often

hear about when a person who uses drugs or lives on the street experiences an overdose incident or has died of an overdose. Though this information will be anecdotal, it could provide additional and essential data about what is happening at the street level.

Together the sources of information cited above could assist in creating a comprehensive picture of drug-related overdoses and could then be used to direct program development, and setting priorities for services. In addition, the information could be useful in developing broader drug policies and provide a framework for other municipalities wishing to understand overdoses in their community. Perhaps, most importantly, retroactive analysis of data when combined with proactive community concern for people who use drugs has the potential to reduce harm and save lives.

*Program*

In Waterloo Region an average of at least 26 people die prematurely of a drug and/or alcohol-related overdose each year. In addition, there is an average of 507 EMS calls for help with an overdose incident and an average of 667 intentional/unknown overdose intent incidents happening in regional hospitals annually. These numbers point to the need for prevention and intervention based in reliable evidence and an understanding of persons using drugs.

One program could focus on educating service providers and people who use drugs about factors that increase the risks associated with using drugs (for example, myths of calling for help and dangers associated with mixing drugs). As indicated by McNally (2005), the most effective way for a prevention program of this nature to be disseminated is collaboratively between a person who uses drugs and a service provider. This service provider would have expert knowledge in overdose prevention and the ability to inspire people to pass the message and tools along to family and peers. While prevention programs are a good place to start, programs that target life saving interventions can also have a significant positive impact.

The hospital data identifies that opioid overdoses represent the fourth highest category of drugs implicated in an overdose. The “Baseline Study on Substance Use” (completed by Public Health, 2008) indicates that misuse of prescription opioids was the third most prevalent drug in the region, following cannabis and crack cocaine. Given that cannabis never results in an overdose, and intervention in a crack cocaine overdose must be immediate, a peer administered Naloxone program could reduce injuries and save lives. Naloxone, a.k.a. Narcan, is a drug used to interrupt the effects of opiates, essentially “reversing” an overdose.

A pilot study in New York City followed 22 participants over a three month period. Of the 22 participants, 11 witnessed at least one overdose but a total of 26 overdoses were witnessed overall. Each of the 22 participants were then given two doses of Naloxone and trained to assess the overdose victim, activate emergency service systems, position the individual for rescue breathing, and to administer Narcan. Due to follow up difficulties, information from only 17 overdose incidents was collected. Of these,

Naloxone was administered 10 times and in each incident the life of the person overdosing was saved. Of the seven occasions when Naloxone was not administered, five survived, 1 died and 1 outcome was unknown. Participants reported feeling comfortable using Naloxone 75% of the time and 60% of participants kept Naloxone on their person at all times. This indicates Naloxone programs can be effective. Before committing to a similar pilot project in Waterloo Region, it would be advisable, however, to assess the extent of opiate-related drug overdoses locally.

Finally, a local "early warning" system when bad or lethal drugs become available on the streets of Waterloo Region is worth exploring as a preventative measure. There is no such formal system presently in place but recent examples of fentanyl-laced heroin that killed hundreds of people in the U.S., or high purity heroin being available in the streets of Canadian cities are a deep cause for concern for those working in substance use and abuse. An early warning system brings vital information to service providers and people who use drugs and is one recommendation identified as a priority in the Toronto Drug Strategy (2003).

## *Conclusion*

This study aims to provide insight into the extent of drug-related overdose incidents and deaths occurring in Waterloo Region. It was found that, on average, 26 people in Waterloo Region die from overdoses each year. In addition, 667 persons on average are seen annually at area emergency rooms because of drug overdoses. While much of the related literature indicates there is a reluctance to seek help from emergency medical services among people who use drugs, Waterloo Region Emergency Medical Services received an average of 507 calls annually to respond to drug overdoses. These findings indicate that programs should focus generally on overdose prevention and intervention through collaboration between service providers and people who use drugs and based on practice models that have been proven to be effective elsewhere while still being tailored to the specific needs in Waterloo Region.

The report was also able to highlight the difficulty in obtaining reliable data to determine the extent of overdose incidents and deaths. Reliable data in this area is not only important to determine where to focus prevention and intervention efforts, it is also important to inform emerging drug policies in Waterloo Region and beyond.

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## Appendix One: Code Definitions

| ICD Code | Definition | Example |
|---|---|---|
| X60 | *Intentional* self poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics | Tylenol, Advil, Aspirin, and other acetaminophens |
| X61 | *Intentional* self poisoning and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism, and psychotropic drugs, not elsewhere classified | Phenobarbitol, Dilantin, Dopamine, Levodopa, Benzodiazepines (alprazolam, diazepam, flurazepam) |
| X62* | *Intentional* self poisoning by and exposure to narcotics and psychodysleptics (hallucinogens), not elsewhere classified | Oxycontin, Codeine, Morphine, Percocet, Heroin, Cocaine, Ketamine, and other Street/Prescribed drugs |
| X63* | *Intentional* self-poisoning by and exposure to other drugs acting on the autonomic nervous system | Amphetamines, Crystal Meth, Ecstasy, and SSRI's |
| X64 | *Intentional* self poisoning by and exposure to other and unspecified drugs, medicaments, and biological substances | Pesticides, Biological Weapons, Fertilizers. |
| X65 | *Intentional* self poisoning by and exposure to alcohol | Beer, Wine, Spirits |
| Y10 | Poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics, *undetermined intent* | Tylenol, Advil, Aspirin, and other acetaminophens |
| Y11 | Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism, and psychotropic drugs, not elsewhere classified, *undetermined intent* | Phenobarbitol, Dilantin, Dopamine, Levodopa, Benzodiazepines (alprazolam, diazepam, flurazepam) |
| Y12 | Poisoning by and exposure to narcotics and psychodysleptics (hallucinogens), not elsewhere classified, *undetermined intent* | Oxycontin, Codeine, Morphine, Percocet, Heroin, Cocaine, Ketamine, and other Street/Prescribed drugs |
| Y13 | Poisoning by and exposure to other drugs acting on the autonomic nervous system, *undetermined intent* | Amphetamines, Crystal Meth, Ecstasy, and SSRI's |
| Y14 | Poisoning by and exposure to other and unspecified drugs, medicaments, and biological substances, *undetermined intent* | Pesticides, Biological Weapons, Fertilizers. |
| Y15 | Poisoning by and exposure to alcohol, *undetermined intent* | Beer, Wine, Spirits |

*Drugs in each of these categories may overlap as some psychodysleptics may also be classified as "other drugs acting on the autonomic nervous system"