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Chemical Injury Surveillance for New Zealand, 2008

Prepared for the New Zealand Ministry of Health

June 2009

Catherine Tisch
David Slaney

Client Report
FW09077

Chemical Injury Surveillance for New Zealand, 2008

Bruce Adlam
Programme Leader, Population & Environmental Health

Catherine Tisch
Project Leader

Jackie Benschop
Peer Reviewer

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

Current Situation

- The Chemical Injury Surveillance System (CISS) presently incorporates national mortality data [sourced from the Coronial Services Office (CSO)], national inpatient hospitalisation data [sourced from the New Zealand Health Information Service (NZHIS)], national human exposure poisoning phone call data [sourced from the National Poisons Centre (NPC)], national spraydrift data [sourced from the DriftNet surveillance system], national chemical/poison related notifiable diseases data [sourced from EpiSurv, the National Notifiable Disease Database] and national accident claim data [sourced from the Accident Compensation Corporation (ACC)].
- CISS also incorporates local emergency department data notified to Public Health Units (PHUs). Data received from PHUs for 2008 represent the following District Health Boards (DHBs): Waitemata, Auckland, Wairarapa, Capital and Coast, West Coast and Southland.
- In December 2005, an amendment to the Hazardous Substances and New Organisms (HSNO) Act was made that now requires all diagnosing medical practitioners in addition to hospital practitioners to report injuries caused by hazardous substances to the Medical Officer of Health. A case report form in EpiSurv to capture this data became operational on 19 September 2007.

Results

- *National results for 2008:*
    - 8571 poisoning hospitalisations (NZHIS), a national rate of 212.8 per 100 000 population.
    - 22 755 NPC calls categorised as human poisonings.
    - 7 spraydrift complaints.
    - 1 chemical poisoning from the environment notification, no notifications of decompression sickness, 315 lead absorption notifications, 1 notification of toxic shellfish poisoning and 8 notifications of hazardous substances injury.
    - Approximately 506 claims to ACC relating to chemical and hazardous substances injury.
    - A HSNO substance was involved in 171 emergency department notifications involving approximately 51 substances, and 8 Hazardous Substances Injury notifications via EpiSurv involving 5 substances.

- *Waitemata DHB results for 2008:*
    - 1159 poisoning hospitalisations (NZHIS), a rate of 240.7 per 100 000 population.
    - 672 North Shore Hospital injury notifications, a rate of 139.5 per 100 000 population

- *Auckland DHB results for 2008:*
    - 921 poisoning hospitalisations (NZHIS), a rate of 227.6 per 100 000 population.
    - 2017 Auckland City Hospital injury notifications, a rate of 498.5 per 100 000 population.

- *Wairarapa DHB results for 2008:*
    - 120 poisoning hospitalisations (NZHIS), a rate of 310.4 per 100 000 population.
    - 92 Masterton Hospital injury notifications, a rate of 238.0 per 100 000 population.

- *Capital and Coast DHB results for 2008:*
    - 215 poisoning hospitalisations (NZHIS), a rate of 80.6 per 100 000 population.
    - 563 Wellington Hospital injury notifications, a rate of 211.1 per 100 000 population.

- *West Coast DHB results for 2008:*
    - 46 poisoning hospitalisations (NZHIS), a rate of 146.8 per 100 000 population.
    - 5 Grey Hospital injury notifications, a rate of 16.0 per 100 000 population.

- *Southland DHB results for 2008:*
    - 220 poisoning hospitalisations (NZHIS), a rate of 205.9 per 100 000 population.
    - 163 Invercargill Hospital injury notifications, a rate of 152.6 per 100 000 population.

- *Mortality data for 2006/2007*
    - 196 chemical injury deaths in 2006 and 110 in 2007, as of 31 December 2008. Corresponding annual rates of 4.9 and 2.7 per 100 000 population, respectively.
    - Demographic and substance data were similar for both years.

1. INTRODUCTION

In 2001, the Institute of Environmental Science and Research (ESR) was commissioned by the New Zealand Ministry of Health (MoH) to develop a national Chemical Injury Surveillance System (CISS). The CISS was primarily developed in response to the legislative requirements of Section 143 of the Hazardous Substances and New Organisms (HSNO) Act (1996); all hazardous substance injuries that result in hospitalisation are to be notified to the Medical Officer of Health. In December 2005, the HSNO Act was amended to include hazardous substance injury notifications from diagnosing medical practitioners.

The CISS is intended to encompass this requirement, and extend it to achieve the greatest public health utility. Hazardous substances incorporated in the CISS include substances not covered by the HSNO Act such as medicines in finished dose form, and party drugs or ethanol when classified as food (see also p.2). Reporting to the CISS is not a legislative requirement, but it is one mechanism through which hospital and medical practitioners can meet their statutory obligations under the HSNO Act. The following describes the objectives and scope of the CISS [adapted from previous ESR reports to the MoH (Bates & Fowles, 2000; Fowles, 2001)], provides some definitions and discusses the current situation and other previously trialled approaches.

1.1. Objectives of the CISS

Two primary objectives are outlined below for the CISS:

- National surveillance of chemical/hazardous substance injuries resulting in the review of appropriate controls for certain products, and areas for targeted intervention, including: restriction of access to methods of (para) suicide, reducing the number of childhood poisonings through reviewing child resistant packaging needs for certain products, and improving workplace practices leading to a reduced number of serious acute injuries from occupational settings
- Improved local surveillance of chemical/hazardous substance injuries, by collecting specific data on substance/product, circumstances, and specific susceptible groups. The result being, the prioritisation of resources for facilitating investigations, intervention priorities and enforcement activities.

1.2. Scope of the CISS

1.2.1. Inclusions

The system is intended to cover:

- Injuries (for example, poisonings and chemical burns) caused by inappropriate use of hazardous substances including flammables and explosives
- Injuries caused by inappropriate use of therapeutic substances and ethanol (when classified as food)
- Poison/chemical related hospital admissions (including short stay unit admissions and presentations to emergency departments)

- Injuries from hazardous substances (under the HSNO Act) that result in a presentation to a medical practitioner (captured in EpiSurv as of 19 September 2007)
- Fatalities where the primary cause of death was poison/chemical related
- Both intentional and unintentional exposures
- Chemical/poison related notifiable disease (non-biological).

1.2.2. Exclusions

The system is **not** intended to cover:

- Adverse reactions to therapeutic agents when used as intended
- Injuries or deaths where poisoning is a secondary cause (for example, car crashes)
- Biological food poisonings (for example, salmonellosis).

1.3. Definitions

"**Hospitalisation**": The MoH has interpreted "hospitalisations" to include all hospital attendances, irrespective of whether the patient is classed as an inpatient or outpatient. The MoH considers the distinction between overnight stays and brief stays to be irrelevant, but considers that the important element is whether the person was treated as a patient.

"**Hazardous substance**": The HSNO Act defines a hazardous substance as a substance which possesses an intrinsic toxicity, ecotoxicity, flammability, capacity to oxidise, having an explosive, or corrosive property that meet pre-defined thresholds set by the Environmental Risk Management Authority New Zealand (ERMANZ) (Environmental Risk Management Authority New Zealand, 2008). Certain substances are excluded from ERMA's jurisdiction even though they are clearly hazardous under the definition of the Act - this is because they are regulated under different legislation. Examples of these substances include human therapeutic drugs in finished form (which are regulated under the Medicines Act) and ethanol (alcohol) when classified as a food (which is regulated under the Food Act). These substances are often referred to as 'non-hazardous, for the purposes of the HSNO Act'. Since the CISS is an instrument of the MoH, and is driven by a public health need, the substances included in it extend beyond that defined by ERMA's regulatory limits. This is why therapeutic drugs and alcohol are included in the system, even though they are not regulated by the HSNO Act *per se*.

"**Injury**": Has been defined by the MoH as any physical harm or damage serious enough to warrant medical treatment.

"Primary Substance": the primary substance identified that was involved in the death, it does not infer it is necessarily the single causative substance.

Substance Classes, for example chemicals/drugs of abuse: refer to Appendix 2.

1.4. Current Situation

Figure 1 presents a summary of the evolution of the New Zealand Chemical Injury Surveillance System.

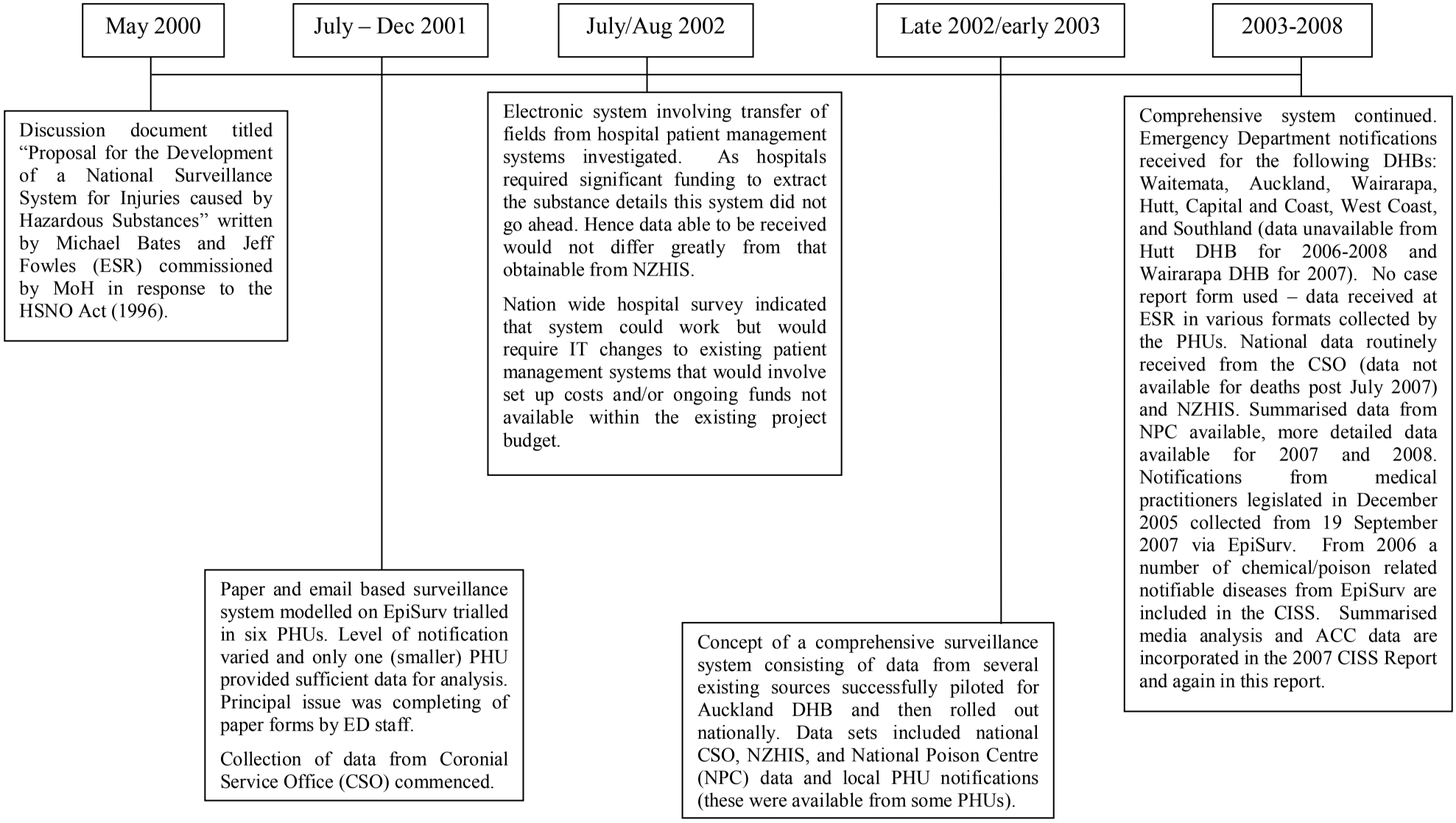

Figure 1: Evolution of CISS

Since 2001, three approaches for obtaining hospital notification data have been trialled and/or assessed. The latest, successfully trialled for Auckland in 2003 was a 'comprehensive' surveillance system incorporating injury data from the NZHIS, NPC, CSO and PHU. Results of this trial were presented in a report to the MoH in December 2003 (McDowell, Fowles, & Phillips, 2003).

Despite encountering some concerns, the trial was able to provide better functional analyses for local investigation and intervention, as well as national policy and practice, than other systems trialled to date. Specifically, the information provided by each data set could be used to better understand the underlying causes and consequences of exposures to hazardous substances.

Figure 2 is known as the injury pyramid; it demonstrates the relationship between severity of injury and the number of injuries that occur. For example, the peak of the injury pyramid represents fatal injuries, these are fewer in number but are highly visible, conversely, the base of the pyramid depicts injuries that do not receive attention in a health care institution; this represents the greatest number of injuries. The CSO mortality data, NZHIS inpatient hospitalisation data, PHU hospital emergency department data, NPC data, DriftNet spraydrift complaint data, EpiSurv chemical/poison related notifiable disease data and medical practitioner HSNO notifications, and ACC claim data, therefore cover a wide spectrum of the injury pyramid.

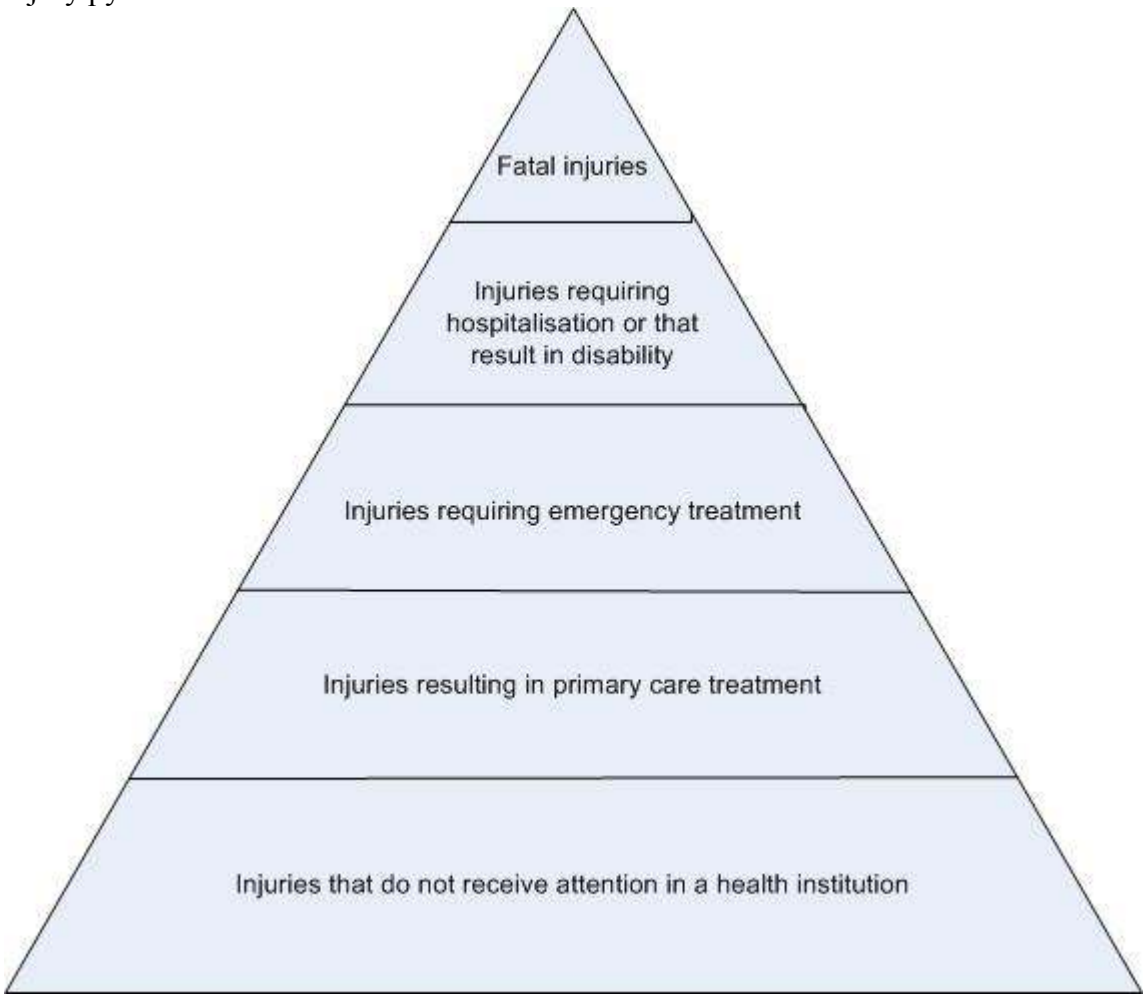

Figure 2: The Injury Pyramid. Adapted from: (Espitia-Hardeman & Paulozzi, 2005)

During the 2003/04 financial year, it was proposed that the 'comprehensive' system be implemented as the national chemical injuries surveillance system and roll-out of the system take place during this period. A report prepared for the MoH addressing this implementation and 2003 statistics was released in June 2004 (McDowell, Fowles, & Phillips, 2004) and a report on 2004 statistics was released in July 2005 (McDowell & Gallagher, 2005). The launch of the case report form for hazardous substance injury notifications via EpiSurv in September 2007 will ensure that all sectors of the injury pyramid (with the exception of injuries that do not receive medical attention which is virtually impossible to collect) will be captured by the CISS.

Previous to 1 July 2007, deaths were investigated under the Coroners Act 1988 and coronial files were stored at the CSO. Deaths investigated post 1 July 2007 are now to be accessed through the Coronial Services Case Register and external access to, and extraction from, this register is under review by the CSO. The case register is an interim solution pending the design and installation of any new database. The CISS can continue to collect data for deaths that occurred before 1 July 2007, and ESR will continue to liaise with personnel from the CSO in regard to future data provision for deaths occurring post 1 July 2007. For this reason, completeness of CSO mortality data for 2007 is likely to be approximately 50-60% of those that are usually estimated, as only deaths prior to 1 July 2007 were able to be obtained.

During 2007 a review of the International Classification of Disease (ICD) version 10 (ICD-10) external cause codes incorporated in the CISS was undertaken. As a result, the list of codes has been expanded to be more comprehensive of the range of chemical and hazardous substances injuries that occur. The current codes can be found in Table 1.

From 2007 two additional data types are included in the CISS; ACC data and summarised media data. With respect to the medium term strategy more details are given in Section 3 of this report.

A brief overview on the comprehensive surveillance system and the specific datasets are given in Section 2 of this report.

1.5. Other Approaches Trialled to Date

Prior to the comprehensive CISS, two other approaches were investigated: a) a paper and email based system and b) an electronic system. As further details on the first are given in a 2002 MoH report (Fowles *et al.*, 2002) and details on both are given in the 2003 MoH report (McDowell *et al.*, 2003), only a brief overview is given here.

1.5.1. Paper and Email Based System

- Trialled July-December 2001 in six PHUs.
- Modelled on the national notifiable disease system (EpiSurv).
- Level of notification varied greatly from region to region with only one (smaller) region providing sufficient data for subsequent analysis.
- Number of issues, principally time to complete paper forms.

1.5.2. Electronic System

- Electronic transfer of details from the hospital system.
- Cases to be identified based on ICD-10 codes.
- Discussion held regarding trialling at Middlemore Hospital but data fields which could be obtained without significant additional funding would not differ to that sent to NZHIS as part of the National Minimum Data Set.
- Nationwide hospital survey indicated that the system could work but would require information technology changes to existing patient management systems (this would involve set up costs and/or ongoing funds).
- Thus with appropriate funding, an electronic system could potentially be implemented as hospitals update and renew their patient management systems.

1.6. Incorporation of the Email and Electronic Based Approaches into the Comprehensive Surveillance System

While not relying solely on PHU notification data to obtain a picture of the burden of disease from chemical injuries, the comprehensive system does incorporate data from this source.

Experiences with the paper based and electronic systems showed that no one approach would work in all settings and that local circumstance would dictate local data quality and capture practicalities.

1.7. This Report

This report provides a brief overview of the comprehensive surveillance system before detailing its continuation during the 2008/2009 financial year. Summary statistics from the various data sources for 2008 are then presented as are additional CSO analyses pertaining to 2006 and 2007. The Coronial Services Office is currently migrating files to a new electronic system so it is not possible to access files for deaths post 1 July 2007. Therefore mortality data cannot be examined for 2008 and only six months of data is included in the 2007 analysis.

2. BACKGROUND OF THE COMPREHENSIVE CHEMICAL INJURY SURVEILLANCE SYSTEM

2.1. Introduction

A brief overview of the comprehensive system is given below. More detail can be sourced from the 2003 MoH report (McDowell *et al.*, 2003).

- Different health exposures and injuries result in different contacts with the health system, for example, some injuries may be attended to in the home, others would involve a visit to a General Practitioner and/or be hospitalised. Some health exposures and injuries may ultimately result in death with or without receiving medical attention. Data from several sources are therefore required to develop a comprehensive surveillance system.
- By implementing a surveillance system which encompasses several health outcomes (as opposed to just hospital morbidity for example) in addition to exposure and hazard data, a more complete picture of heath effects resulting from exposure to hazardous substances/chemicals can be achieved (Figure 2).
- The following data sources are incorporated into the comprehensive surveillance system: Coronial Services Office, New Zealand Health Information Service, Public Health Units, the National Poisons Centre, DriftNet, EpiSurv and Accident Compensation Corporation.

2.2. Coronial Services Office Data

- All deaths that result from acute chemical injury are deemed to be suspicious; therefore, a coroner's inquest should be completed.
- Files are stored at the national CSO in Wellington.
- Case demographics, circumstances surrounding death (including intent), and toxicology results are available from CSO files.
- Although initially obtained manually, ESR now receives most of this data electronically. ESR has been receiving CSO data since 2001.
- The main limitation associated with the coronial data is timeliness. It is estimated that by the end of a given year, approximately 50-60% of cases for that year are available. By the end of the following year, it is estimated that 90-95% of cases for the preceding year will have files readily accessible.
- The small number of chemical injury deaths means caution should be exercised when interpreting data, especially rates.

2.3. New Zealand Health Information Service Data

- Public hospitals are required to provide NZHIS with data known as the National Minimum Data Set (NMDS) for all **inpatients** (those admitted to hospital. Note that the criteria for classification as an inpatient differs between hospitals).

- Hospitalisations with International Classification of Disease (ICD) version 10 (ICD-10) external cause codes of interest (Table 1) are identified and the relevant data obtained from NZHIS.
- Data includes basic demographics, domicile code, admission and discharge date, ICD-10 codes (external cause codes and diagnosis codes) and free text fields.

Table 1: ICD-10 External Causes of Morbidity Codes of Interest for Chemical Injury Surveillance

ICD-10 Code	Description
Intentional poisoning by and exposure to:	
X60	Nonopioid analgesics, antipyretics and antirheumatics
X61	Antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified
X62	Narcotics and psychodysleptics [hallucinogens], not elsewhere classified
X63	Other drugs acting on the autonomic nervous system
X64	Other and unspecified drugs, medicaments and biological substances
X65	Alcohol
X66	Organic solvents and halogenated hydrocarbons and their vapours
X67	Other gases and vapours
X68	Pesticides
X69	Other and unspecified chemicals and noxious substances
X75	Intentional self-harm by explosive material
X76	Intentional self-harm by smoke, fire and flames
X83	Intentional self-harm by other specified means
Unintentional poisoning by and exposure to:	
X40	Nonopioid analgesics, antipyretics and antirheumatics
X41	Antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified
X42	Narcotics and psychodysleptics [hallucinogens], not elsewhere classified
X43	Other drugs acting on the autonomic nervous system
X44	Other and unspecified drugs, medicaments and biological substances
X45	Alcohol
X46	Organic solvents and halogenated hydrocarbons and their vapours
X47	Other gases and vapours
X48	Pesticides
X49	Other and unspecified chemicals and noxious substances
Poisoning by and exposure to (undetermined intent):	
W36	Explosion and rupture of gas cylinder
W37	Explosion and rupture of pressurized tyre, pipe or hose
W38	Explosion and rupture of other specified pressurized devices
W39	Discharge of firework
W40	Explosion of other materials
X04	Exposure to ignition of highly flammable material
X08	Exposure to other specified smoke, fire and flames
X20	Contact with venomous snakes and lizards
X21	Contact with venomous spiders
X22	Contact with scorpions
X23	Contact with hornets, wasps and bees
X24	Contact with centipedes and venomous millipedes (tropical)

X25	Contact with other venomous arthropods
X26	Contact with venomous marine animals and plants
X27	Contact with other specified venomous animals
X28	Contact with other specified venomous plants
X58	Exposure to other specified factors
Y25	Contact with explosive material
Y26	Exposure to smoke, fire and flames
Y33	Other specified events
Y86	Sequelae of other accidents
Y870	Sequelae of intentional self-harm, assault and events of undetermined intent
Y872	Sequelae of events of undermined intent
Y10	Nonopioid analgesics, antipyretics and antirheumatics
Y11	Antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified
Y12	Narcotics and psychodysleptics [hallucinogens], not elsewhere classified
Y13	Other drugs acting on the autonomic nervous system
Y14	Other and unspecified drugs, medicaments and biological substances
Y15	Alcohol
Y16	Organic solvents and halogenated hydrocarbons and their vapours
Y17	Other gases and vapours
Y18	Pesticides
Y19	Other and unspecified chemicals and noxious substances
Assault	
X85	Assault by drugs, medicaments and biological substances
X86	Assault by corrosive substance
X87	Assault by pesticides
X88	Assault by gases and vapours
X89	Assault by other specified chemicals and noxious substances
X96	Assault by explosive material
X97	Assault by smoke, fire and flames
Y08	Assault by other specified means
Y871	Sequelae of assault
Legal intervention	
Y351	Legal intervention involving explosives
Y352	Legal intervention involving gas
Y356	Legal intervention involving other specified means
Y890	Sequelae of legal intervention

Limitations associated with the NZHIS data:

- Only inpatients are captured, therefore those treated in emergency departments but not admitted are not included
- Criteria for classification as an inpatient vary between hospitals
- Often, only generic classification of the substances involved is available, rather than the specific substance name
- There is a time delay between presentation at hospital and availability of the data from NZHIS. This varies by area, but is generally less than one year
- The ICD-10-AM coding system is complex and inflexible. The current version is the 10th since ICD coding was first used in 1901.

2.4. Public Health Unit Data

- While a paper and email-based system piloted in 2001 was not universally successful, some PHUs currently operate their own local surveillance systems based on this approach.
- Any data, whether collected via a paper or electronic system can be incorporated into the comprehensive CISS.
- The quality, completeness and consistency of data collected vary between PHUs. Classification of intent can be problematic.

2.5. National Poisons Centre Data

- The NPC operates a 24 hours a day, 365 days per year telephone service that fields enquiries regarding **actual** or **potential** toxic exposures.
- While there is no requirement to phone the NPC in the event of a poisoning, about 32 000 phone calls are received each year.
- Details of calls are recorded in an electronic database.
- NPC also operates an Internet database known as TOXINZ.
- There is no clinical or laboratory confirmation of actual exposures.

2.6. DriftNet (Spraydrift) Data

- DriftNet is a surveillance system designed to monitor the incidence of spraydrift events with potential, reported or alleged health effects.
- Sourced from PHU staff who collect information on spraydrift complaints and incidents that are reported to them.
- Comparison with regional council data indicates that the DriftNet system is under utilised.

2.7. Chemical/Poison Related Notifiable Disease Data

- A number of chemical/poison related diseases are currently notifiable under the Health Act (1956).
- Sourced from EpiSurv – the national notifiable disease surveillance system.
- Diseases of interest include: decompression sickness, chemical poisoning from the environment, lead absorption, toxic shellfish poisoning and hazardous substances injury (hazardous substances injury is notifiable under the HSNO Act).
- As with communicable diseases there is likely to be a degree of under-reporting of chemical/poison related diseases. The extent to which the data reflect the true incidence of the disease burden is affected by many factors such as: public awareness of the injury, use of diagnostic facilities and the interest, resources and priorities of local public health units (see Institute of Environmental Science and Research, 2008 for a discussion of under reporting).

2.8. Accident Compensation Corporation claim data

- The ACC administers New Zealand's accident compensation scheme, which provides personal injury cover for all New Zealand citizens, residents and temporary visitors to New Zealand.
- ACC is a crown entity and is responsible for many things including: paying compensation, buying health and support services to treat and care for injured people and providing injury prevention services.
- Data collected on accident compensation claims include demographics, ICD-10 diagnosis codes (external cause codes not assigned) and geographic details. Unfortunately not all claims are assigned an ICD-10 code and it is not possible to find out what proportion of claims this relates to. Where numbers of claims are less than or equal to three, the exact figure cannot be provided. For these reasons, when referring to ACC claim data in this report, the figures are often referred to as estimates.

3. PROGRESS ON NATIONAL IMPLEMENTATION AND DEVELOPMENT OF THE MEDIUM TERM STRATEGY, 2008/2009

National implementation of the comprehensive surveillance system was initiated in 2003/2004 following the successful pilot for the Auckland region. National data continues to be received on a quarterly basis from the NZHIS for inpatient hospitalisations and from the CSO for fatal chemical injury cases (note figures are not available for deaths post 1 July 2007). CISS datasets from these sources date back to 2001. National DriftNet (spraydrift) data date back to 1998. From 2006, the CISS will also be reporting on a number of chemical/poison related notifiable diseases from EpiSurv. National NPC data for the period January to December 2007 was obtained for the first time in electronic format, and was available again for the year 2008.

Local chemical injury emergency department notifications from Auckland Regional Public Health Service (ARPHS) for Auckland City Hospital, and West Coast Public Health Unit (WCPHU) for Grey Hospital, also continue to be received on a regular basis. Datasets for both date back to 2003. The CISS also includes local injury notification data from Southland Public Health Unit (SOPHU) for Invercargill Hospital, for the years 2002-2008 and Regional Public Health (RPH) representing Capital and Coast DHB (Wellington Hospital) for the years 2005-2008. North Shore and Waitakere Hospital emergency department notifications are incorporated for the first time in this report for the year 2008. From 2004-2005 the CISS also incorporated data representing Hutt Valley DHB (this was not available for 2006-2008) and Wairarapa DHB for the years 2004-2006 and 2008 (Masterton Hospital data not available for 2007).

Thus this report is able to document injury trends for the above six DHBs. The contributing DHBs are well representative of New Zealand, both on a geographic and population basis. Four of the six DHBs are based in the North Island, most of which represent large metropolitan centres. On a DHB population basis Waitemata is ranked first, Auckland DHB is ranked fourth, Capital and Coast is ranked sixth, and Wairarapa is ranked twentieth out of all 21 DHBs. The other two DHBs represent smaller provincial and rural areas in the South Island. West Coast has the smallest population of all the DHBs and Southland is ranked 14/21. This cross-section of DHBs provides a useful sentinel surveillance system, which incorporated with the national datasets, provides useful analysis that can contribute to the planning and implementation of policies and interventions.

However, the nature of the CISS is such that new datasets can be readily incorporated. Sourcing of further PHU/emergency department data continues and will be integrated when available, for example North Shore/Waitakere Emergency Department data for 2008.

The 2006 Annual CISS Report was the first time that a number of chemical/poison related notifiable diseases (under the Health Act) were incorporated. This adds another dimension to the comprehensive CISS and continues for the 2008 analysis. The chemical/poison related notifiable diseases (with the exception of hazardous substance injuries) will continue to be reported in the "Notifiable and Other Diseases in New Zealand Annual Report" (for example Institute of Environmental Science and Research, 2008).

A new notifiable disease that was incorporated in the 2007 Annual CISS Report was hazardous substances injury notifications from medical practitioners. In December 2005, an

amendment to the HSNO Act was made that now requires all diagnosing medical practitioners, in addition to hospitals, to report injuries caused by hazardous substances to the Medical Officer of Health. However, the notification of diseases from substances not classified as hazardous substances is still not mandated. This would require changes to legislation outside of the HSNO Act, for example, the Health Act. A case report form for capturing hazardous substances injury notifications was incorporated into EpiSurv on 19 September 2007.

Under the Health Act, clinicians are required to notify certain scheduled medical diseases to the Medical Officer of Health. As of December 2007, laboratories are now required to report test results that indicate a person is or may be infected with a notifiable disease or illness to the Medical Officer of Health (Ministry of Health, 2007). The new legislative requirements will improve the old system and will lead to improvements in the rates of reporting. This is unlikely to impact on the 2007 CISS Annual Report numbers and rates and may lead to an increase in the numbers of notifiable diseases reported from 2008 onwards as has been noted for lead absorption.

As recognised for several years, the most desirable means of capturing any notification data is via integration with patient management systems. ESR continues to investigate the potential of providing a web based reporting tool for direct reporting of notifications from medical practitioners. If a system is developed this could be expanded to include direct reporting from hospitals and medical practitioners for notifications of hazardous substance injuries. The major complication with this approach is that no one common patient management system is used by all hospitals, and even within the same hospital a different system may be used for emergency department patients and inpatients. Furthermore, General Practitioners use different systems again. Thus to have a nationwide integrated system would involve funding which is not presently available. With respect to the CISS, until a system is in place we will continue to seek permission to obtain emergency department electronic data extracts from those hospitals not currently covered by the CISS.

DriftNet data continue to be included in this report but as in previous years, the numbers of reported events are low. Comparison with regional council data indicates that the DriftNet system (employed in PHUs) is under-utilised. Therefore improved communication between regional councils and PHUs may enhance the referral of spraydrift incidents with health impacts to PHUs.

An additional data set which was incorporated for the first time in the 2007 CISS Annual Report is claim data from the ACC. Although the data summarised in this report is not a true reflection of claims relating to chemical injury (due to issues surrounding data collection and provision, including: many of the claims do not have ICD codes, the ones that do have ICD codes only have the diagnosis code and not the external cause code, codes with a small number of claimants undergo rounding and it is not possible to analyse each claim individually, they are only aggregated to a larger grouping), it provides trends which highlight the number of people who have injuries from chemicals and hazardous substances that are severe enough to warrant accident compensation. The number reported here is therefore an under-representation of the true figure.

The 2007 CISS Annual Report was also the first time a summary media analysis was included and this is again incorporated. It is apparent that many chemical/poison related notifiable illnesses are reported in the media, of which a minority are reported to EpiSurv. A short

summary is included in this annual report to highlight the types of poison/chemical injuries that are reported in the media.

In 2006/2007, an internal review of the CISS was carried out by the CISS team to provide the MoH with a number of recommendations for enhancing the surveillance system. With respect to strategies listed in the 2006 CISS Annual Report (Tisch & Slaney, 2007) to be carried out in 2008/2009 these have been addressed. The CISS now receives ICD diagnosis codes and free text fields, and the development of automated search algorithms for extracting further substance information was completed in 2008.

In 2008/2009, further strategies that were developed include:

- Continue to investigate the potential of providing a web based reporting tool for hospitals and medical practitioners for directly notifying PHUs and ESR (on behalf of the MoH) of incidents of hazardous substances injuries.

Since 2005, ESR has invested $1.5M in the development of an information integration platform, SurvINZ, with a redevelopment of the pre-existing national notifiable disease surveillance system (EpiSurv 6) to a web based national surveillance system (EpiSurv). This has enabled the integration of systems such as direct laboratory notification.

In the Direct Laboratory Notification Project, the MoH has overseen the communications with PHUs and laboratories, the development of HL7 data standards (ENDMS Guide), security and data transmission mechanisms. ESR has configured specialist software as the message receiver or "message broker" to the ENDMS guide and made the appropriate changes in EpiSurv to ensure there is a PHU user interface for the DLNP. The system, LabSurv, has been configured to two HL7 standards (2.1 and 2.4).

Theoretically the mechanism now exists for the direct reporting of hazardous substance injuries by hospitals and medical practitioners to PHUs and ESR (on behalf of the Ministry of Health). The next challenge in the process is the engagement of hospitals and medical practitioners. This will require political commitment and a well planned careful consultation process with the parties involved.

Although the CISS covers the majority of data sources explained in the injury pyramid (Figure 2), it is recognised that some of the data sources are not complete (for example, emergency department notifications are only received from six hospitals, and a degree of under-reporting exists for spraydrift complaint and EpiSurv notifiable disease data). Given that the intent of the CISS is to examine mortality and morbidity associated with hazardous substances injuries in New Zealand, there is potential to look at additional or alternative surveillance methods for obtaining such data. In the future other techniques could be employed such as sentinel surveys of general and hospital based practitioners.

4. RESULTS FROM THE CHEMICAL INJURIES SURVEILLANCE SYSTEM FOR 2008

4.1. Introduction

National results for 2008 are presented for the NZHIS hospitalisation data by DHB, age, sex, ethnicity, intent and substance. Summarised results for spraydrift complaints, chemical/poison related notifiable diseases, National Poisons Centre call data, Accident Compensation Corporation data and a media analysis follow. A more detailed analysis of the combined datasets relating to injuries in children aged less than five years, poisonings involving paracetamol and ethanol, and injuries caused by substances covered by the HSNO Act are then discussed. Finally, results from the CSO data for the years 2006 and 2007 are documented. As mentioned earlier in this report, mortality data for those who died post 1 July 2007 is unavailable. This report uses 2006 census data and prioritised ethnicity to calculate rates.

4.2. Summary of Key Statistics

4.2.1. National Analysis

- See Appendix 1 Table 6, Table 7 and Table 14.
- 8571 poisoning hospitalisations (NZHIS) in 2008, a national rate of 212.8 per 100 000 population.
- 22 755 NPC calls categorised as human poisoning for 2008.
- 7 spraydrift complaints in 2008.
- 1 chemical poisoning from the environment notification, no notifications of decompression sickness, 315 lead absorption notifications, 1 cases of toxic shellfish poisoning and 8 cases of hazardous substance injury were reported for 2008.
- Wairarapa DHB had the highest NZHIS poisoning hospitalisation rates (310.4 per 100 000, 120), with the lowest rate recorded from Capital and Coast DHB (80.6 per 100 000 population, 215).
- The majority of the NZHIS poisoning hospitalisations (48.7%, 4177) were deemed intentional (however 1690 were of unknown intent).
- The highest age-specific rate for the NZHIS data was for those aged 15-24 years (369.2 per 100 000 population, 2109).
- The majority of the NZHIS hospitalisations were female (57.7%, 4946).
- Where ethnicity was known, the majority of NZHIS hospitalisations (71.3%, 6042/8480) were for Europeans. Maori had the highest NZHIS hospitalisation rate (256.0 per 100 000 population, 1447).
- The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (24.5%, 2102), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (12.9%, 1107). Of the X61 poisonings where substance was known (1200 poisonings

and 1489 substances, note some poisonings had more than one substance listed), the most common substance was zopiclone (21.0%, 313/1489), followed by quetiapine (12.5%, 186) and citalopram (7.7%, 114).

- The most common substance identified in the NPC human exposure call data was paracetamol (5.4%, 1230/22 646), followed by dishwashing liquid (2.8%, 640) and all purpose cleaner (2.4%, 547).

4.2.2. Waitemata DHB Analysis

- See Appendix 1 Table 6, Table 8 and Table 15.
- 1159 NZHIS hospitalisations, a rate of 240.7 per 100 000 population.
- 672 North Shore/Waitakere Hospital injury notifications, a rate of 139.5 per 100 000 population.
- 2240 NPC human exposure calls, a rate of 465.1 per 100 00 population.
- The majority of North Shore Hospital notifications (44.3%, 298) and NZHIS hospitalisations were intentional (51.1%, 592).
- The 15-24 years age group had the highest notification rate (353.0 per 100 000 population, 239) and NZHIS hospitalisation rate (443.1 per 100 000 population, 300).
- The majority of notification data (58.4%, 392) and NZHIS hospitalisations were for females (56.9%, 660).
- Where ethnicity was known, the majority of notifications (78.4%, 515/657) and NZHIS hospitalisations (74.4%, 855/1149) were for Europeans. Europeans had the highest ethnicity-specific notification rate (163.4 per 100 000 population) and Maori had the highest ethnic-specific NZHIS hospitalisation rate (314.9 per 100 000 population, 135).
- Where substance was known (564), the most common substance was ethanol (40.6%, 229), followed by paracetamol (18.1%, 102) and zopiclone (5.1%, 29).
- The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (26.8%, 311), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (13.2%, 153). Of the X61 poisonings where substance was known (157 poisonings and 218 substances, note some poisonings had more than one substance listed), the most common substance was zopiclone (22.5%, 49/218), followed by quetiapine (12.4%, 27) and citalopram (8.3%, 18).

4.2.3. Auckland DHB Analysis

- See Appendix 1 Table 6, Table 9 and Table 16.
- 921 NZHIS hospitalisations, a rate of 227.6 per 100 000 population.
- 2017 Auckland City Hospital injury notifications reported to ARPHS, a rate of 498.5 per 100 000 population.
- 2277 NPC human exposure calls, a rate of 562.8 per 100 000 population.
- The majority of ARPHS notifications were of unknown intent (93.3%, 1882) and the majority of NZHIS hospitalisations were intentional (54.0%, 497).
- The 15-24 years age group had the highest ARPHS age-specific notification rate (1180.9 per 100 000 population, 794) and NZHIS hospitalisation rate (358.4 per 100 000 population, 241).

- The majority of ARPHS notification data was for males (55.5%, 1112); however, the majority of NZHIS hospitalisation data was for females (55.9%, 515).
- Where ethnicity was known, the majority of ARPHS notifications (68.7%, 1339/1948) and NZHIS hospitalisations (64.3%, 581/904) were for Europeans. Maori had the highest ethnic-specific ARPHS notification rate (690.3 per 100 000 population, 206) and NZHIS hospitalisation rate (361.9 per 100 000 population, 108).
- Where substance was known (2756), the most common ARPHS substance was ethanol (53.0%, 1460), followed by paracetamol (5.3%, 146) and zopiclone (3.9%, 107).
- The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (27.3%, 251), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (15.4%, 142). Of the X61 poisonings where substance was known (218 poisonings and 280 substances, note some poisonings had more than one substance listed), the most common substance was zopiclone (22.9%, 64/280), followed by quetiapine (10.4%, 29) and citalopram (8.2%, 23).

4.2.4. Wairarapa DHB Analysis

- See Appendix 1 Table 6, Table 10 and Table 17.
- 120 NZHIS hospitalisations, a rate of 310.4 per 100 000 population.
- 92 Masterton Hospital injury notifications reported to RPH, a rate of 238.0 per 100 000 population.
- 177 NPC human exposure calls, a rate of 457.9 per 100 000 population.
- The majority of RPH notifications and NZHIS hospitalisations were intentional (62.0%, 57 and 55.0%, 66, respectively).
- The 0-4 years age group had the highest RPH age-specific rate (574.0 per 100 000 population, 14) and the 15-24 years age group had the highest NZHIS age-specific rate (780.1 per 100 000 population, 33).
- The majority of RPH notifications (60.9%, 56) and NZHIS hospitalisations (55.0%, 66) were females.
- The majority of RPH notifications (76.7%, 56/73) and NZHIS hospitalisations (75.8%, 91) were for Europeans, and the highest ethnic-specific rate was for Maori (273.1 per 100 000 population, 15; 455.2 per 100 000 population, 25, respectively).
- Where substance was known (125), the most common RPH substance was ethanol (20.0%, 25), followed by paracetamol (11.2%, 14) and zopiclone (8.0%, 10).
- The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (23.3%, 28), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (15.0%, 18). Of the X61 poisonings where substance was known (10 poisonings and 11 substances, note one poisoning had two substances listed), the most common substance was zopiclone (27.3%, 3/11), followed by citalopram and methotrimeprazine (for each: 18.2%, 2).

4.2.5. Capital and Coast DHB Analysis

- See Appendix 1 Table 6, Table 11 and Table 18
- 215 NZHIS hospitalisations, a rate of 80.6 per 100 000 population.

- 563 Wellington Hospital injury notifications reported to RPH, a rate of 211.1 per 100 000 population.
- 1 884 NPC human exposure calls, a rate of 706.6 per 100 000 population.
- The majority of RPH notifications (73.7%, 415) and NZHIS hospitalisations (53.5%, 115) were intentional.
- The 15-24 years age group had the highest RPH age-specific rate (502.8 per 100 000 cases, 213) and NZHIS hospitalisation rate (141.6 per 100 000 population, 60).
- The majority of RPH notifications (68.9%, 388) and NZHIS hospitalisations (63.7%, 137) were for females.
- Where ethnicity was known, the majority of RPH notifications (75.8%, 410/541) and NZHIS hospitalisations (69.4%, 145/209) were for Europeans. Maori had the highest ethnicity-specific RPH notification rate (256.6 per 100 000 population, 68) and NZHIS hospitalisation rate (117.0 per 100 000 population, 31).
- Where substance was known (693), the most common RPH substance was paracetamol (16.6%, 115) followed by zopiclone (8.5%, 59) and ethanol (5.2%, 36).
- The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (22.8%, 49), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (17.2%, 37). Of the X61 poisonings where substance was known (8 poisonings and 9 substances, note one poisoning had two substances listed), the most common substance was iminostilbenes (22.2%, 2/9), the other substances each occurred once.

4.2.6. West Coast DHB Analysis

- See Appendix 1 Table 6, Table 12 and Table 19.
- 46 NZHIS hospitalisations, a rate of 146.8 per 100 000 population.
- 5 Grey Hospital injury notifications reported to WCPHU, a rate of 16.0 per 100 000 population.
- 159 NPC human exposure calls a rate of 507.4 per 100 000 population.
- There were 3 unintentional WCPHU notifications and 2 intentional. Intentional exposures were highest for NZHIS hospitalisations (56.5%, 26).
- The 25-44 years age group had the highest WCPHU age-specific notification rate (35.8 per 100 000 population, 3) and the 15-24 years age group had the highest NZHIS hospitalisation rate (295.3 per 100 000 population, 10).
- The majority of WCPHU notifications were for females (80.0%, 4). There was approximately the same number of female and male NZHIS hospitalisations (24 versus 22).
- All of the WCPHU notifications where ethnicity was known (2) were for Europeans. The majority of NZHIS hospitalisations were also for Europeans (88.9%, 40/45).
- Where substance was known (6), the most common WCPHU substance was codeine phosphate (50.0%, 3), followed by benzylpiperazine, ethanol and zopiclone (for each: 16.7%, 1).
- The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (28.3%, 13), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (13.0%, 6). Of the X61 poisonings where substance was known (12 poisonings and

15 substances, note some poisonings had more than one substance listed), the most common substance was zopiclone (33.3%, 5/15), followed by clonazepam (13.3%, 2).

4.2.7. Southland DHB Analysis

- See Appendix 1 Table 6, Table 13 and Table 20.
- 220 NZHIS hospitalisations, a rate of 205.9 per 100 000 population.
- 163 Invercargill Hospital injury notifications reported to SOPHU, a rate of 152.6 per 100 000 population.
- 747 NPC human exposure calls, a rate of 699.3 per 100 000 population.
- 74.2% (121) of SOPHU injury notifications were deemed intentional. The majority of NZHIS hospitalisations were of unknown intent (41.8%, 92).
- Highest age-specific injury rate was amongst the 15-24 years age group for SOPHU notifications (400.4 per 100 000 population, 55 cases) and amongst the 0-4 years age group for NZHIS hospitalisations (463.0 per 100 000 population, 32).
- The majority of SOPHU notifications (65.6%, 107) and NZHIS hospitalisations (54.1%, 119) were for females.
- Ethnicity data were not collected for SOPHU notifications. Where ethnicity was known the majority of NZHIS hospitalisations were for Europeans (75.6%, 164/217). Maori had the highest ethnicity-specific rate (388.8 per 100 000 population, 44).
- Where substance was known (268), the most common SOPHU substance was Paracetamol (12.3%, 33), followed by ethanol (10.1%, 27) and codeine phosphate (6.7%, 18).
- The most common NZHIS external cause code was Y11 (Undetermined poisoning by Antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (20.0%, 44/220), followed by X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (10.9%, 24). Of the Y11 poisonings where substance was known (34), the most common substance was zopiclone (23.5%, 8), followed by amitriptyline, carbamazepine and citalopram (each: 11.8%, 4).

4.2.8. Specific Analyses

4.2.8.1. Injuries in Children aged less than five years

- See Appendix 1 Table 7, Table 21 and Table 22.
- 801 NZHIS hospitalisations, a rate of 291.2 per 100 000 population (9.3% of total NZHIS poisoning hospitalisations).
- 142 emergency department injury notifications, a rate of 237.6 per 100 000 population (note, does not include Auckland City Hospital data as children sent to Starship Hospital of which data not available and no relevant attendances to Grey Hospital).
- The majority of NZHIS hospitalisations (95.5%, 765) and emergency department notifications (95.1%, 135) were deemed unintentional. None of the NZHIS hospitalisations were deemed intentional and three of the emergency department notifications were deemed intentional.
- The majority of NZHIS hospitalisations (59.6%, 477) and emergency department notifications (54.9%, 78) were males. Males also had a higher NZHIS hospitalisation

rate (339.8 per 100 000 population) and emergency department notification rate (255.3 per 100 000 population).

- The majority of NZHIS hospitalisations (where ethnicity was known) were for Europeans (58.5%, 467/798), followed by Maori (28.4%, 227). This trend was also evident for the emergency department notifications (74.6%, 85/114; 13.2%, 15, respectively). For the NZHIS hospitalisation data, Maori had the highest ethnicity-specific rate (341.7 per 100 000 population) followed by Europeans (315.8 per 100 000 population). For the emergency department data Europeans had the highest ethnicity-specific rate (284.7 per 100 000 population) followed by Pacific Peoples (185.7 per 100 000 population, 10).
- Where substance was known (143), the most common substance involved in emergency department notifications was paracetamol (28.0%, 40), followed by amoxicillin/clavulanate (4.9%, 7) and diclofenac (3.5%, 5).

4.2.8.2. Paracetamol Poisonings

- See Appendix 1 Table 23
- 410 emergency department notifications involving paracetamol, a rate of 31.6 per 100 000 population.
- Paracetamol was ranked among the most common substances reported by emergency departments (ranked first from Wellington Hospital and Invercargill Hospital, and second from Auckland City Hospital, North Shore/Waitakere Hospitals, and Masterton Hospital).
- 53.4% (219) of the paracetamol notifications were deemed intentional (35.6% of the cases were of unknown intent).
- Those aged 15-24 years had the highest age-specific paracetamol poisoning rate (93.2 per 100 000 population, 182), followed by those aged 0-4 years (46.6 per 100 000 population, 40).
- Approximately three quarters of emergency department paracetamol poisoning cases were female (74.8%, 306/409). Females also had the highest sex-specific rate (45.9 per 100 000 population).
- Where ethnicity was known, (370) approximately three quarters of the paracetamol poisonings were for Europeans (75.1%, 278). Europeans also had the highest ethnicity-specific rate (88.2 per 100 000 population) followed by Maori (77.0 per 100 000 population, 33).

4.2.8.3. Ethanol Poisonings

- See Appendix 1 Table 24.
- 322 NZHIS hospitalisations for 2008 (8.0 per 100 000 population) and 1777 emergency department ethanol notifications (133.7 per 100 000 population) (note, all of these are ethanol when classed as food).
- Ethanol was ranked among the most common substances reported by emergency departments (ranked first from North Shore/Waitakere Hospitals, Auckland City Hospital, second from Invercargill, second equal for Grey Hospital and third for Wellington Hospital).
- 19.3% (62) of the NZHIS ethanol notifications were aged less than 18 years (the legal drinking age in New Zealand). 5.9% (86/1460) of the Auckland City Hospital ethanol notifications were aged less than 18 years, a further 59 notifications in this age group

were reported from other emergency departments; North Shore/Waitakere (21.9% of ethanol notifications, 50), Masterton (20.0% of ethanol notifications, 5), Wellington (5.6% of ethanol notifications, 2), Invercargill (7.4% of ethanol notifications, 2) (the Grey Hospital notification was not less than 18 years of age).

- The majority of NZHIS notifications were intentional (38.8%, 125 however 80 of the poisonings were of unknown intent) whereas the majority of emergency department ethanol notifications were of unknown intent (89.5%, 1591).
- The numbers of male and female NZHIS hospitalisations was almost the same (166 versus 156). Where sex was known (1769), the majority of emergency department notifications were male (59.5%, 1053). For both NZHIS hospitalisations (8.4 per 100 000 population) and emergency department notifications (162.4 per 100 000 population) males had the highest sex-specific rate.
- Where ethnicity was known, approximately two thirds of the ethanol NZHIS hospitalisations (66.5%, 212/319) and emergency department notifications were for Europeans (69.5%, 1171/1686) followed by Maori (21.9%, 70 and 11.2%, 188 respectively). Maori had the highest ethnicity-specific rate for both NZHIS hospitalisations (12.4 per 100 000 population, 70) and emergency department notifications (174.7 per 100 000 population, 188).

4.2.8.4. Injuries Involving HSNO Substances

- See Appendix 1 Table 25 and Table 26.
- 171 emergency department notifications involving approximately 51 substances covered by the HSNO Act.
- 8 EpiSurv hazardous substances injury notifications.
- The most common HSNO substance reported was carbon monoxide (17.5%, 30/171), followed by hydrocarbons (9.4%, 16), unspecified chemicals (7.6%, 13) and hypochlorite (7.0%, 12).
- The majority of notifications (46.2%, 79) were the result of unknown intent followed by unintentional exposures (32.2%, 55).
- The majority of notifications (58.5%, 100) were for males, they also had the highest sex-specific rate (15.8 per 100 000 population).
- The highest age-specific HSNO substance rate was for the 0-4 years age group (26.8 per 100 000 population, 23), closely followed by the 15-24 years age group (23.6 per 100 000 population, 46).
- Where ethnicity was known (147), the majority of HSNO substance notifications were for Europeans (60.5%, 89), followed by Maori (14.3%, 21). Maori had the highest ethnicity-specific rate (20.1 per 100 000 population, 21) followed by Pacific Peoples (16.7 per 100 000 population, 16).

4.2.9. Coronial Service Office Data for 2006 and 2007

- See Appendix 1 Table 28 to Table 32.
- There were 196 chemical injury deaths in 2006 and 110 in 2007, with corresponding annual rates of 4.9 and 2.7 per 100 000 population respectively. CSO data are estimated to be 80-90% complete for 2006. However, for 2007 CSO data could only be accessed up to 1 July 2007.

- The majority of the chemical injury deaths were intentional (2006: 61.2%, 120; 2007: 52.7%, 58). However, 18.9% (37) of the deaths in 2006 and 26.4% (29) of the deaths in 2007 were of unknown intent.
- Canterbury DHB had the greatest number of chemical injury deaths for 2006 (38) and 2007 (18). West Coast DHB had the highest mortality rate in 2006 (9.6 per 100 000 population, 3) and Wanganui DHB had the highest mortality rate in 2007 (6.4 per 100 000 population, 4).
- The mortality rate was highest in the 45-64 years age group in 2006 (7.4 per 100 000 population, 71) and in 2007 (4.6 per 100 000 population, 44).
- The majority of deaths in 2006 (70.9%, 139) and in 2007 (57.3%, 63) were males.
- The majority of deaths where ethnicity was known were for Europeans (2006: 85.3%, 163/191; 2007: 78.3%, 83/106). Europeans also had the highest ethnicity specific rate (2006: 6.1 per 100 000 population; 2007: 3.1 per 100 000 population).
- For 2006/2007 combined, just under half of the primary substances identified as involved in deaths (where substance class could be identified) were classed as household/domestic chemicals (45.8%, 132/288) followed by therapeutics (33.0%, 95) and chemicals/drugs of abuse (18.8%, 54).
- For 2006/2007 combined, the most common primary substance identified involved in the deaths (where primary substance involved could be identified) was carbon monoxide (40.3%, 116/288), followed by hydrocarbons (8.3%, 24) and methadone (5.9%, 17).
- For 2006/2007 combined, the primary substance identified involved in the intentional deaths (where primary substance involved could be identified) was carbon monoxide (68.5%, 111/162), followed by hydrocarbon (6.8%, 11) and amitriptyline (4.3%, 7).
- For 2006/2007 combined, the primary substance identified involved in the unintentional deaths (where primary substance involved could be identified) was morphine or heroin (19.6%, 11/56), followed by methadone (17.9%, 10) and hydrocarbons (16.1%, 9).
- For 2006/2007 combined, a HSNO substance was the primary substance identified in 148 deaths.

4.3. Detailed National Analysis

The following section presents national chemical injury results for 2008 from the NZHIS, DriftNet, EpiSurv, and NPC data sources plus short ACC and media summary sections. Relevant Appendix 1 tables are Table 6, Table 7 and Table 14.

4.3.1. NZHIS Hospitalisation Data

Overview

There were 8571 NZHIS poisoning hospitalisations in 2008, a national rate of 212.8 per 100 000 population. This is similar to the number and rate for 2007 (8606, 213.6 per 100 000 population). Between 2004 and 2007 there was an apparent annual increase in the number and rate of hospitalisations and this has remained steady for 2008 (Figure 3). It should be noted that the ICD 10 codes captured for the NZHIS analysis was expanded for 2007 and 2008, and this may explain this increase.

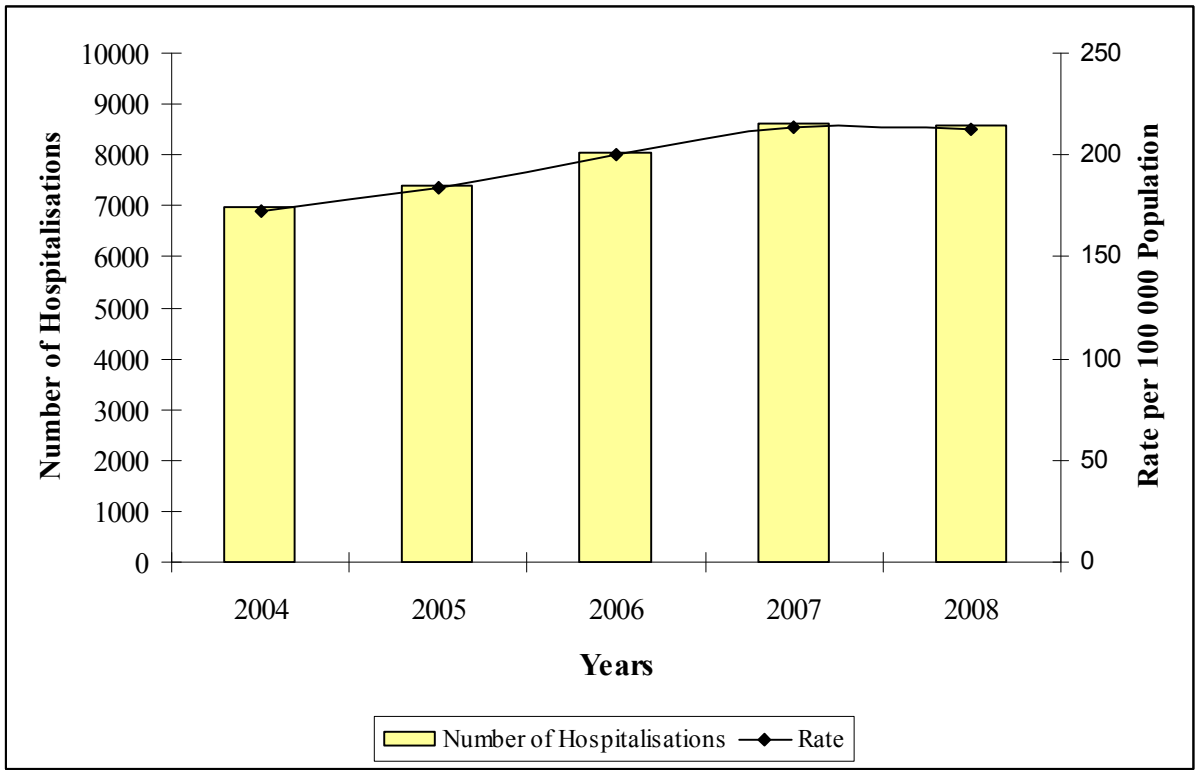

Figure 3: Number and Rate of Hospital Admissions for New Zealand, 2004-2008

Age

The 15-24 years age group had the highest NZHIS age-specific hospitalisation rate (369.2 per 100 000 population, 2109), followed by the 0-4 years age group (291.2 per 100 000 population, 801) (Figure 4). The 15-24 years age group also had the highest age-specific rate in 2007 (370.3 per 100 000 population, 2115). In 2008, the 15-24 years age group also had the highest intentional hospitalisation rate (222.2 per 100 000 population, 1269). This trend was also observed for 2007 (228.1 per 100 000 population, 1303). The 5-14 years age group had the lowest age-specific rate in 2008 (64.1 per 100 000 population, 380). None of the NZHIS hospitalisations for the 0-4 years age group were deemed intentional, however, 27.1% (103) of the poisonings in the 5-14 years age group were.

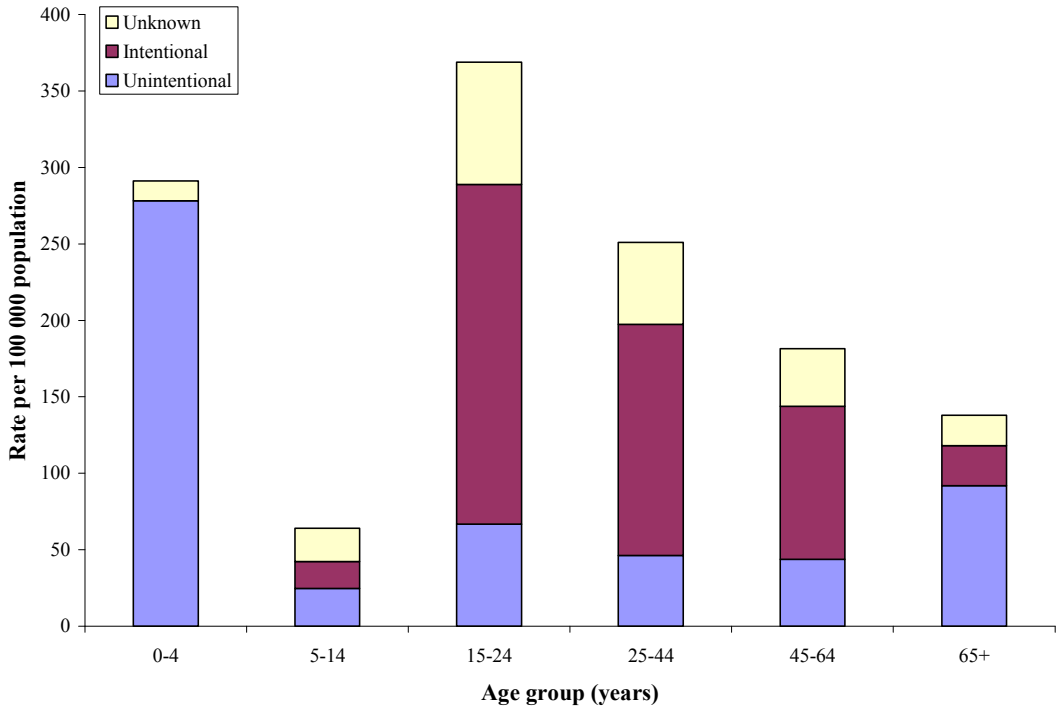

Figure 4: NZHIS Poisoning Hospitalisation Rate by Age Group and Intent, 2008

Sex

The majority of hospitalisations were for females (57.7%, 4946), they also had a higher sex-specific rate (239.8 per 100 000 population versus 184.4 per 100 000 population for males). This trend was also observed for 2007 (59.6% of hospitalisations female, 5128 at a rate of 248.7 per 100 000 population).

Intent

The majority of NZHIS poisoning hospitalisations were intentional (48.7%, 4177). During 2007, 50.3% of NZHIS hospitalisations were intentional. In 2008, 1690 (19.7%) of the NZHIS hospitalisations were of unknown intent.

The majority of female poisonings were intentional (57.5%, 2846), however for males, the majority of poisonings were unintentional (40.0%, 1449). This trend was also observed for 2007 (59.4%, 3047 of female poisonings were intentional and 40.9%, 1421 of male poisonings were unintentional).

Ethnicity

Where ethnicity was known (8480), Europeans accounted for the greatest number of NZHIS hospitalisations (71.3%, 6042). The highest ethnicity-specific rate was for Maori (256.0 per 100 000 population, 1447). This trend was also observed during 2007 (71.7%, 6086/8487 of hospitalisations were Europeans and the highest rate was for Maori; 245.2 per 100 000 population, 1386).

Substance

The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (24.5%, 2102), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (12.9%, 1107). This trend was also observed for 2007 (X61: 25.0%, 2153; and X60: 13.2%, 1138). Of the 2102 X61 poisonings in 2008, the most common diagnosis codes were T426 (Other antiepileptic and sedative-hypnotic drugs) (20.8%, 438), T424 (Benzodiazepines) (19.9%, 418), and T432 (Other and unspecified antidepressants) (19.6%, 412). Of the X61 poisonings where substance was known (1200 poisonings and 1489 substances, some poisonings had more than one substance listed), the majority were zopiclone (21.0%, 313/1489), followed by quetiapine (12.5%, 186) and citalopram (7.7%, 114). During 2007 zopiclone was also the most common substance: 21.2%, 144 however this was followed by citalopram (9.4%, 64) and clonazepam (8.1%, 55).

DHB rates

Figure 5 shows the number of NZHIS chemical injury hospitalisations and the corresponding rate by DHBs for 2008. Analysis of the 2008 NZHIS data by DHB showed that the Wairarapa DHB had the highest rate of poisoning hospitalisations (310.4 per 100 000 population, 120) followed by Lakes (275.5 per 100 000 population, 271) and Wanganui DHBs (273.4 per 100 000 population, 170). The lowest hospitalisation rate was recorded in Capital and Coast DHB (80.6 per 100 000 population, 215). During 2007 Capital and Coast DHB also had the lowest hospitalisation rate: 103.1 per 100 000 population, 275 however the DHB with the highest rate was West Coast: 277.6 per 100 000 population, 87. In 2008, when broken down by intent, Wairarapa DHB had the highest hospitalisation rate resulting from intentional poisoning (170.7 per 100 000 population, 66).

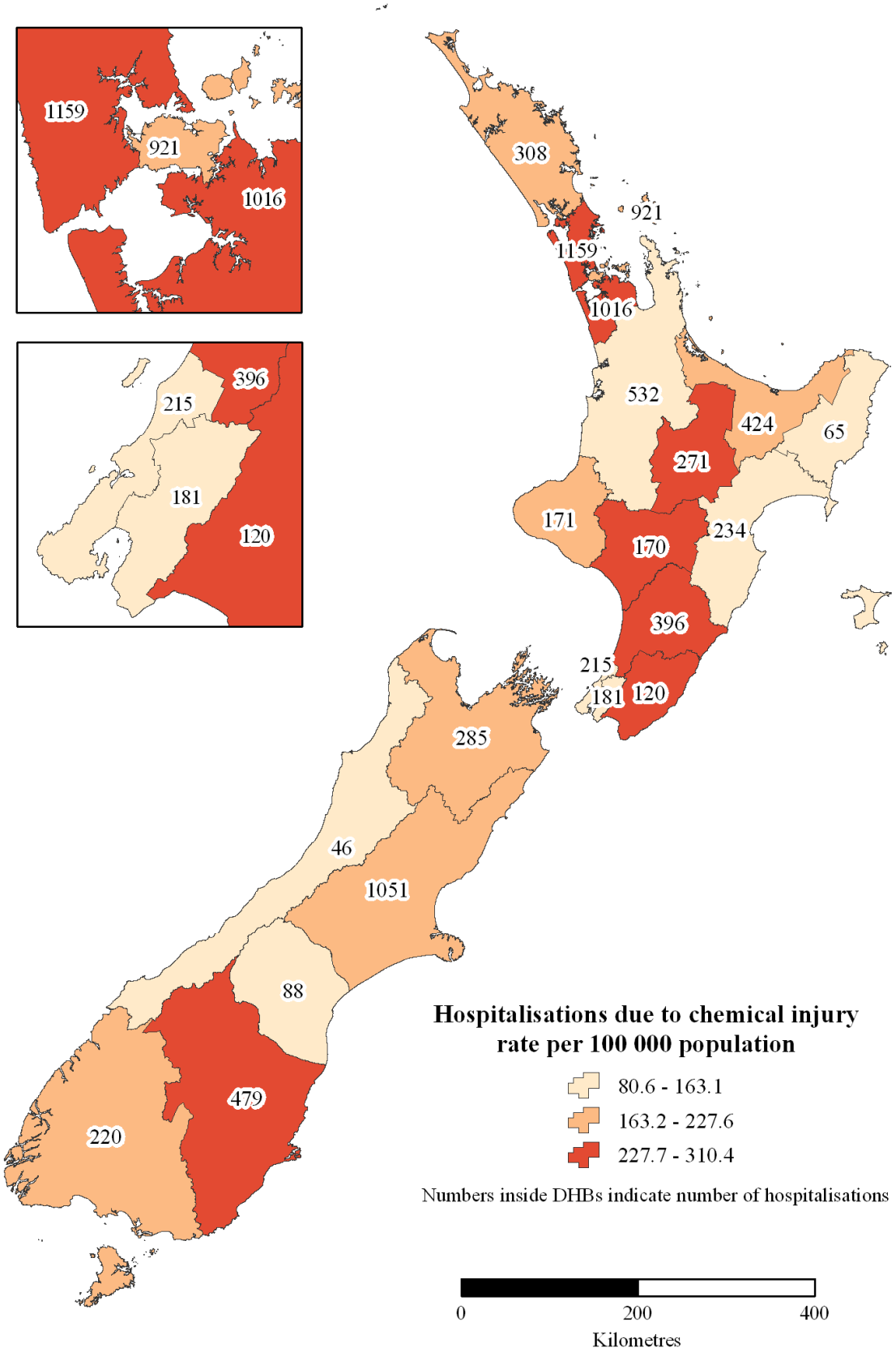

Figure 5: Number of NZHIS Chemical Injury Hospitalisations and Rates by DHB, 2008

4.3.2.Spraydrift

Seven spraydrift incidents were reported by PHUs during 2008. This is the similar to the number reported during 2007 (8) and continues the low number of spraydrift notifications in recent years (Table 2). For the years 1998-2008, the average number of spraydrift complaints reported per year is 12.

Table 2: Number of Spraydrift Complaints Reported by Year

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number of complaints	14	16	13	28	9	4	10	5	7	8	7

The majority of spraydrift complaints for 2008 were reported from North Island PHUs (Table 3). The specific agrichemical associated with the spraydrift event was known/suspected for four of the complaints. The majority of complaints involved symptoms resulting from spraydrift exposure, however, most of the complainants did not seek (or it was unknown whether they sought) medical attention.

Table 3: Summary of Spraydrift Complaints Reported for 2008

Location/PHU	Incident	Agrichemical	Symptoms/Damage	Cause
Far North District TLA, Northland Public Health Unit	In November approximately 25 people from a local school were possibly exposed to spraydrift from a neighbouring orchard.	Endosulfan (Thionex ®)	Symptoms included headache, tiredness, eye irritation, skin reaction and respiratory symptoms.	Spraydrift from vehicle mounted spraying
Hastings District TLA, Health Care Hawke's Bay	In January a woman advised that she got 'drenched' in spray from a neighbouring property.	Unknown	Symptoms included sore, swollen eyes and a blocked nose.	Spraydrift by unknown means
Hastings District TLA, Health Care Hawke's Bay	In October an unknown number of children were exposed to spraydrift from a property across the road as they walked to school.	Unknown	Unknown whether complainants sought medical attention or whether there was damage to crops or property from the drift.	Spraydrift by unknown means
Hastings District TLA, Health Care Hawke's Bay	In October a person complained of spraydrift exposure when a neighbouring orchard was spraying.	Unknown	Unknown whether complainants sought medical attention or whether there was damage to crops or property from the drift.	Spraydrift by unknown means
Whakatane District TLA, Toi Te Ora – Public Health	In July a male complained of spraydrift exposure, chemicals could be smelt.	2,4-Dichlorophenoxyacetic acid (2,4-D) (complainants opinion)	Unknown whether complainant sought medical attention or whether there was damage to crops or property from the drift.	Spraydrift from aerial helicopter
Western Bay of Plenty District TLA, Toi Te Ora – Public Health	In September a male complained of possible spraydrift exposure when he awoke with various symptoms. Kiwifruit orchard situated nearby.	Hydrogen Cyanamide (Hicane ®) (complainants opinion)	Symptoms included a red puffy face, bloodshot eyes and a sore throat. Alleges that symptoms occur each year. Complainant was diagnosed by a homeopath.	Spraydrift by unknown means
Westland District TLA, West Coast Public Health Unit	In August three persons complained of spraydrift exposure originating from a neighbouring property.	2,4-Dichlorophenoxyacetic acid (2,4-D)	Symptoms included respiratory problems and headache. No medical attention was sought. Some die-off appears on plants.	Spraydrift from aerial helicopter

4.3.3.Poison/Chemical Notifiable Disease Analysis

The following section details the 2008 notifications from EpiSurv for the following diseases/injuries: chemical poisoning from the environment, decompression sickness, lead absorption, toxic shellfish poisoning and hazardous substance injury.

Chemical poisoning from the environment

In 2008, 1 case was notified as chemical poisoning from the environment. This is significantly lower than the number notified in 2007 (13 cases). A Maori female aged 1-4 years from Northland DHB suffered from a skin rash and seizures and was hospitalised. It is thought that the house she lived in may have previously been a clandestine methamphetamine laboratory.

Decompression sickness

There were no cases of decompression sickness notified in 2008. Over the last five years, numbers of decompression sickness notifications have been low: none in 2007, 1 in 2006, 1 in 2005, none in 2004 and 2 in 2003.

As with previous years, the annual number of hospitalisations for decompression sickness exceeds the annual number of notifications, indicating a continued under-reporting. Diagnosis of decompression sickness as the primary reason for admission (ICD-10-AM code T70.3) was specified in 12 cases for 2008. Since 2002, the number of hospitalisations where decompression sickness was recorded as the primary reason for admission ranges from eight in 2005 and 2006 to 45 in 2002.

Lead absorption

There were 315 cases of lead absorption notified in 2008 (7.4 per 100 000 population), which is significantly higher than the number notified in 2007 (1.8 per 100 000 population, 78 cases). This is partly due to the lowering of the blood lead level notification in 2007 and the introduction of electronic laboratory notification in 2008.

Of the 315 cases notified in 2008, 13 (4.1%) were aged less than 15 years; 2 were aged less than 1 year, 5 cases were aged 1-4 years, 4 cases were aged 5-9 years and 2 cases were aged 10-14 years. The highest number of notifications in children was recorded in 1999 (25 cases) and the lowest in 2004, 2005 and 2007 (6 cases each).

Sex was recorded for 98.1% (309/315) of the cases. The majority of lead absorption notifications were for males (89.3%, 276 cases), compared to females (10.7%, 33 cases).

Ethnicity was recorded for 56.5% (178/315) of the cases. Of these responses, the majority of lead absorption notifications were reported for Europeans (82.6%, 147 cases), followed by Maori (7.9%, 14 cases), Pacific Peoples (6.7%, 12 cases) and Other ethnicity (2.8%, 5 cases). Of the 141 cases for which hospitalisation status was recorded, two (1.4%) were hospitalised.

Table 4 and Table 5 summarise risk factor information for lead absorption cases notified in 2008. Several cases had more than one risk factor recorded. Similar to previous years, the most common risk factor for lead absorption for children was living in, or regularly visiting, a building built prior to 1970 that had paint chalking/flaking, and/or had recently undergone alteration or refurbishment. Unlike previous years, for adults the most common risk factor for lead absorption was exposure to a high-risk occupation.

Blood lead levels were recorded for all of the notifications. For child notifications, blood lead level concentrations ranged from 0.48 to 1.9 µmol/L with a median of 0.7 µmol/L. For adult notifications, blood lead level concentrations ranged from 0.36 to 6.1 µmol/L with a median of 0.71 µmol/L.

Two lead poisoning clusters were reported by Auckland Regional Public Health Service during 2008. One cluster involved four family members who were exposed to lead paint when it was removed from their house. The remaining cluster involved 100 persons who were occupationally exposed to lead during the removal of paint from the Auckland Harbour Bridge. Cases continue to be reported from this cluster.

Table 4: Exposure to risk factors associated with lead absorption for adults (cases aged 15 years and over), 2008

Risk factor	Yes	No	Unknown	%[a]
Case had exposure to high-risk occupation[b]	213	58	31	78.6
Cased lived in or regularly visited a building built prior to 1970[c]	67	51	184	56.8
Case had exposure through hobbies[d]	59	65	178	47.6
Close contact of case was occupationally exposed to lead	4	107	191	3.6

[a] "%" refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Several cases had more than one risk factor

[b] Occupations included painter (37), radiator repairer (12), builder/labourer (8), cleaner (5), lead lighter (5), plastics worker (4), metallurgist (3), welder (3), foundry worker (2), laboratory technician (3), supervisor (2), electrician (2), aeronautical engineer (1), aircraft refueller (1), boilermaker (1), engineer (1), factory process worker (1), fitter (1), meat process worker (1), sand stripper (1), yardsman (1) and unspecified (118)

[c] Of these, 32 cases lived in or regularly visited a building that had chalking/flaking paint, and/or had recently undergone alterations or refurbishment

[d] Hobbies were reported as shooting (34), home renovations (6), making sinkers (4), making lead bullets (3), lead lighting (3), boat building (2), car restorer (2), painter (2), antique furniture restorer (1), circuit board repairer (1), figurine maker (1) and unspecified (1)

Table 5: Exposure to risk factors associated with lead absorption for children (cases aged less than 15 years), 2008

Risk factor	Yes	No	Unknown	%[a]
Cased lived in or regularly visited a building built prior to 1970 that had paint chalking/flaking, and/or had recently undergone alterations or refurbishment	6	1	6	85.7
Pica behaviour	4	6	3	40.0
Case played in soil containing paint debris	1	6	6	14.3
Close contact of case was occupationally exposed to lead	1	8	4	11.1
Case lived near an industry that is likely to release lead	0	10	3	0.0

[a] "%" refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Several cases had more than one risk factor.

Toxic shellfish poisoning

There was 1 suspected case of toxic shellfish poisoning reported in 2008. This continues the trend of low numbers of toxic shellfish poisoning cases reported in past years. Since 1997, numbers of cases reported ranged from 1 in 1998, 2002, 2006 and 2008 to 7 cases in 1999.

The 2008 notification was a 51 year old male from Nelson Marlborough DHB who collected and consumed mussels from Wainui Bay in the Tasman District. The type of toxic shellfish poisoning was unspecified. The case did not require hospitalisation.

Hazardous substance injury

8 cases of hazardous substance injury (HSI) were notified during 2008, this compares to 3 during 2007. It is important to note that the case report form went live in EpiSurv on 19 September 2007 therefore data from all of 2007 will not be captured.

The first notification occurred in June when a man from Waikato DHB was exposed to unsealed asbestos in a ceiling while renovating an old house. He had been exposed to asbestos during 2007 and 2008 and was referred to a respiratory physician. In October a three case cluster of HSI was reported from Waikato DHB. The men were on a camping trip and were accidentally exposed to carbon monoxide fumes from a gas cooker inside a cabin. Two of the men died and the survivor was hospitalised. This cluster was heavily publicised in the media. Four HSI cases were reported from Auckland Regional Public Health Service in November. A three year old female was accidentally exposed to solvents (Coopers Flush It and Coopers Strip It) and received corrosive burns. She was hospitalised in Starship Children's Hospital. A female from Waitemata DHB was accidentally exposed to carbon monoxide in her caravan from a gas cooking supply. The patient had several recent admissions to hospital for unexplained collapse and loss of consciousness episodes. The last two notifications involved male workers at a public swimming pool who were mixing chemicals and were exposed to chlorine vapours, both were hospitalised.

4.3.4. National Poisons Centre call data

During 2008, the NPC received 35 138 phone calls (includes exposure calls, information calls and product enquires), of these, 23 233 related to actual exposures (including chronic exposures, acute human exposures and animal exposures). Acute human exposure calls accounted for 64.8% (22 755) of the total number of calls received. During 2007, the NPC received 32 985 phone calls (includes exposure calls, information calls and product enquires), of these, 22 276 related to actual exposures (including chronic exposures, acute human exposures and animal exposures). Acute human exposure calls accounted for 66.1% (21 805) of the total number of calls received.

Age

Where age was known (22 181), the majority of exposure phone calls were for those aged 5-14 years (53.0%, 11 767), followed by the 0-4 years age group (21.6%, 4794). These two age groups also had the highest age-specific rates (1986.0 per 100 000 population and 1742.8 per 100 000 population, respectively). During 2007 where age was known (16 988),

approximately two thirds of exposure phone calls were for those aged 0-4 years (66.4%, 11 275), followed by the 25-44 years (8.8%, 1499), and 5-14 years age groups (8.6%, 1466). The 0-4 years age group also had the highest age-specific rate (4098.9 per 100 000 population), followed by the 5-14 years (247.4 per 100 000 population, 1466) and 15-24 years age groups (226.6 per 100 000 population, 1294).

Intent

The NPC uses different definitions than the other CISS data sources for intent; in particular 'abuse' as well as 'intentional'. Abuse would be classified as using any substance for any reason other that it is intended and also includes taking any amount of illicit substances. Intentional poisoning would be knowingly using a legal substance with the intent of harm or deliberate effect (Shieffelbien, 2007, 20 September). The majority of NPC human exposure phone calls were for child exploration (54.4%, 12 374), followed by unintentional exposures (33.5%, 7627). Intent was unknown for 1.0% (236) of the calls. During 2007 the majority of NPC human exposure phone calls were for child exploration (54.6%, 11 915), followed by unintentional exposures (33.9%, 7400). Intent was unknown for 0.9% (188) of the calls.

Sex

Where sex was known (22 356), the number of human exposure calls was similar for females (50.2%, 11 224) and males (49.8%, 11 132). The sex-specific rate was slightly higher for males (566.3 per 100 000 population) than females (544.2 per 100 000 population). The number of human exposure calls by intent was generally split evenly by sex with the exception of intentional exposures (69.1% female). During 2007 where sex was known (21 272), the number of human exposure calls was similar for females (49.7%, 10 570) and males (50.3%, 10 702). The sex-specific rate was slightly higher for males (544.5 per 100 000 population) than females (512.5 per 100 000 population). The number of human exposure calls by intent was generally split evenly by sex with the exception of intentional exposures (70.7% female) and abuse exposures (66.2% male).

Ethnicity

Where ethnicity was known (12 523), the majority of human exposure calls were for Europeans (79.2%, 9921), followed by Maori (10.7%, 1344). The highest ethnicity-specific rate was for Europeans (368.3 per 100 000 population) followed by Maori (237.7 per 100 000 population). During 2007 the highest ethnicity-specific rate was also for Europeans (264.0 per 100 000 population, 7112) followed by Maori (142.0 per 100 000 population, 803).

Substance

Where substance class was known (19 895), the majority of human exposure calls were for therapeutics (44.3%, 8818), followed by household/domestic chemicals (28.6%, 5698) and agrichemicals (9.3%, 1850). Paracetamol was the most common substance involved in human exposure calls to the NPC (5.4%, 1230/22 646) followed by dishwashing liquid (2.8%, 640) and all purpose cleaner (2.4%, 547). During 2007 the most common substance involved in human exposure calls to the NPC was also paracetamol (5.2%, 1127) followed by

dishwashing liquid (2.9%, 628). During 2008 a HSNO substance was involved in 30.8% of the calls (6966/22 646), the most common substances were dishwashing liquid (9.2%, 640/6966), all purpose cleaner (7.9%, 547) and hydrocarbons (6.9%, 481).

4.3.5. ACC Analysis

During 2008, there were approximately 506 ACC claims relating to chemical injuries, a rate of 12.6 per 100 000 population (Table 27) (slightly more than 2007 where there were approximately 489 claims related to chemical injuries, a rate of 12.1 per 100 000 population). There were more male (53.2%, 269) than female (46.8%, 237) ACC claims. Males also had a higher sex-specific rate (13.7 per 100 000 population versus 11.5 per 100 000 population for females). Where ethnicity was known (482), the majority of claims were for Europeans (68.5%, 330), followed by Maori (18.0%, 87). The highest ethnicity-specific rate was for Maori (15.4 per 100 000 population) followed by Europeans (12.3 per 100 000 population).

Approximately half of the claims (49.6%, 251) related to 'toxic effects of substances chiefly non-medicinal as to source' (ICD-10 diagnosis codes T51.0 – T65.9), followed by 'poisoning by drugs, medicaments and biological substances' (ICD-10 diagnosis codes T36.0 – T50.9) (39.1%, 198). Of particular interest is that although no decompression sickness notifications were reported in EpiSurv for 2008, 7 claims were received.

4.3.6. Media Analysis

During 2008, national and local media articles of interest were identified by the utilisation of ESR library search services. These illustrate the degree of underreporting of chemical poisoning from the environment and hazardous substances injury cases to EpiSurv. Media articles ranged from a woman who suffered serious burns after trying to set a gas bottle on fire in a party trick (Keith, 2008) to a worker who fell into a vat of chemicals (Francis, 2008). In these instances human health effects were documented or the persons involved visited a healthcare institution. A selection of the injuries caused by hazardous substances are documented below, only one of these was reported via EpiSurv (carbon monoxide incident in Raglan).

During 2008 a number of newspapers reported various workplace incidents that resulted in harm, often involving inhalation of hazardous substances. On 14 April, ten workers were transported to hospital after inhaling chlorine fumes at a chicken processing factory in Rolleston (Nordqvist, 2008). On 3 September, 40 workers at a Christchurch manufacturing plant needed medical care after a chemical spill, 9 of which required hospitalisation. Symptoms included watering eyes, sore throats and coughing fits (No author, 2008a; Radio New Zealand, 2008).

There were a number of high profile events that were reported in the media during 2008. On 5 April one fireman died and several were seriously injured when they attended a fire at Icepak's Tamahere coolstore (No author, 2008b; Taylor, 2008). The plant erupted into a fireball as the result of a large amount of highly flammable propane LPG being present. On the 8 September, two men died and one was seriously injured and later hospitalised after they suffered carbon monoxide poisoning at a motor camp near Raglan (Broun, 2008; Feek, 2008; Feek & Broun, 2008; McDonald & Feek, 2008). They inhaled the fumes from a charcoal

barbecue they brought inside to heat their small cabin, the two men were found dead in their beds and the survivor lying on the floor against the door.

The incidents above are a summary of the many chemical and hazardous substance injuries which are reported in the media that are generally not notified to the local PHUs for reporting via EpiSurv.

4.4. Detailed Waitemata DHB Analysis

Overview

There were 1159 NZHIS poisoning hospitalisations reported for Waitemata DHB during 2008, a rate of 240.7 per 100 000 population. Waitemata DHB is ranked 6/21 when DHBs are ordered from highest to lowest rate.

A total of 672 North Shore/Waitakere Hospital emergency department attendance notifications were reported for 2008, a rate of 139.5 per 100 000 population.

Age

The 15-24 years age group had the highest NZHIS hospitalisation rate (443.1 per 100 000 population, 300) and emergency department rate (353.0 per 100 000 population, 239), followed by the 0-4 years age group (322.3 per 100 000 population, 106; 200.7 per 100 000 population, 66, respectively).

Intent

The majority of NZHIS hospitalisations (51.1%, 592) and emergency department notifications (44.3%, 298) were for intentional poisoning, this also had the highest rate (122.9 per 100 000 population; 61.9 per 100 000 population, respectively).

Sex

The majority of NZHIS hospitalisations (56.9%, 660) and emergency department notifications (58.4%, 392/671) were for females. For both the NZHIS hospitalisations (267.0 per 100 000 population) and emergency department notifications (158.6 per 100 000 population), females had the highest sex-specific rate.

Ethnicity

Where ethnicity was known, the majority of NZHIS hospitalisations (74.4%, 855/1149) and emergency department notifications (78.4%, 515/657) were for Europeans. The highest ethnicity-specific rate was for Maori for NZHIS hospitalisations (314.9 per 100 000 population, 135) and Europeans for the emergency department notifications (163.4 per 100 000).

Substance

The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (26.8%, 311), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (13.2%, 153). Of the 311 X61 poisonings, the most common diagnosis code was T424 (Benzodiazepines) (23.5%, 73), followed by T426 (Other antiepileptic and sedative-hypnotic drugs) (22.8%, 71). Of the X61 poisonings where substance was known (157 poisonings and 218 substances, some poisonings had more than one substance), the most common substance was zopiclone (22.5%, 49/218), followed by quetiapine (12.4%, 27) and citalopram (8.3%, 18).

Where substance class was known (590), the most common substance class for the emergency department notifications was chemicals/drugs of abuse (46.9%, 277), followed by therapeutics (44.2%, 261). Where substance was known (564), the most common emergency department notification substance was ethanol (40.6%, 229), followed by paracetamol (18.1%, 102) and zopiclone (5.1%, 29).

4.5. Detailed Auckland DHB Analysis

Overview

There were 921 NZHIS poisoning hospitalisations reported for Auckland DHB during 2008, a rate of 227.6 per 100 000 population (compared with 231.3 per 100 000 population, 936 for 2007). Auckland DHB is ranked 8/21 when DHBs are ordered from highest to lowest rate. Figure 6 shows that following a stable number of admissions for 2004 and 2005 there was an increase during 2006 which has remained stable over the subsequent years. It should be noted that the ICD 10 codes captured for the NZHIS analysis was expanded for 2007 and 2008.

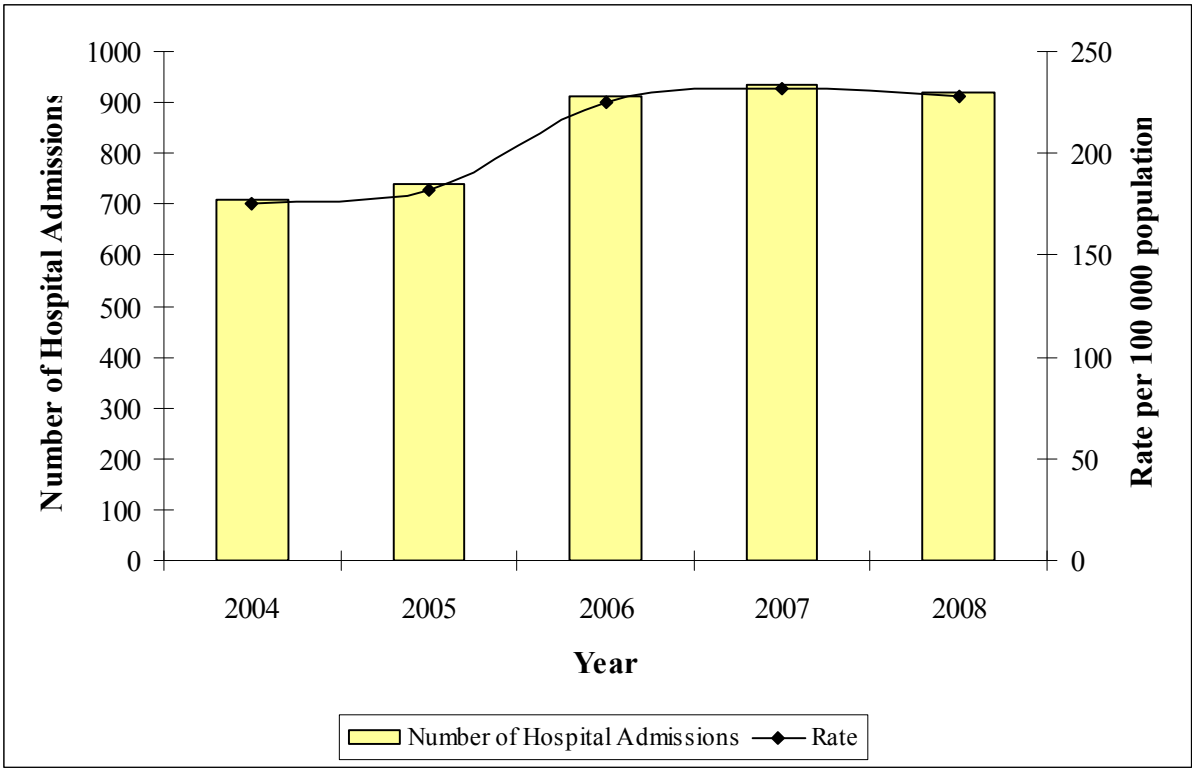

Figure 6: Number and Rate of Admissions for Auckland District Health Board, 2004-2008

A total of 2017 Auckland City Hospital emergency department attendance notifications were reported for 2008, a rate of 498.5 per 100 000 population. Figure 7 shows that there has been a general annual increase in the number of emergency department notifications between 2004 and 2007, with the 2008 number and rate being less than 2007 (648.5 per 100 000 population, 2624) but greater than 2006.

These data are incomplete for children as the majority of these cases are seen at Starship Children's Hospital and notification data from this hospital are not routinely received by ARPHS.

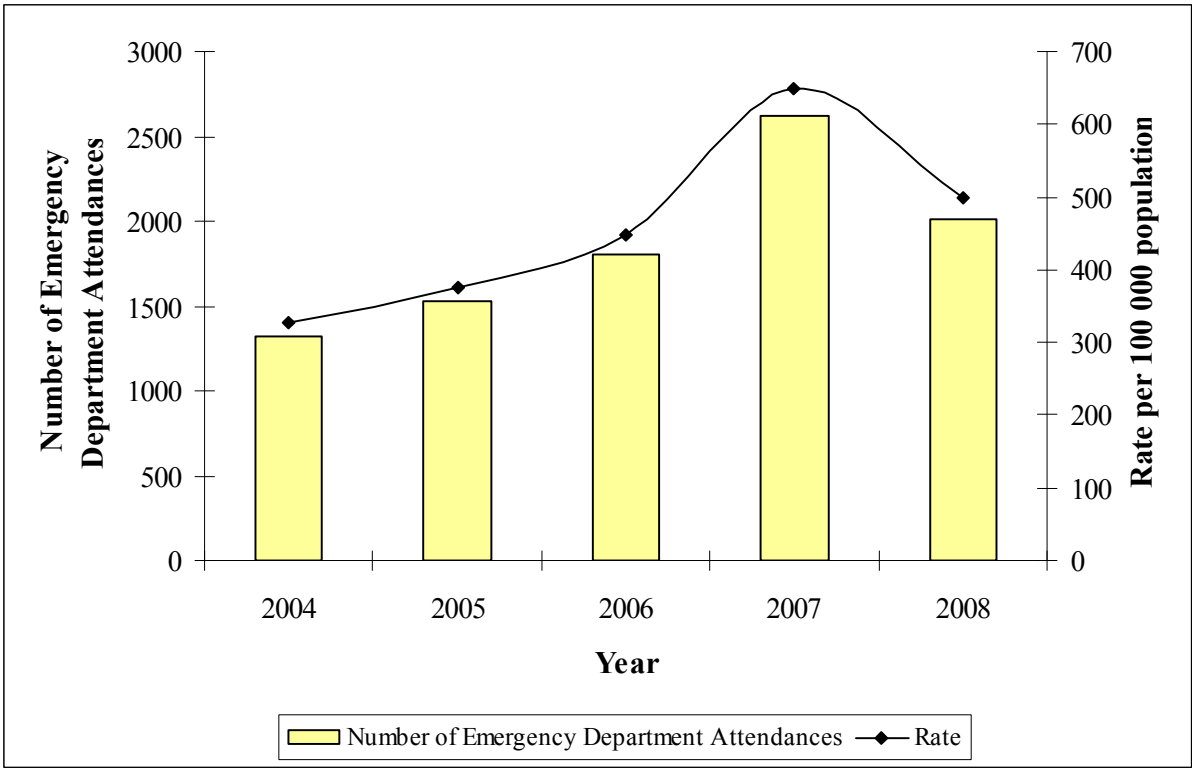

Figure 7: Number and Rate of Emergency Department Attendances to Auckland City Hospital, 2004-2008

Age

The 15-24 years age group had the highest age-specific NZHIS hospitalisation rate (358.4 per 100 000 population, 241), followed by the 0-4 years age group (287.9 per 100 000 population, 75). This trend was also observed during 2007 (15-24 years age group: 340.6 per 100 000 population, 299; and 0-4 years age group 330.1 per 100 000 population, 86). In 2008 the highest ARPHS age-specific notification rate was for the 15-24 years age group (1180.9 per 100 000 population, 794) followed by the 25-44 years age group (545.6 per 100 000 population, 743). During 2007 the highest ARPHS age-specific notification rate was also for the 15-24 years age group (1609.2 per 100 000 population, 1082) followed by the 25-44 years age group (738.0 per 100 000 population, 1005).

Intent

The majority of NZHIS hospitalisations (54.0%, 497) were for intentional poisoning, it also had the highest rate (122.8 per 100 000 population). This trend was also observed during 2007 (51.4%, 481 were intentional poisoning, a rate of 118.9 per 100 000 population). In 2008 the majority of ARPHS notifications were of unknown intent (93.3%, 1882), this also had the highest rate (465.2 per 100 000 population). During 2007 the majority of ARPHS notifications were for intentional poisoning (46.6%, 1222).

Sex

The majority of NZHIS hospitalisations were for females (55.9%, 515), they also had a higher sex-specific rate (248.3 versus 205.9 per 100 000 population for males). This trend was also observed during 2007 (57.7%, 540 hospitalisations were for females, a rate of 260.4 per 100 000 population). In 2008 where sex was known (2004) for ARPHS notifications, the majority were for males (55.5%, 1112). During 2007 where sex was known (2614) for ARPHS notifications the majority were for males (55.9%, 1460)). In 2008 the sex-specific rate was higher for males (563.9 versus 430.1 per 100 000 population for females).

Ethnicity

Where ethnicity was known, the majority of NZHIS hospitalisations (64.3%, 581/904) and ARPHS notifications (68.7%, 1339/1948) were for Europeans. The highest ethnicity-specific rate was for Maori for both the NZHIS hospitalisations (361.9 per 100 000 population, 108) and ARPHS notifications (690.3 per 100 000, 206). This trend was also observed during 2007 where ethnicity was known, the majority of NZHIS hospitalisations (62.7%, 576/919) and ARPHS notifications (66.1%, 1642/2485) were for Europeans. The highest ethnicity-specific rate was for Maori for both the NZHIS hospitalisations (382.0 per 100 000 population, 114) and ARPHS notifications (1045.5 per 100 000, 312) during 2007.

Substance

The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (27.3%, 251), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (15.4%, 142). This trend was also observed during 2007 (most common code was X61: 27.6%, 258 followed by X60: 13.1%, 123). Of the 251 X61 poisonings during 2008, the most common diagnosis code was T424 (Benzodiazepines) (26.3%, 66), followed by T426 (Other antiepileptic and sedative-hypnotic drugs) (23.1%, 58). Of the X61 poisonings where substance was known (218 poisonings and 279 substances, some poisonings had more than one substance), the most common substance was zopiclone (22.9%, 64/279), followed by quetiapine (10.4%, 29) and citalopram (8.2%, 23). The trend for 2007 was the same in regard to zopiclone being the most substance (38.4%, 31/109); however, this was followed by clonazepam (11.0%, 12) and fluoxetine (9.2%, 10).

Where substance class was known (2754), the most common substance class for ARPHS notifications was chemicals/drugs of abuse (61.7%, 1698), followed by therapeutics (35.4%, 975). Where substance was known (2756), the most common ARPHS notification substance was ethanol (53.0%, 1460), followed by paracetamol (5.3%, 146) and zopiclone (3.9%, 107). This trend was also observed during 2007, where substance class was known (2973), the most common substance class for ARPHS notifications was chemicals/drugs of abuse (67.0%, 1993), followed by therapeutics (31.3%, 932). Where substance was known (2963), the most common ARPHS notification substance was ethanol (55.1%, 1634), followed by paracetamol (4.6%, 137) and zopiclone (3.5%, 103).

4.6. Detailed Wairarapa DHB Analysis

Overview

There were 120 NZHIS poisoning hospitalisations reported for Wairarapa DHB during 2008, a rate of 310.4 per 100 000 population. Wairarapa DHB has the highest hospitalisation rate compared to the other DHBs. Figure 8 shows that the numbers and rate of hospitalisations was generally stable between 2004 and 2006 and has subsequently increased for 2007 (264.2 per 100 000 population, 102) and 2008. It should be noted that the ICD 10 codes captured for the NZHIS analysis was expanded for 2007 and 2008.

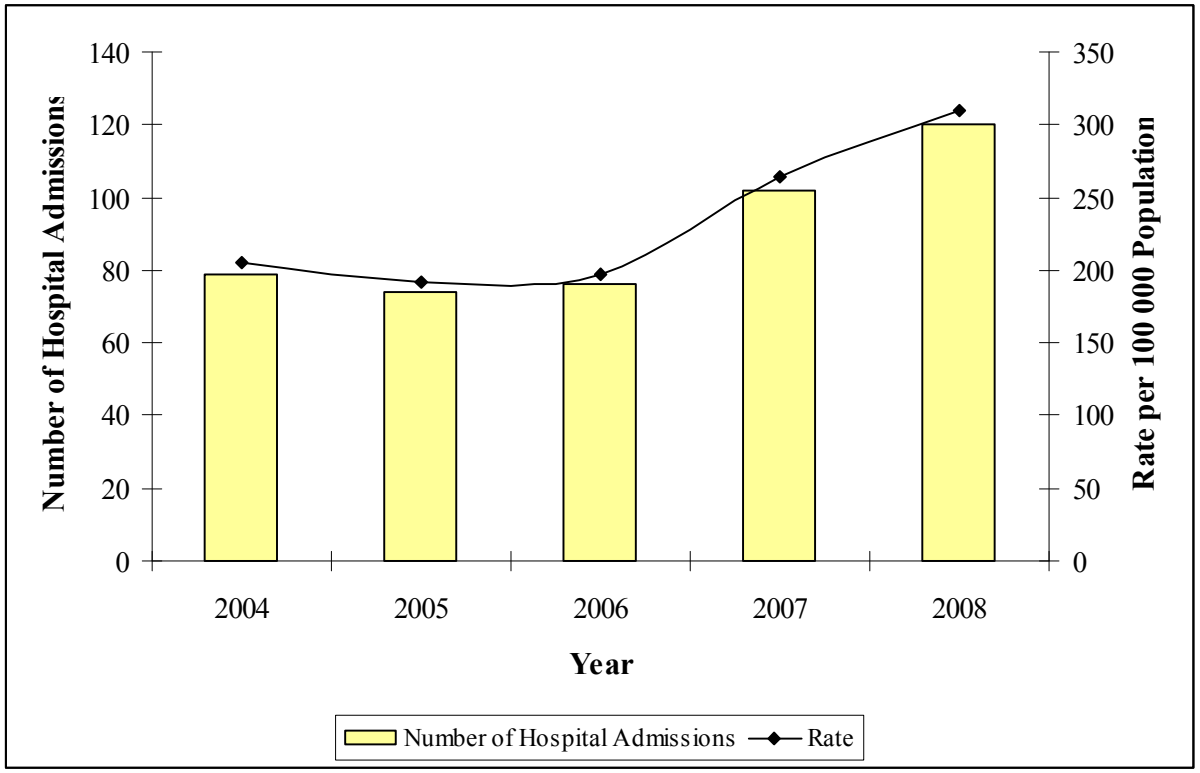

Figure 8: Number and Rate of Admissions for Wairarapa District Health Board, 2004-2008

A total of 92 Masterton Hospital Emergency Department notifications were reported for 2008, a rate of 238.0 per 100 000 population. Unfortunately data are not available for 2007 and in 2006 there were 80 attendances.

Age

The highest age-specific rate for NZHIS poisoning hospitalisations was for the 15-24 years age group (780.1 per 100 000 population, 33), followed by the 0-4 years age group (492.0 per 100 000 population, 12). For RPH notifications, the highest age-specific was for the 0-4 years age group (574.0 per 100 000 population, 14) followed by the 15-24 years age group (425.5 per 100 000 population, 18).

Intent

The majority of NZHIS hospitalisations (55.0%, 66) and RPH notifications (62.0%, 57) were for intentional exposure, this also had the highest rate by intent (170.7 per 100 000 population and 147.5 per 100 000 population, respectively). Unknown intention accounted for 23.3% (28) of the hospitalisations and 10.9% (10) of the notifications, respectively.

Sex

Females accounted for the majority of NZHIS hospitalisations (55.0%, 66) and RPH notifications (60.9%, 56). Females also had the highest sex-specific notification rate (332.3 per 100 000 population and 281.9 per 100 000 population, respectively).

Ethnicity

Where ethnicity was known, approximately three quarters of the NZHIS hospitalisations (75.8%, 91) and RPH notifications (76.7%, 56/73) were for Europeans. The highest ethnicity-specific rate both the NZHIS hospitalisations (455.2 per 100 000 population, 25) and RPH notifications (273.1 per 100 000, 15) was for Maori.

Substance

The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (23.3%, 28), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (15.0%, 18). Of the 28 X61 poisonings, the most common diagnosis code was T426 (Other antiepileptic and sedative-hypnotic drugs) (25.0%, 7), followed by T424 (Benzodiazepines) (21.4%, 6) and T432 (Other and unspecified antidepressants) (21.4%, 6). Of the 28 X61 poisonings, the substance was known for 10 poisonings with 11 substances involved (one poisoning had two substances listed), zopiclone was the most common substance (27.3%, 3/11), followed by citalopram and methotrimeprazine (for each: 18.2%, 2)

Where substance class was known (122) the most common substance class for RPH notifications was therapeutics (60.7%, 74) followed by chemicals/drugs of abuse (23.8%, 29). Where substance was known (125), the most common RPH substance notification was ethanol (20.0%, 25), followed by paracetamol (11.2%, 14), and zopiclone (8.0%, 10).

4.7. Detailed Capital and Coast DHB Analysis

Overview

There were 215 NZHIS hospitalisations recorded for Capital and Coast DHB, a rate of 80.6 per 100 000 population. This is the lowest NZHIS hospitalisation rate by DHB for 2008, similar for recent years (103.1 per 100 000 population, 275 for 2007). Figure 9 shows the trend in hospital admissions for Capital and Coast DHB between 2004 and 2008. It can be

seen that admissions and the rate were stable between 2004 and 2005 and subsequently increased in 2006. The 2007 numbers and rate were at a similar level to 2006 and then dropped in 2008 to levels similar in 2004 and 2005. It should be noted that the ICD 10 codes captured for the NZHIS analysis was expanded for 2007 and 2008.

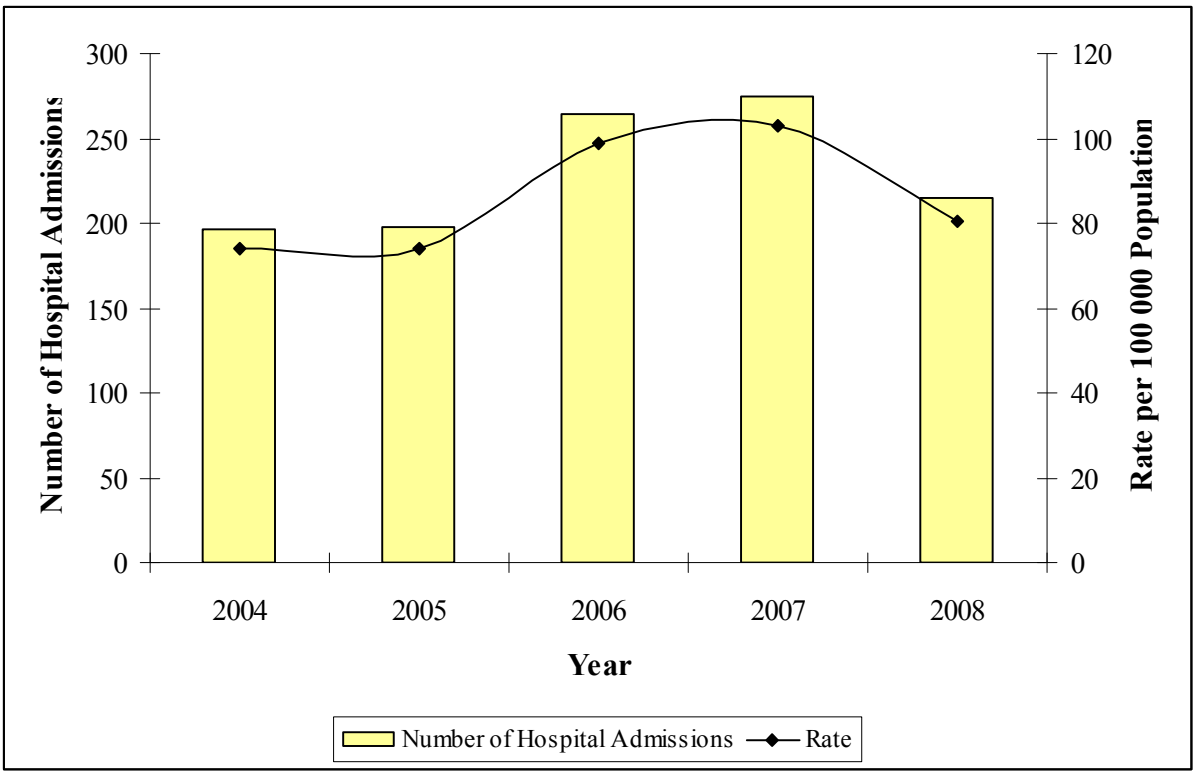

Figure 9: Number and Rate of Admissions for Capital and Coast District Health Board, 2004-2008

A total of 563 Wellington City Emergency Department notifications were reported to RPH for 2008, a rate of 211.1 per 100 000 population. The number and rate is slightly lower than reported for 2007 (216.0 per 100 000 population, 576) (Figure 10, note data not available for 2004).

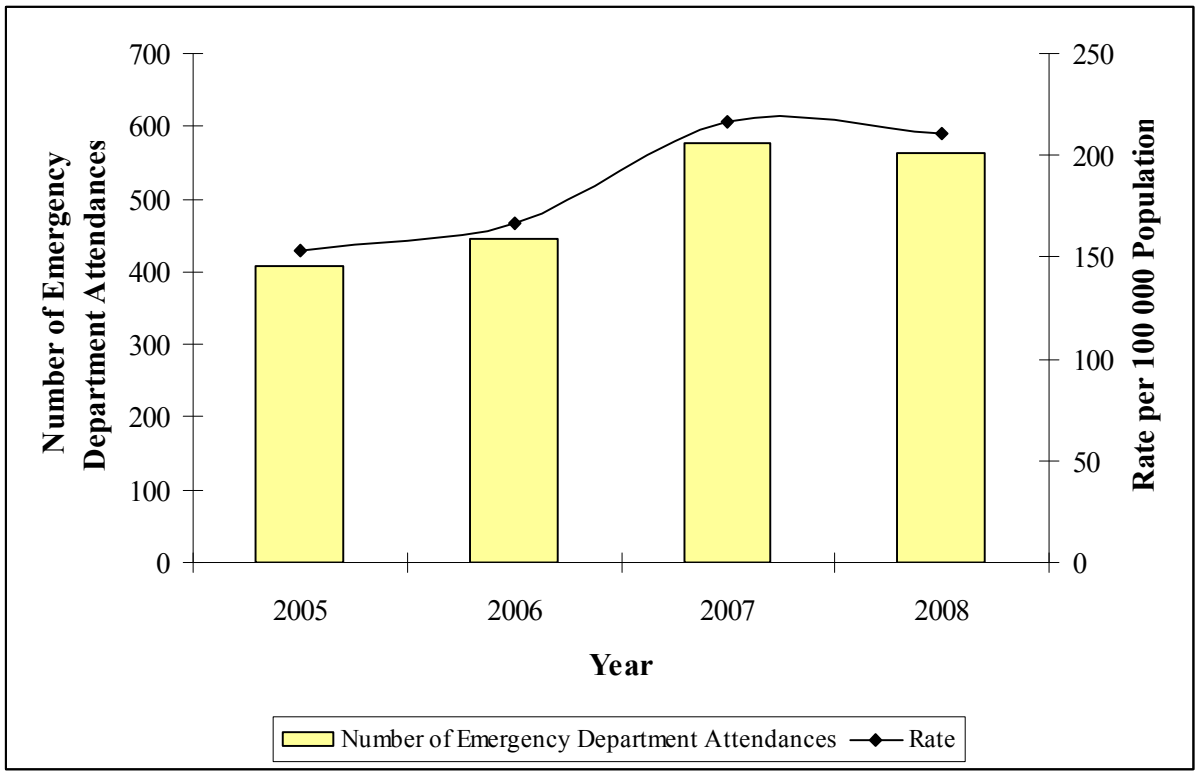

Figure 10: Number and Rate of Wellington Hospital Emergency Department Attendances, 2005-2008

Age

The highest age-specific NZHIS hospitalisation rate was for the 15-24 years age group (141.6 per 100 000 population, 60), followed by the 0-4 years age group (137.0 per 100 000 population, 24). In 2007 the highest age-specific rate was also for the 15-24 years age group (172.3 per 100 000 population, 73), however, this was followed by the 25-44 years age group (125.4 per 100 000 population, 107). In 2008 the highest age-specific RPH notification rate was for the also for the 15-24 years age group (502.8 per 100 000 population, 213) followed by the 0-4 years age group (222.7 per 100 000 population, 39). This trend was also observed during 2007 (15-24 years age group: 481.5 per 100 000 population, 201; followed by the 0-4 years age group: 256.9 per 100 000 population, 45)

Intent

The majority of NZHIS hospitalisations (53.5%, 115) and RPH notifications (73.7%, 415) were for intentional exposure. Intentional exposure also had the highest rate for both the NZHIS hospitalisations (43.1 per 100 000 population) and RPH notifications (155.6 per 100 000 population). This trend was also observed for 2007, the majority of NZHIS hospitalisations (62.9%, 173) and RPH notifications were for intentional exposure (70.8%, 408). Intentional exposure also had the highest rate for both the NZHIS hospitalisations (64.9 per 100 000 population) and RPH notifications (153.0 per 100 000 population).

Sex

Females accounted for the majority of NZHIS hospitalisations (63.7%, 137) and RPH notifications (68.9%, 388). The sex-specific rate was highest for females for both the NZHIS hospitalisations (99.2 per 100 000 population) and RPH notifications (280.9 per 100 000 population). This trend was also observed during 2007, females accounted for the majority of NZHIS hospitalisations (64.4%, 177) and RPH notifications (67.7%, 390). The sex-specific rate was highest for females for both the NZHIS hospitalisations (128.1 per 100 000 population) and RPH notifications (282.3 per 100 000).

Ethnicity

Where ethnicity was known, approximately 70% of the NZHIS hospitalisations (69.4%, 145/209) and RPH notifications (75.8%, 410/541) were for Europeans. The highest ethnicity-specific rate was for Maori for both the NZHIS hospitalisations (117.0 per 100 000 population, 31) and RPH notifications (256.6 per 100 000, 68). This trend was also observed during 2007, where ethnicity was known, approximately three-quarters of the NZHIS hospitalisations (71.8%, 191/266) and RPH notifications (75.4%, 422/560) were for Europeans. The highest ethnic-specific rate was for Maori for both the NZHIS hospitalisations (124.5 per 100 000 population, 33) and RPH notifications (234.0 per 100 000, 62).

Substance

The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (22.8%, 49), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (17.2%, 37). This trend was also observed for 2007 (X61: 30.5%, 84 followed by X60: 19.6%, 54). Of the 49 X61 poisonings in 2008, the most common diagnosis code was T432 (Other and unspecified antidepressants) (18.4%, 9), followed by T426 (Other antiepileptic and sedative-hypnotic drugs) (16.3%, 8) and T430 (Tricyclic and tetracyclic antidepressants) (16.3%, 8). Of the 49 X61 poisonings, the substance was known for 8 poisonings with 9 substances involved (one poisoning had two substances listed) the only substance that occurred more than once was iminostilbenes (2). During 2007 the substance was known in only one hospitalisation, the substance was zopiclone.

Where substance class was known (648) the most common substance class for RPH notifications was therapeutics (86.4%, 560) followed by chemicals/drugs of abuse (12.8%, 83). Where substance was known (693), the most common RPH substance notification was paracetamol (16.6%, 115), followed by zopiclone (8.5%, 59) and ethanol (5.2%, 36). The trends observed for 2007 were similar, where substance class was known (693) the most common substance class for RPH notifications was therapeutics (85.1%, 590) followed by chemicals/drugs of abuse (9.2%, 64). Where substance was known (689), the most common RPH substance notification was paracetamol (18.4%, 127), followed by zopiclone (7.8%, 54), clonazepam (4.8%, 33), quetiapine (4.4%, 30) and ibuprofen (4.2%, 29).

4.8. Detailed West Coast DHB Analysis

Overview

There were 46 NZHIS hospitalisations recorded for West Coast DHB in 2008, a rate of 146.8 per 100 000 population. West Coast DHB is ranked 18/21 when hospitalisation rates are ranked from highest to lowest. The rate and number is considerably lower than 2007 (277.6 per 100 000, 87) and the lowest during the last five years Figure 11. It should be noted that the ICD 10 codes captured for the NZHIS analysis was expanded for 2007 and 2008.

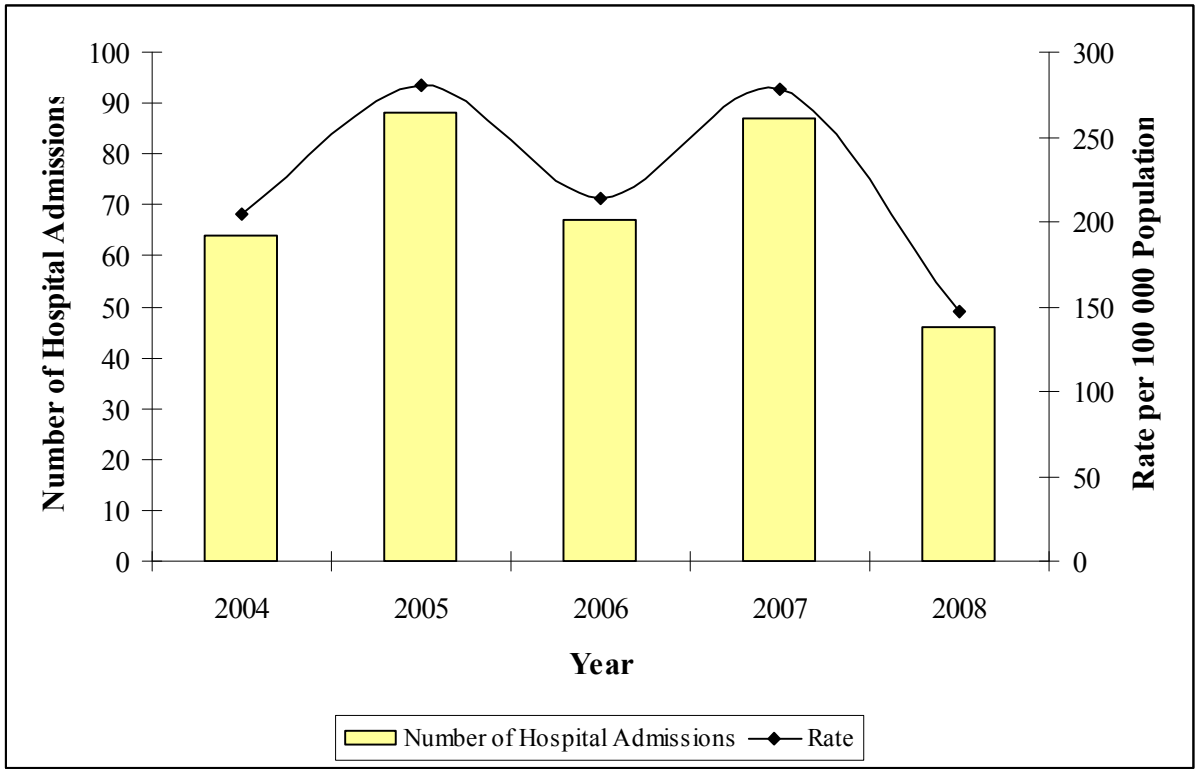

Figure 11: Number and Rate of Admissions for West Coast District Health Board, 2004-2008

There were 5 emergency department notifications (16.0 per 100 000 population) from Grey Hospital relating to chemical injury during 2008. This is the lowest number reported during the previous recent years (Figure 12). It should be noted that there were a number of months where notifications were not passed on from Grey Hospital to WCPHU.

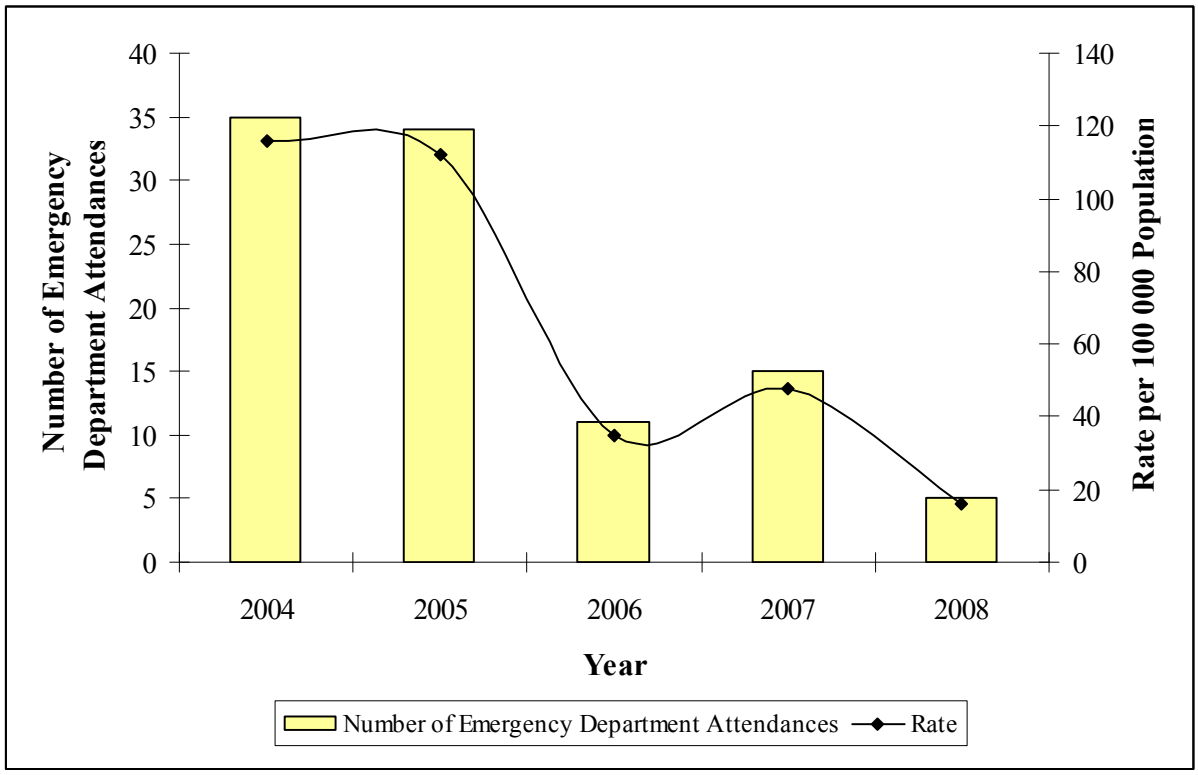

Figure 12: Number and Rate of Emergency Department Attendances for Grey Hospital, 2004-2008

Intent

For the NZHIS hospitalisations, intentional (56.5%, 26) exposures were the most common intent. The majority of emergency department attendance injuries were unintentional (60.0%, 3). The trend for NZHIS hospitalisations in 2007 is different with intentional (40.2%, 35) and unintentional (40.2%, 35) exposures being equal as the most common intent. The majority of WCPHU injuries were intentional (9/15, 60.0%).

Sex

The number of female (52.2%, 24) and male (47.8%, 22) NZHIS hospitalisations were similar. The majority of WCPHU injuries however were females (80.0%, 4). Females had the highest NZHIS hospitalisation (155.6 per 100 000 population) and WCPHU (26.0 per 100 000 population) sex-specific rate. The trend observed for 2007 is similar, there were approximately equal numbers of female (51.7%, 45) and male (48.3%, 42) NZHIS hospitalisations. The majority of WCPHU injuries however were females (80.0%, 12). Females had the highest NZHIS hospitalisation (291.8 per 100 000 population) and WCPHU (78.1 per 100 000 population) sex-specific rate.

Age

The highest age-specific rate for NZHIS hospitalisations was for the 15-24 years age group (295.3 per 100 000 population, 10), followed by the 25-44 years age group (179.2 per 100 000 population, 15). The highest age-specific WCPHU notification rate was for the 25-44 years age group (35.8 per 100 000 population, 3). The trend observed for 2007 is different with the highest age-specific rate for NZHIS hospitalisations being the 15-24 years age group (738.3 per 100 000 population, 25), followed by the 0-4 years age group (316.5 per 100 000 population, 6). The highest age-specific WCPHU notification rate was for the 15-24 years age group (177.2 per 100 000 population, 6).

Substance

The most common NZHIS external cause code was X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (28.3%, 13), followed by X60 (Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (13.0%, 6). This is similar to the trend observed during 2007 (X61: 17.2%, 15 and X60: 13.8%, 12). Of the 13 X61 poisonings during 2008, the most common diagnosis codes were T424 (Benzodiazepines) (30.8%, 4), followed by T432 (Other and unspecified antidepressants) (23.1%, 3). Of the X61 poisonings, the substance was known for 12 poisonings with 15 substances involved (some poisonings had more than one substance listed) the most common substance was zopiclone (33.3%, 5/15), followed by clonazepam (13.3%, 2). For 2007 where substance was known (15), the most common substance was clonazepam (20.0%, 3), followed by buspirone, fluoxetine, sodium valproate and zopiclone (for each: 13.3%, 2).

Therapeutic substances were associated with the majority of the WCPHU notifications (62.5%, 5/8). Codeine phosphate was the most common substance involved in the injuries (50.0%, 3/6). During 2007 therapeutic substances were associated with the majority of the WCPHU notifications (27/32, 84.4%), and codeine phosphate, ethanol, paracetamol and sodium valproate were the most common substances involved in the injuries (for each: 9.4%, 3/32).

4.9. Detailed Southland DHB Analysis

Overview

There were 220 NZHIS poisoning hospitalisations recorded for Southland DHB for 2008, a rate of 205.9 per 100 000 population. Southland DHB is ranked 13/21 when DHBs are ranked from highest to lowest hospitalisation rate. The 2008 rate and number of hospitalisations is lower than 2007 (238.7 per 100 000 population, 255) but above previous years (Figure 13). It should be noted that the ICD 10 codes captured for the NZHIS analysis was expanded for 2007 and 2008.

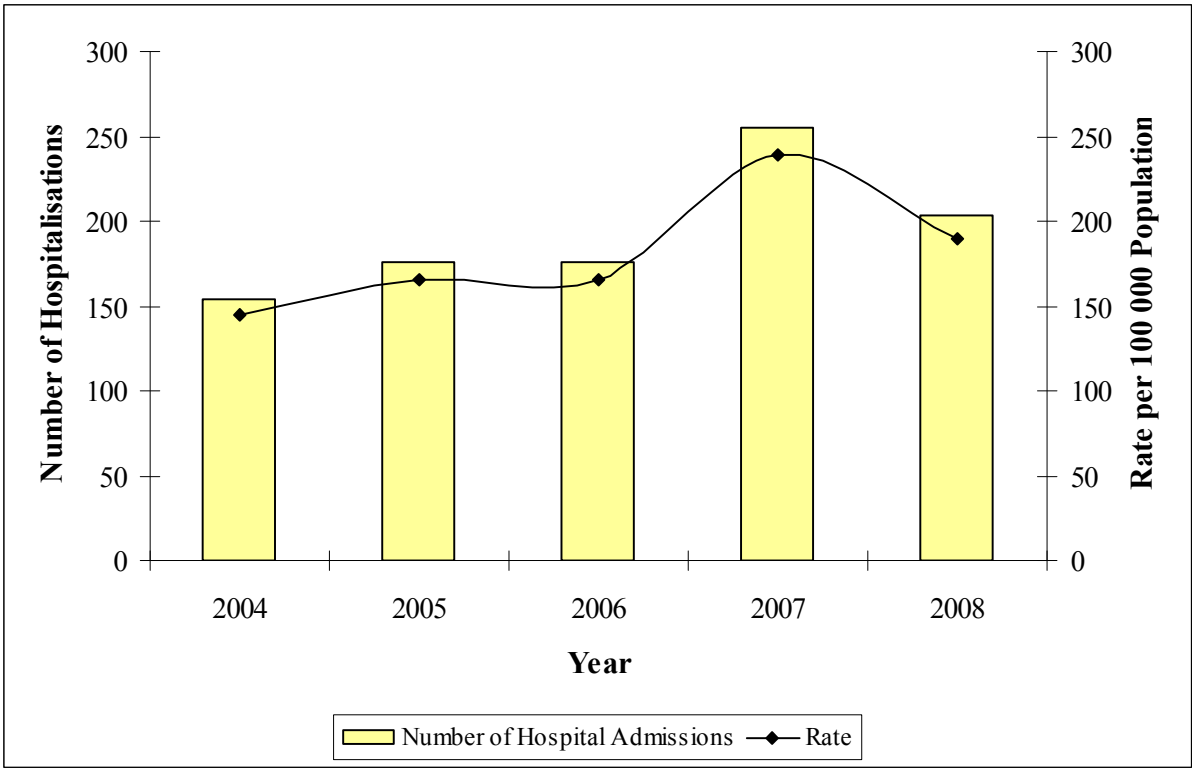

Figure 13: Number and Rate of Admissions for Southland District Health Board, 2004-2008

163 injury notifications (152.6 per 100 000 population) from Invercargill Hospital were reported. This is greater than the rate and number of notifications for recent years (during 2007 118 injury notifications reported at a rate of 110.5 per 100 000 population) but is not as high as reported during 2004 and 2005 (Figure 14).

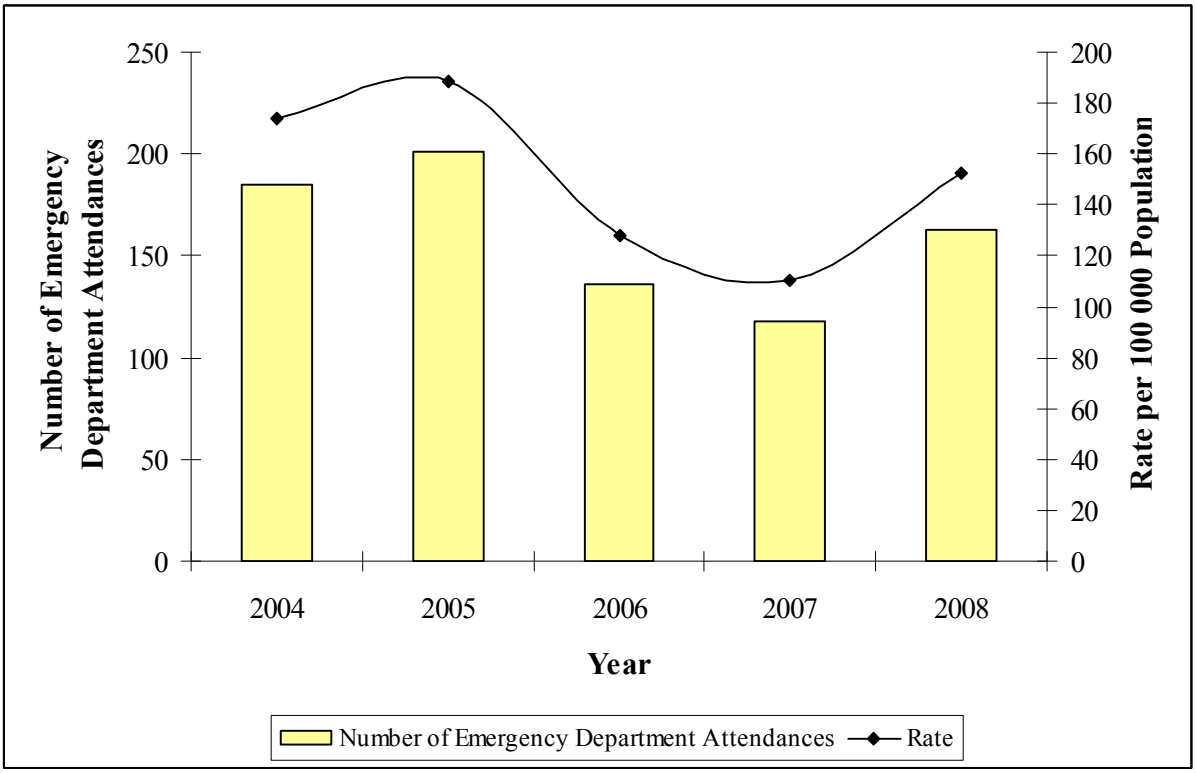

Figure 14: Number and Rate of Emergency Department Attendances for Invercargill Hospital, 2004-2008

Age

The highest age-specific NZHIS hospitalisation rate (463.0 per 100 000 population, 32) occurred in the 0-4 years age group. This was closely followed by the 15-24 years age group (451.3 per 100 000 population, 62). For the SOPHU notifications, the 15-24 years age group had the highest age-specific injury rate (400.4 per 100 000 population, 55) followed by the 0-4 years age group (332.8 per 100 000 population, 23). These trends were also observed during 2007, the highest age-specific NZHIS hospitalisation rate (680.0 per 100 000 population, 47) occurred in the 0-4 years age group. This was followed by the 15-24 years age group (429.5 per 100 000 population, 59). For the SOPHU notifications, the 15-24 years age group had the highest age-specific injury rate (269.3 per 100 000 population, 37) followed by the 0-4 years age group (245.9 per 100 000 population, 17).

Sex

The number of female injury notifications greatly outnumbered the number of male injury notifications for SOPHU notifications (107 and 56 respectively). For the NZHIS hospitalisations, females slightly outnumbered males (119 versus 101 respectively). During 2007 the number of female injury notifications greatly outnumbered the number of male injury notifications for both the NZHIS hospitalisations (153 and 102, respectively) and SOPHU notifications (72 and 46 respectively).

Intent

The majority of NZHIS hospitalisations were of unknown intent (41.8%, 92). Three-quarters of the SOPHU injuries were intentional (74.2%, 121). Approximately 3% of the SOPHU injuries were of unknown intent (3.1%, 5). During 2007 the numbers of NZHIS hospitalisations were split approximately evenly between intentional (30.6%), unintentional (34.5%) and unknown (34.9%) exposures. Three-quarters of the SOPHU injuries were intentional (74.6%, 88).

Ethnicity

Where ethnicity was known (217), the majority of NZHIS hospitalisations were for Europeans (75.6%, 164). Maori had the highest ethnicity-specific rate (388.8 per 100 000 population, 44). Ethnicity data was not collected by SOPHU for the emergency department notifications. During 2007 where ethnicity was known (251), the majority of NZHIS hospitalisations were for Europeans (84.5%, 212), Europeans also had the highest ethnicity-specific rate (240.6 per 100 000 population).

Substance

The most common NZHIS external cause code was Y11 (Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified, undetermined intent) (20.0%, 44), followed by X61 (Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified) (10.9%, 24). During 2007 the most common NZHIS external cause code was X61 (14.9%, 38), followed by Y11 (9.4%, 24). Of the 44 Y11 poisonings during

2008, the most common diagnosis codes were T426 (Other antiepileptic and sedative-hypnotic drugs) (25.0%, 11), T432 (Other and unspecified antidepressants) (18.2%, 8) and T424 (Benzodiazepines) (15.9%, 7). Of the 44 Y11 poisonings, substance was known for only 34 hospitalisations, the most common substance was zopiclone (23.5%, 8/34), followed by amitriptyline, carbamazepine and citalopram (for each: 11.8%, 4). During 2007 the substance was only known for one hospitalisation, the substance involved was carbamazepine.

Where substance class was known (263), the majority of SOPHU notification substances were classed as therapeutics (77.6%, 204) followed by chemicals/drugs of abuse (16.0%, 42) and household/domestic chemicals (4.6%, 12). Where substance was known (268), paracetamol was the most common substance (12.3% 33), followed by ethanol (10.1%, 27) and codeine phosphate (6.7%, 18). For 2007 where substance class was known (170), the majority of SOPHU notification substances were classed as therapeutics (75.9%, 129) followed by chemicals/drugs of abuse (14.1%, 24) and household/domestic chemicals (7.6%, 13). Where substance was known (170), paracetamol was the most common substance (15.9% 27), followed by ethanol (7.6%, 13) and citalopram (5.3%, 9).

4.10. Specific Analyses

Inclusion of several datasets in a comprehensive surveillance system enables comparison of data relating to specific public health issues to be investigated. The resulting picture is therefore more representative of the associated burden of injury than would have been obtained when examining each dataset separately. This is illustrated in the following examples: injury in children aged less than five years, poisonings involving paracetamol or ethanol, and injuries caused by substances covered by the HSNO Act.

4.10.1. Injuries in Children Aged Less than Five Years

Details on cases aged less than five years are presented in Appendix 1 Table 21 and Table 22. ARPHS data are excluded from this analysis since data from Starship Children's Hospital are not received.

In 2008, there were 801 NZHIS poisoning hospitalisations involving children less than five years of age (9.3% of total NZHIS poisoning hospitalisations). The corresponding age-specific poisoning rate for 2008 was 291.2 per 100 000 population. As expected, none of the NZHIS hospitalisations in this age group were intentional. The majority of hospitalisations were for males (59.6%, 477) and where ethnicity was known (798), the majority were for Europeans (58.5%, 467) followed by Maori (28.4%, 227). Maori had the highest ethnicity-specific rate (341.7 per 100 000 population), followed by Europeans (315.8 per 100 000 population). The most common NZHIS external cause code was X44 (Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances) (24.2%, 194), followed by X40 (Accidental poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics) (22.1%, 177).

142 children aged less than five years presented to the emergency department of North Shore/Waitakere, Masterton, Wellington, and Invercargill Hospitals. The majority of notifications were for unintentional poisoning (95.1%, 135) and involved more males than females (54.9%, 78). Where ethnicity was known (114), the majority of notifications were for

Europeans (74.6%, 85), followed by Maori (13.2%, 15). Europeans had the highest ethnicity-specific rate (284.7 per 100 000 population), followed by Pacific Peoples (185.7 per 100 000 population, 10). Some of the 142 children had consumed multiple substances. Of the 143 known substance occurrences (approximately 69 individual substances) notified from the PHUs for children aged less than five years, 28.0% (40) involved paracetamol. Other prominent substances included amoxicillin/clavulanate (4.9%, 7) and diclofenac (3.5%, 5).

4.10.2. Paracetamol Poisonings

Summary demographic data on paracetamol poisonings for 2008 are presented in Appendix 1 Table 23. For the emergency department data, paracetamol was either the most common or second most common of the identifiable substances.

In total, there were 410 notifications of paracetamol poisoning. Auckland City Hospital reported the highest at 146 (up from 137 reported in 2007), this represents 5.3% of total substances for this hospital. North Shore and Waitakere Hospitals reported a total of 102 paracetamol poisonings (first year data has been received); this represents 18.1% of the total substances for these hospitals. Masterton Hospital reported 14 paracetamol poisonings (data was not received in 2007); this represents 11.2% of the total substances for this hospital. Wellington Hospital reported 115 paracetamol poisonings (down from 127 reported in 2007); this represents 16.6% of the total substances for this hospital. Grey Hospital did not report any paracetamol poisonings for 2008 (down from 3 reported in 2007). Invercargill Hospital reported 33 paracetamol poisonings (up from 27 reported in 2007); this represents 12.3% of the total substances for this hospital.

The majority of the paracetamol notifications for all hospitals were deemed intentional (53.4%, 219) (however, 35.6% of the notifications were of unknown intent). A large percentage of the emergency department paracetamol notifications were from the 15-24 year age group (44.4%, 182). Approximately three quarters of the notifications were female (74.8%, 306/409) and were of European ethnicity (75.1%, 278/370).

4.10.3. Ethanol Poisonings

Summary demographic data on acute ethanol poisonings for 2008 are presented in Appendix 1 Table 24.

There were 322 alcohol hospitalisations (X65, X45 and Y15) throughout New Zealand. Hospitalisations were similar for both males (166) and females (156). The 25-44 years age group had the largest percentage of people hospitalised with ethanol poisoning (39.4%, 127), whereas, the 15-24 years age group had the highest age-specific rate (5.6 per 100 000 population, 103). The number of ethanol poisonings for persons aged less than 18 years (the legal drinking age in New Zealand) was 62; this represents 19.3% of the total number of ethanol hospitalisations. There were approximately even numbers of intentional (125) and unintentional (117) poisonings. Where ethnicity was known (319), the majority of hospitalisations were for Europeans (66.5%, 212), however, Maori had the highest ethnicity-specific hospitalisation rate (12.4 per 100 000 population, 70).

In 2008, there were 1460 ethanol notifications (53.0% of the total substances) from Auckland City Hospital. The number of notifications for the remaining five DHBs ranged from one

(Grey Hospital) to 228 (North Shore and Waitakere Hospitals), totalling 317. Ethanol consistently appears high up the list for the number of notifications; it was the most common substance for North Shore/Waitakere, Auckland City, Masterton Hospitals, second for Invercargill Hospital, second equal for Grey Hospital and third for Wellington Hospital.

A number of ethanol poisonings for persons aged less than 18 years (the legal drinking age in New Zealand) were recorded; 50 for North Shore/Waitakere Hospitals (21.9% of ethanol notifications), 86 for Auckland City Hospital (5.9% of ethanol notifications), 5 for Masterton Hospital (20.0% of ethanol notifications), 2 for Wellington Hospital (5.6% of ethanol notifications), and 2 for Invercargill Hospital (7.4% of ethanol notifications). The Grey Hospital notification was older than 18 years of age. The majority of ethanol notifications were for males (59.3%, 1053).

4.10.4. Injuries Involving HSNO Substances

Summary data on HSNO substance notifications from emergency department are presented in Appendix 1 Table 25 and Table 26.

Combined 2008 emergency department data identified 171 emergency department notifications involving approximately 51 substances covered by the HSNO Act. The most common HSNO substance reported was carbon monoxide (17.5%, 30), followed by hydrocarbons (9.4%, 16) and unspecified chemicals (7.6%, 13). The majority of notifications (46.2%, 79) were the result of unknown exposure and were males (58.5%, 100). The highest age-specific HSNO substance PHU rate was for the 0-4 years age group (26.8 per 100 000 population, 23), closely followed by the 15-24 years age group (23.6 per 100 000 population, 46). Where ethnicity was known (147), the majority were Europeans (60.5%, 89), followed by Maori (14.3%, 21). The highest ethnicity-specific rate was for Maori (20.1 per 100 000 population), followed by Pacific Peoples (16.7 per 100 000 population, 16).

5. CORONIAL SERVICE OFFICE DATA FOR 2006 AND 2007

Overview

Summary data on CSO deaths for 2006 and 2007 are presented in Appendix 1 Table 28 to Table 32. As of 31 December 2008, the number of deaths attributable to chemical injuries in New Zealand for 2006 and 2007 was 196 (4.9 per 100 000 population) and 110 (2.7 per 100 000 population) respectively. The number of deaths attributable to chemical injuries for 2006 and 2007 is generally less than that observed for the years 2003 to 2005 (Figure 15); this is not surprising due to timeliness and access issues discussed previously.

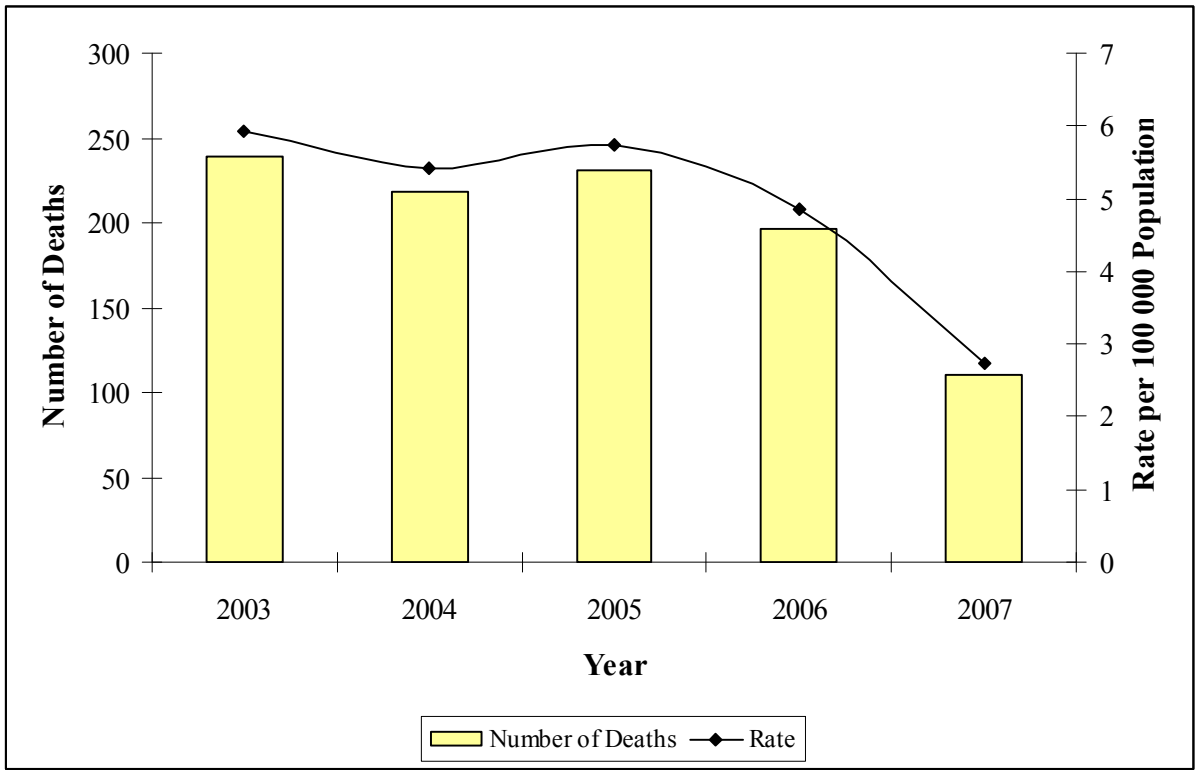

Figure 15: Number of New Zealand Chemical Injuries Deaths per Year

Intent

Figure 16 illustrates the percentage of chemical injury deaths by intent for 2006 and 2007. The graph shows that for both years, the majority of chemical injury deaths were deemed intentional (61.2%, 120 deaths for 2006; and 52.7%, 58 deaths for 2007), however, a number of deaths were of unknown intent (18.9%, 37 deaths for 2006; and 26.4%, 29 deaths for 2007).

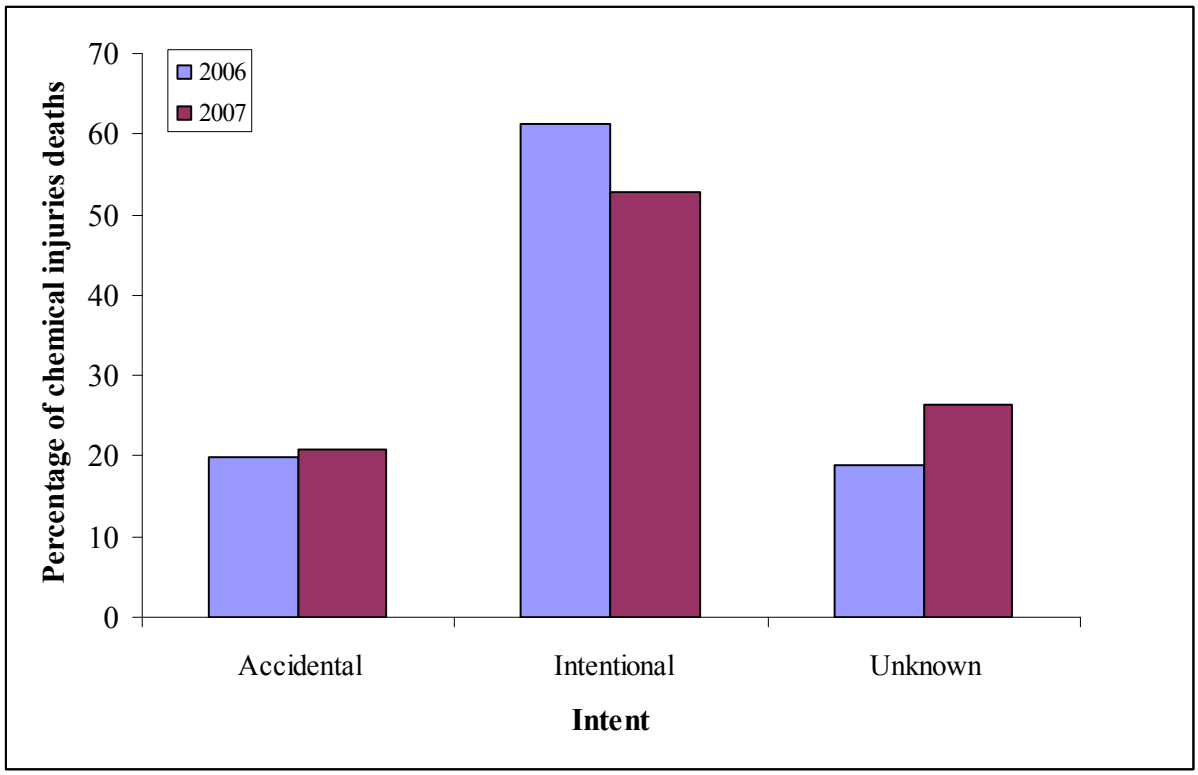

Figure 16: Percentage of Chemical Injury Deaths by Intent, 2006 and 2007

DHB

Figure 17 and Figure 18 illustrate chemical injury mortality data by DHB for both 2006 and 2007. In 2006, the greatest number of deaths occurred in Canterbury DHB (38), followed by Waitemata (20) and Auckland DHBs (19). West Coast DHB had the highest rate (9.6 per 100 000 population, 3), followed by Canterbury DHB (8.1 per 100 000 population, 38). In 2007, Canterbury DHB had the highest number of reported deaths (18), followed by Capital and Coast DHB (12). Wanganui DHB had the highest rate (6.4 per 100 000 population, 4), followed by Northland DHB (4.7 per 100 000 population, 7). It is important to note however, these rates are often based on a low number of reported deaths and there is often a large difference for DHBs in terms in the number of deaths reported between 2006 and 2007.

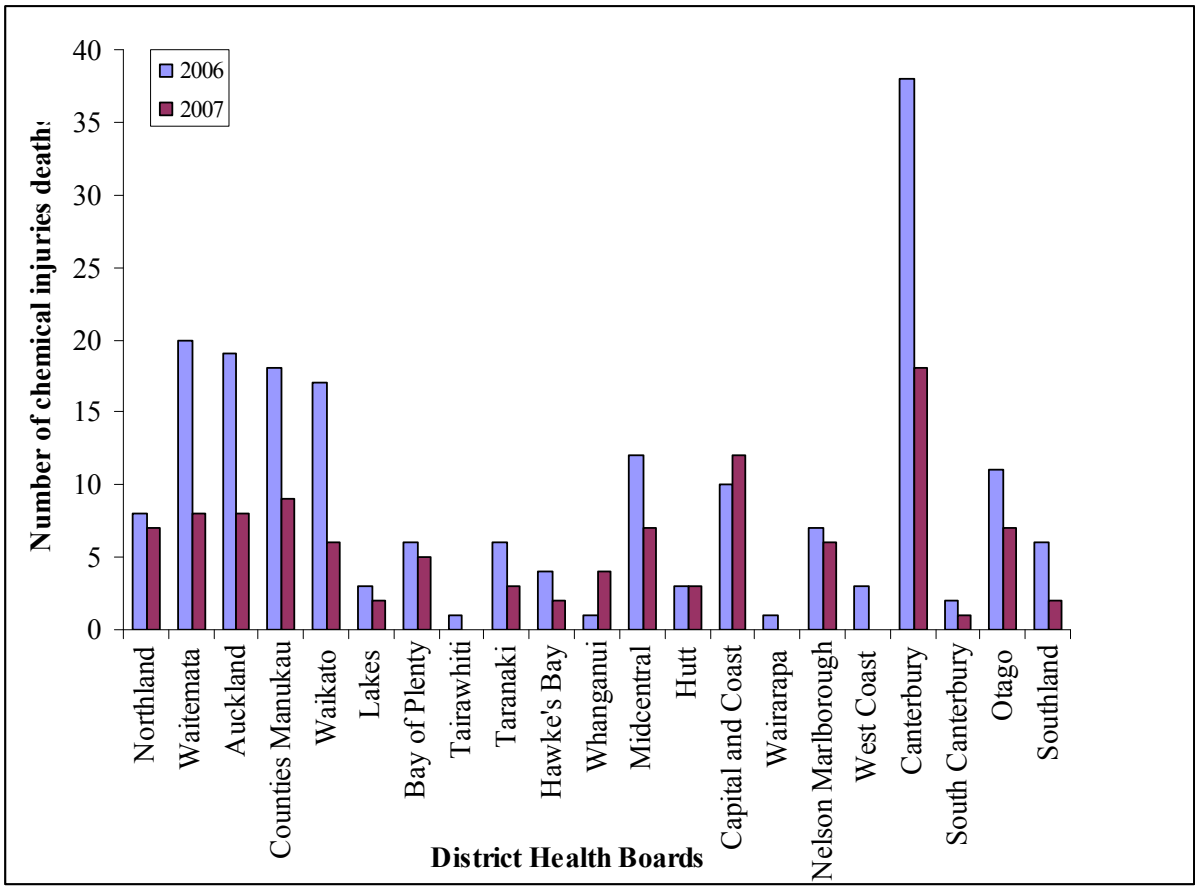

Figure 17: Number of Chemical Injury Deaths by DHB, 2006 and 2007

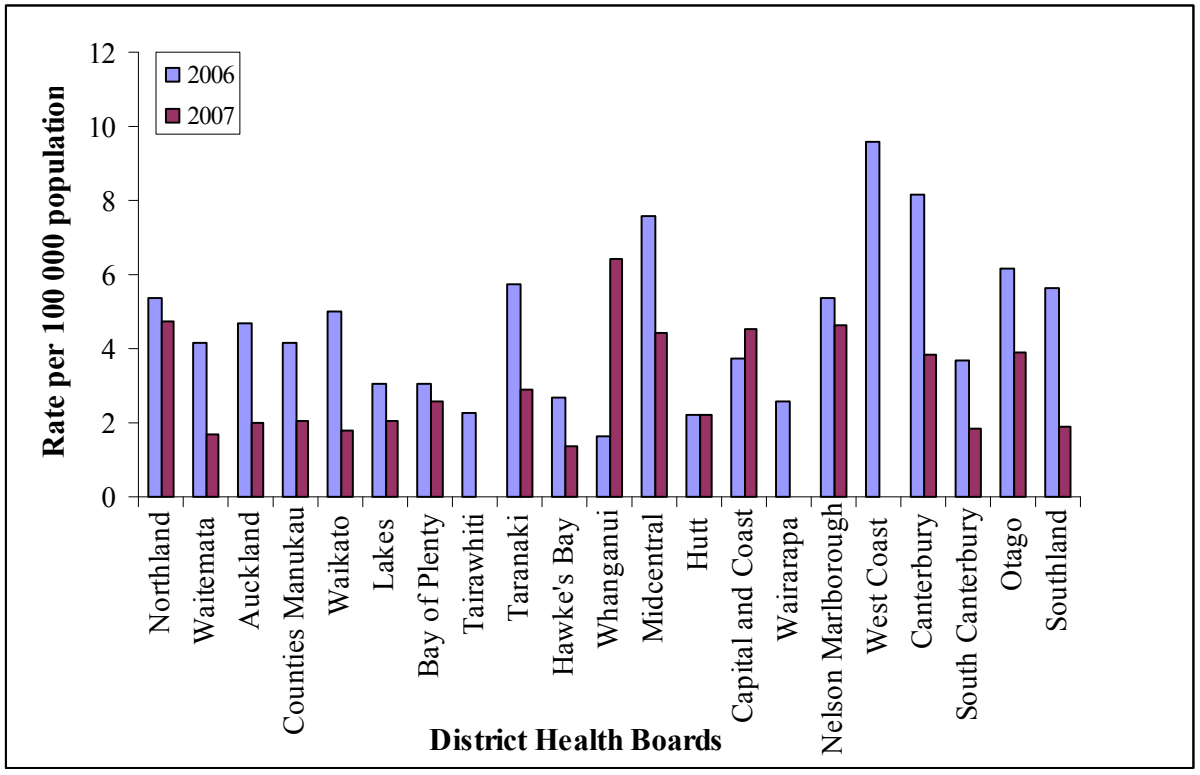

Figure 18: Chemical Injury Mortality Rate by DHB, 2006 and 2007

In 2006, Waitemata DHB had the greatest number of intentional deaths (16), followed by Canterbury DHB (15). In 2006, 17 DHBs had 50.0% or more of the total deaths attributable to intentional exposure. Canterbury DHB had the greatest number of intentional deaths in 2007 (11), followed by Northland and Nelson Marlborough DHBs (5 each). In 2007, 12 DHBs had 50.0% or more of the total deaths attributable to intentional exposure.

Age

In both 2006 and 2007, the highest age-specific mortality rate occurred in the 45-64 years age group (7.4 per 100 000 population, 71 and 4.6 per 100 000 population, 44, respectively) (Figure 19). In both years they were marginally ahead of the 25-44 years age group (7.0 per 100 000 population, 79 and 4.1 per 100 000 population, 47, respectively. Two children died as a result of chemical injury in 2006 (one aged 1-4 years and one aged 5-14 years) and one in 2007 (aged 5-14 years).

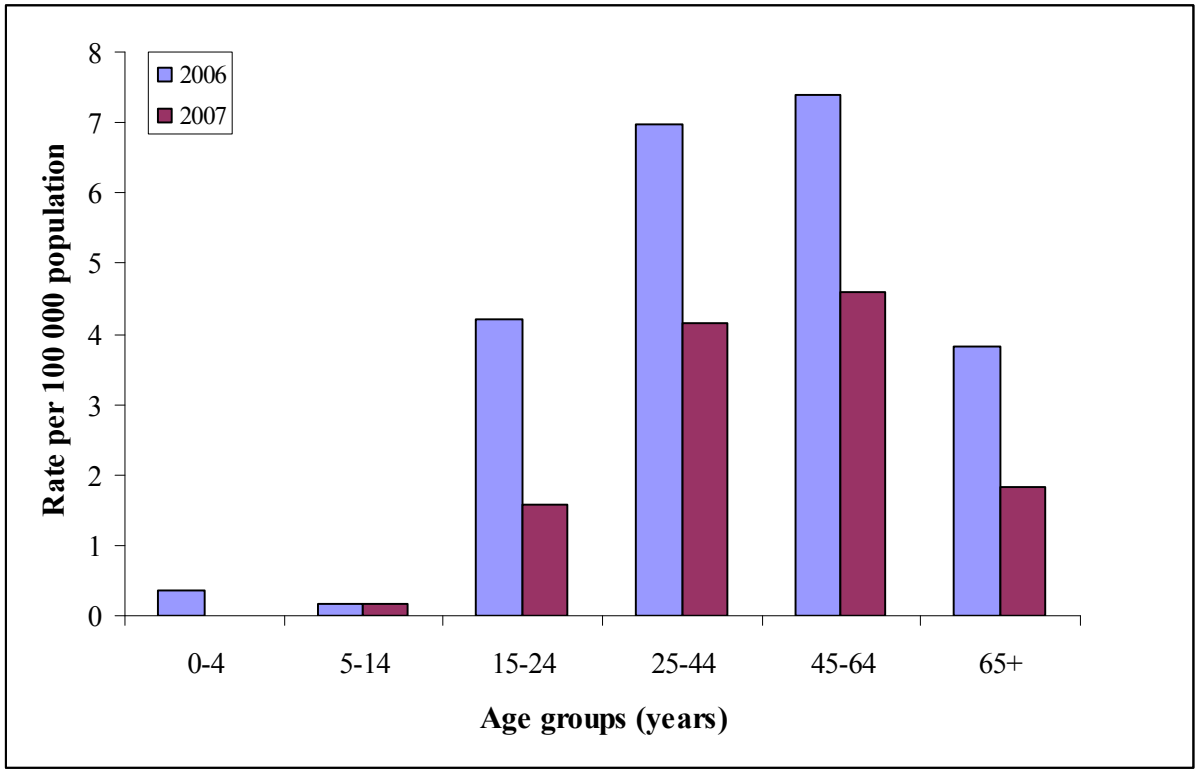

Figure 19: Age-Specific Mortality Rates, 2006 and 2007

The proportion of intentional deaths versus unintentional/unknown intent deaths for each age group generally increases with increasing age (Figure 20 and Figure 21). For example, in 2006 58.3% (14/24) of the deaths for the 15-24 years age group were intentional, this compares with 73.7% (14/19) for those aged 65 years and over. This trend is similar for 2007 and previous years.

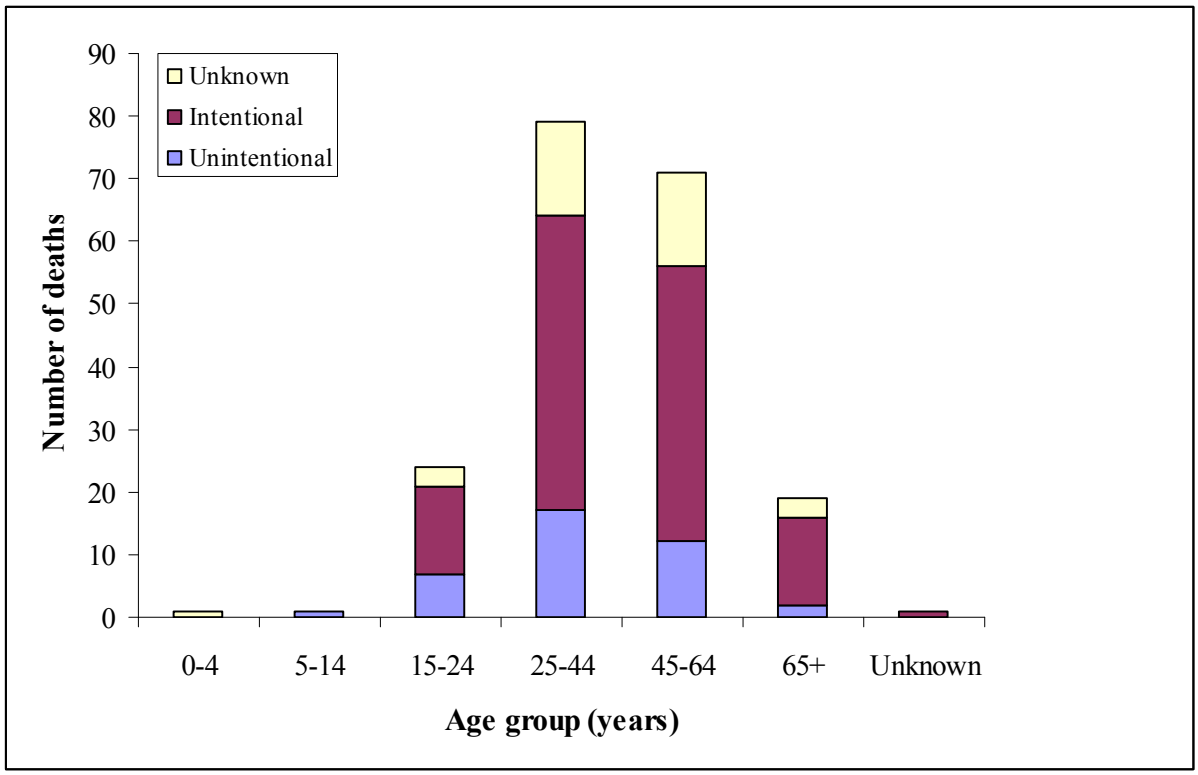

Figure 20: Number of Chemical Injury Deaths by Age Group and Intent, 2006

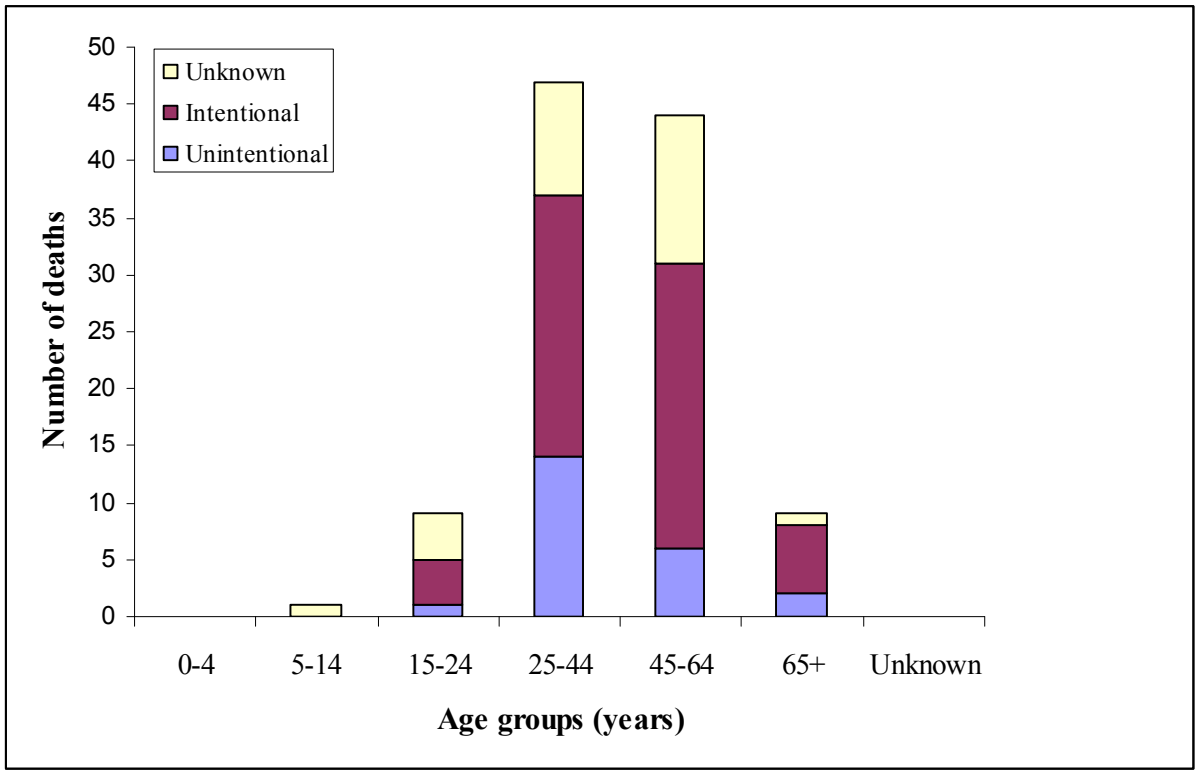

Figure 21: Number of Chemical Injury Deaths by Age Group and Intent, 2007

Sex

For both 2006 and 2007 the majority of chemical injury deaths were for males; 70.9% (139/196) and 57.3% (63/110), respectively. This equates to 2.4 male deaths for every female death (139 versus 57) in 2006, and 1.3 male deaths for every female death (63 versus 47) in 2007.

Ethnicity

Where ethnicity was known (191), the majority of chemical injury deaths for 2006 were for Europeans (85.3%, 163), followed by Maori (11.0%, 21). The same pattern was evident for 2007 (Europeans: 78.3%, 83/106; Maori: 15.1%, 16). Europeans also had the highest ethnicity-specific mortality rate (2006: 6.1 per 100 000 population; 2007: 3.1 per 100 000 population).

Substance

Substance data were similar for 2006 and 2007. For both years combined, 57.5% (176/306) of the deaths involved more than one substance. Combined results show that just under half (45.8%, 132/288) of the substances primarily identified in the deaths (where substance class could be assigned) were classed as household/domestic chemicals. This was followed by therapeutics (33.0%, 95) and chemicals/drugs of abuse (18.8%, 54).

The substance that accounts for the majority of household/domestic chemicals substance class was carbon monoxide. Carbon monoxide was the primary substance identified in 40.3% (116/288) of deaths for 2006 and 2007 combined. In particular, it was attributed to 68.5% (111/162) of the intentional deaths. Other primary substances which accounted for a notable proportion of the deaths for 2006 and 2007 combined were hydrocarbons (for example butane, toluene and petrol) (8.3%, 24), methadone (5.9%, 17) and morphine or heroin (5.6%, 16). The leading substances involved in the unintentional deaths were morphine or heroin (19.6%, 11/56), methadone (17.9%, 10) and hydrocarbons (16.1%, 9). Figure 22 shows the top primary substances identified that were involved in deaths by intent for 2006 and 2007 combined.

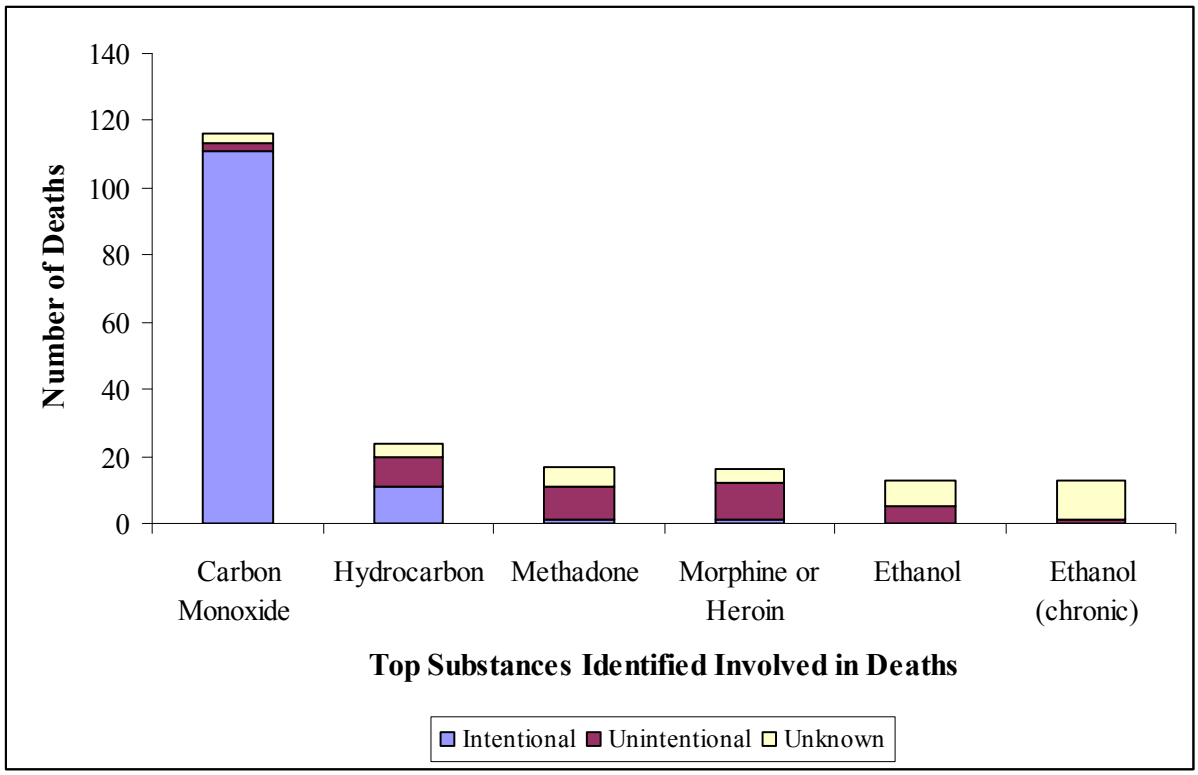

Figure 22: Top Five Primary Substances Identified in Deaths, 2006 and 2007 combined

Primary substances identified for the deaths for these two years which are specifically regulated by the HSNO Act included carbon monoxide (116), hydrocarbons (24), cyanide (3), chemicals involved with the manufacture of methamphetamine (1), methylated spirits (1), paraquat (1), pentachlorophenol (1) and diquat (1). Where two or more deaths occurred due to a hazardous substance (143) (Table 32) the majority were intentional (86.7%, 124), male (75.5%, 108), and in the 25-44 years age group (36.4%, 52).

6. CONCLUSIONS

This report has presented comprehensive chemical injury surveillance data for the year 2008. It includes national inpatient hospitalisation data (sourced from NZHIS), national spraydrift data (sourced from the DriftNet surveillance system), national poison/chemical notifiable diseases (sourced from EpiSurv), national poison call data (sourced from the NPC), national accident claim data (sourced from ACC), national media analysis and local emergency department data for North Shore/Waitakere Hospitals (Waitemata DHB), Auckland City Hospital (Auckland DHB), Masterton Hospital (Wairarapa DHB), Wellington Hospital (Capital and Coast DHB), Grey Hospital (West Coast DHB) and Invercargill Hospital (Southland DHB). A summary of key statistics for 2008 are detailed in Section 4.2.

In 2004, a comprehensive assemblage of chemical injury data was first presented. National trends across datasets for 2003 and comparison of New Zealand's mortality figures with international results for 2001/2002 were included in the 2003 Annual Report (McDowell *et al.*, 2004), and the latter also published in the New Zealand Medical Journal in 2005 (McDowell, Fowles, & Phillips, 2005). This years report contains one years worth of local emergency department notification data (2008) for all six DHBs (however, it is possible to compare this to previous years data as shown illustrated in figures at the overview of each section) and two years worth of national CSO data (detailed 2006 and 2007 analysis). In the 2005 report analysis was also undertaken using local Hutt DHB emergency department data (these data were not available for 2006 to 2008).

As mentioned in Section 3 data from other PHUs/hospitals would be readily and appreciatively encompassed into CISS. While it has been recognised that the most desirable means of capturing any notification is via integration with patient management systems, resources are currently unavailable to enable this.

This Annual Report is the third year that national chemical/poison related notifiable diseases sourced from EpiSurv were included in the CISS and the second year that hazardous substances injury data via EpiSurv were included. It is the intention to continue to incorporate this to capture all available chemical/hazardous substances injury data sources.

The 2008 Annual Report is the second time that a more detailed analysis of NPC human exposure calls were incorporated in the CISS. In the past only summarised NPC data was available and it was not possible to analyse further. It is the intention to continue to incorporate this in the CISS in the future.

DriftNet data have again been included in this report. The number of complaints reported by PHUs for 2008 was only seven, and the number of complaints reported through DriftNet since its implementation in 1998 averages 12 per year for the whole country. It is apparent that the amount of data currently being collected using DriftNet is an under representation of the overall number of events. While we know that the total number of complaints generated by the public is much larger that that, only incidents with health impacts fall under the scope of DriftNet. According to a report by Mazzoni (Mazzoni, 2001) there are significant numbers of incidents *with health effects* being reported to councils and *not passed* on to PHUs:

"…two regional councils forwarded their datasets containing their spray drift incidents over the past two years. Preliminary analysis of both datasets indicates that indeed the reported incidents are much higher than what is being captured on *Driftnet* (over 200 cases total). In both datasets, a number of the spray drift incidents report human exposures and health

complaints. The regional council data however lack the amount of detail and follow up that *Driftnet* would provide. A comprehensive health impact analysis from these regional council datasets is therefore not possible. This clearly indicates the need for the two agencies (PHSs and Regional Councils) to coordinate their efforts in the health sector. Incidentally one of the datasets containing over sixty complaints, some of which indicate human health concerns came from a regional council whose PHS had reported no health spray drift complaints in *Driftnet* for either year".

It has been suggested previously (McDowell, 2004) that the low number of reported complaints on DriftNet may be due to: 1) unfamiliarity with the software and/or software incompatibility and 2) complaints being directed to the NPC or regional councils rather than PHUs. The regional council's aspect has been discussed above, and it appears the bulk of complaints are being directed there rather than the PHUs or NPC (the NPC only received 29 spraydrift calls in 2002). In additions, as ESR is currently accepting the DriftNet data in any form from PHUs and no longer requiring the use of DriftNet software program *per se*, the software itself is not a likely reason for the low number of complaints. Therefore future discussion between PHUs and regional councils may improve the referral of spraydrift incidents with health impacts to PHUs.

The 2008 Annual Report is the second year that national accident claim data from ACC and a national media analysis has been incorporated. Although it is not possible to capture all ACC claims relating to hazardous and chemical injuries or all media articles, the inclusion of this data adds another element to the comprehensive CISS. It is the intention to include these data sources in future Annual Reports.

An expanded and more detailed HSNO substance injuries analysis has again been included in the 2008 Annual Report. Analysis of hazardous substances injury by demographics provides more useful information and is consistent with other similar analyses in this report.

During 2007 the list of NZHIS hospitalisation ICD-10 external cause codes, which are incorporated in the CISS, was reviewed and have been expanded. The current codes are more comprehensive of the range of chemical and hazardous substances injuries that occur and will provide a more accurate depiction of the occurrence of such injuries in New Zealand. The expanded list will therefore be capturing more injuries and for this reason, the numbers in 2008 can be directly compared to the numbers for 2007 but should not be directly compared to the numbers reported previous to this.

The small number of cases involved with some of the datasets presented in this report, particularly the CSO data, requires caution when interpreting figures, especially rates. A further limitation of the data presented in this report is the incomplete nature of the CSO data for 2007. As the timing of the reports filed at the CSO can vary by coroner, comparisons across DHBs must be done with care. While intent is most reliable for deaths (determined by the coroner), intent associated with PHU notifications is less robust. For the West Coast and Southland notification data presented in this report, which did not have intent specifically assigned, cases reported as overdoses have been classed as intentional, with any other, for example ingestion or inhalation, have been classed as unintentional.

REFERENCES

Bates, B., & Fowles, J. (2000). *Proposal for the Development of a National Surveillance System for Injuries Caused by Hazardous Substances. ESR Report to the Ministry of Health. Unpublished Report.*

Broun, B. (2008). Alcohol a factor in gassing deaths [Electronic Version]. *The Dominion Post*. Retrieved 9 September from http://www.stuff.co.nz/4685675a11.html.

Environmental Risk Management Authority New Zealand. (2008). What is a Hazardous Substance? Retrieved 12 June, 2008, from http://www.ermanz.govt.nz/hs/abouths/index.html

Espitia-Hardeman, V., & Paulozzi, L. (2005). *Injury Surveillance Training Manual*. Atlanta: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

Feek, B. (2008, 8 September). Poisoning tragedy survivor remains seriously ill. *Waikato Times*.

Feek, B., & Broun, B. (2008). Gas victim has new baby as incentive [Electronic Version]. *Waikato Times*. Retrieved 9 September from http://www.stuff.co.nz/4685675a11.html.

Fowles, J. (2001). *The Notification of Injuries from Hazardous Substances: Draft Guidelines and Reference Material for Public Health Services. ESR Report to Ministry of Health. Unpublished Report*.

Fowles, J., Phillips, D., McDowell, R., Gilmore, K., De Feijter, J., & Boyle, K. (2002). *A Chemical Injuries Surveillance System for New Zealand: Report of a Pilot Study. ESR Report to the Ministry of Health. Unpublished Report.*

Francis, C. (2008). Worker falls into vat of chemicals [Electronic Version]. Retrieved 4 December from http://www.stuff.co.nz/4782313a11.html.

Institute of Environmental Science and Research. (2008). *Notifiable and Other Diseases in New Zealand Annual Report 2007*. Wellington: Institute of Environmental Science and Research.

Keith, L. (2008). Woman in hospital after party trick backfires [Electronic Version]. *Taranaki Daily News*. Retrieved 1 September from http://www.stuff.co.nz/4676438a11.html.

Mazzoni, S. (2001). *Report on Agrichemical Spray Drift Incidents Reported to Public Health Services, 2000. ESR Report to the Ministry of Health. Unpublished Report.*

McDonald, G., & Feek, B. (2008). Gas victims loved outdoor adventure [Electronic Version]. *The Dominion Post*. Retrieved 10 September from http://www.stuff.co.nz/4687116a11.html.

McDowell, R. (2004). *Report on Agrichemical Spray Drift Incidents Reported to Public Health Services, 2003. ESR Report to the Ministry of Health. Unpublished Report.*

McDowell, R., Fowles, J., & Phillips, D. (2003). *A Comprehensive Chemical Injury Surveillance System for New Zealand: Outcome of a pilot study and proposal for national implementation. ESR report to the Ministry of Health. Unpublished Report.*

McDowell, R., Fowles, J., & Phillips, D. (2004). *Chemical Injury Surveillance for New Zealand, 2003: National Implementation and Key Statistics . ESR Report to the Ministry of Health. Unpublished Report.*

McDowell, R., Fowles, J., & Phillips, D. (2005). Deaths from Poisoning in New Zealand 2001-2002. *New Zealand Medical Journal, 118*(1225).

McDowell, R., & Gallagher, L. (2005). *Chemical Injury Surveillance for New Zealand, 2004. ESR Report to the Ministry of Health. Unpublished Report.*

Ministry of Health. (2007). *Direct Laboratory Notification of Communicable Diseases: National Guidelines*. Wellington: Ministry of Health.

No author. (2008a). Chemical leak in Addington [Electronic Version]. *The Press*. Retrieved 3 September from http://www.stuff.co.nz/4679493a11.html.

No author. (2008b, 10 May). Coolstore accident waiting to happen. *The New Zealand Herald*.

Nordqvist, S. (2008). Chicken workers inhale chlorine gas [Electronic Version]. *The Press*. Retrieved 14 April 2008 from http://www.stuff.co.nz/the-press/365160.

Radio New Zealand. (2008). Chemical spill injures 40 Christchurch workers [Electronic Version]. Retrieved 3 September from http://www.radionz.co.nz/news/stories/2008/09/03/12437318a2e5.

Shieffelbien, L. (2007, 20 September). Personal Communication.

Taylor, P. (2008, 10 May). Coolstore using LPG when killer fire erupted. *The New Zealand Herald*.

Tisch, C., & Slaney, D. (2007). *Chemical Injury Surveillance for New Zealand, 2006*. Wellington: Institute of Environmental Science and Research.

APPENDIX 1

Table 6: National Chemical Injury Data from NZHIS, PHU and DriftNet by DHB, 2008

DHB	NZHIS Admitted Patients		PHU Notifications		DriftNet Complaints
	No.	Rate[1]	No.	Rate[1]	No.
Northland	308	207.5			1
Waitemata	1159	240.7	672	139.5	0
Auckland	921	227.6	2017	498.5	0
Counties Manukau	1016	234.6			0
Waikato	532	156.9			0
Lakes	271	275.5			0
Bay of Plenty	424	217.5			2
Tairawhiti	65	146.3			0
Taranaki	171	163.9			0
Hawke's Bay	234	157.8			3
Wanganui	170	273.4			0
MidCentral	396	249.3			0
Hutt	181	133.0			0
Capital and Coast	215	80.6	563	211.1	0
Wairarapa	120	310.4	92	238.0	0
Nelson Marlborough	285	219.1			0
West Coast	46	146.8	5	16.0	1
Canterbury	1051	225.3			0
South Canterbury	88	163.1			0
Otago	479	267.0			0
Southland	220	205.9	163	152.6	0
Area Outside DHB	219				
National	**8571**	**212.8**			**7**

[1] Rate calculated using 2006 Census data and expressed as per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

Table 7: National Chemical Injury Demographic Data from NZHIS, 2008

Demographics		NZHIS (Admitted Patients)		
		No.	Rate[1]	%[2]
Intent	Intentional	4177	103.7	48.7
	Unintentional	2692	66.8	31.4
	Assault	10	0.2	0.1
	Legal	2	0.0	0.0
	Indeterminate or Unknown Intent	1690	42.0	19.7
Age Group	0-4	801	291.2	9.3
	5-14	380	64.1	4.4
	15-24	2109	369.2	24.6
	25-44	2853	251.5	33.3
	45-64	1744	181.8	20.3
	65+	684	138.0	8.0
Sex	Female	4946	239.8	57.7
	Male	3624	184.4	42.3
	Unknown	1		
Ethnicity	European	6042	224.3	71.3
	Maori	1447	256.0	17.1
	Pacific Peoples	394	174.1	4.6
	Asian	377	110.6	4.4
	Other	220		2.6
	Unknown	91		
National		**8571**	**212.8**	

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

[2] Proportion (%) of total cases (for respective data source) where demographic (age group/sex/ethnicity) was known.

Table 8: Waitemata DHB Chemical Injury Demographic Data from NZHIS, and PHU, 2008

Demographics		NZHIS (Admitted Patients)			PHU Notifications		
		No.	Rate[1]	%[2]	No.	Rate[1]	%[2]
Intent	Intentional	592	122.9	51.1	298	61.9	44.3
	Unintentional	386	80.1	33.3	103	21.4	15.3
	Assault	1	0.2	0.1			
	Legal	0	0.0	0.0			
	Indeterminate or Unknown Intent	180	37.4	15.5	271	56.3	40.3
Age Group	0-4	106	322.3	9.1	66	200.7	9.8
	5-14	46	64.2	4.0	21	29.3	3.1
	15-24	300	443.1	25.9	239	353.0	35.6
	25-44	369	257.8	31.8	195	136.2	29.0
	45-64	252	222.5	21.7	130	114.8	19.3
	65+	86	162.4	7.4	21	39.7	3.1
Sex	Female	660	267.0	56.9	392	158.6	58.4
	Male	499	212.9	43.1	279	119.0	41.6
	Unknown	0			1		
Ethnicity	European	855	271.3	74.4	515	163.4	78.4
	Maori	135	314.9	11.7	61	142.3	9.3
	Pacific Peoples	61	200.6	5.3	31	101.9	4.7
	Asian	70	105.7	6.1	37	55.8	5.6
	Other	28		2.4	13		2.0
	Unknown	10			15		
Overall		**1159**	**240.7**		**672**	**139.5**	

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

[2] Proportion (%) of total cases (for respective data source) where demographic (age group/sex/ethnicity) was known.

Table 9: Auckland DHB Chemical Injury Demographic Data from NZHIS, and PHU, 2008

Demographics		NZHIS (Admitted Patients)			PHU Notifications		
		No.	Rate[1]	%[2]	No.	Rate[1]	%[2]
Intent	Intentional	497	122.8	54.0	68	16.8	3.4
	Unintentional	333	82.3	36.2	67	16.6	3.3
	Assault	2	0.5	0.2			
	Legal	0	0.0	0.0			
	Indeterminate or Unknown Intent	89	22.0	9.7	1882	465.2	93.3
Age Group	0-4	75	287.9	8.1	0	0.0	0.0
	5-14	29	58.0	3.1	0	0.0	0.0
	15-24	241	358.4	26.2	794	1180.9	39.4
	25-44	337	247.5	36.6	743	545.6	36.9
	45-64	178	206.2	19.3	394	456.4	19.6
	65+	61	157.3	6.6	83	214.0	4.1
	Unknown	0			3		
Sex	Female	515	248.3	55.9	892	430.1	44.5
	Male	406	205.9	44.1	1112	563.9	55.5
	Unknown	0			13		
Ethnicity	European	581	278.1	64.3	1339	641.0	68.7
	Maori	108	361.9	11.9	206	690.3	10.6
	Pacific Peoples	77	169.0	8.5	168	368.8	8.6
	Asian	103	112.5	11.4	203	221.7	10.4
	Other	35		3.9	32		1.6
	Unknown	17			69		
Overall		**921**	**227.6**		**2017**	**498.5**	

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

[2] Proportion (%) of total cases (for respective data source) where demographic (age group/sex/ethnicity) was known.

Table 10: Wairarapa DHB Chemical Injury Demographic Data from NZHIS, and PHU, 2008

Demographics		NZHIS (Admitted Patients)			PHU Notifications		
		No.	Rate[1]	%[2]	No.	Rate[1]	%[2]
Intent	Intentional	66	170.7	55.0	57	147.5	62.0
	Unintentional	26	67.3	21.7	25	64.7	27.2
	Assault	0	0.0	0.0			
	Legal	0	0.0	0.0			
	Indeterminate or Unknown Intent	28	72.4	23.3	10	25.9	10.9
Age Group	0-4	12	492.0	10.0	14	574.0	15.2
	5-14	11	192.3	9.2	10	174.8	10.9
	15-24	33	780.1	27.5	18	425.5	19.6
	25-44	31	341.1	25.8	31	341.1	33.7
	45-64	29	267.5	24.2	18	166.0	19.6
	65+	4	63.1	3.3	1	15.8	1.1
Sex	Female	66	332.3	55.0	56	281.9	60.9
	Male	54	287.3	45.0	36	191.6	39.1
Ethnicity	European	91	296.1	75.8	56	182.2	76.7
	Maori	25	455.2	20.8	15	273.1	20.5
	Pacific Peoples	1	159.7	0.8	0	0.0	0.0
	Asian	2	402.4	1.7	0	0.0	0.0
	Other	1		0.8	2		2.7
	Unknown	0			19		
Overall		**120**	**310.4**		**92**	**238.0**	

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

[2] Proportion (%) of total cases (for respective data source) where demographic (age group/sex/ethnicity) was known.

Table 11: Capital and Coast DHB Chemical Injury Demographic Data from NZHIS, and PHU, 2008

Demographics		NZHIS (Admitted Patients)			PHU Notifications		
		No.	Rate[1]	%[2]	No.	Rate[1]	%[2]
Intent	Intentional	115	43.1	53.5	415	155.6	73.7
	Unintentional	64	24.0	29.8	106	39.8	18.8
	Assault	0	0.0	0.0			
	Legal	0	0.0	0.0			
	Indeterminate or Unknown Intent	36	13.5	16.7	42	15.8	7.5
Age Group	0-4	24	137.0	11.2	39	222.7	6.9
	5-14	10	29.1	4.7	11	32.0	2.0
	15-24	60	141.6	27.9	213	502.8	37.8
	25-44	64	75.0	29.8	184	215.7	32.7
	45-64	39	66.1	18.1	94	159.4	16.7
	65+	18	64.0	8.4	22	78.3	3.9
Sex	Female	137	99.2	63.7	388	280.9	68.9
	Male	78	60.7	36.3	175	136.2	31.1
Ethnicity	European	145	79.5	69.4	410	224.8	75.8
	Maori	31	117.0	14.8	68	256.6	12.6
	Pacific Peoples	16	84.2	7.7	22	115.7	4.1
	Asian	7	28.3	3.3	21	84.9	3.9
	Other	10		4.8	20		3.7
	Unknown	6			22		
Overall		**215**	**80.6**		**563**	**211.1**	

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

[2] Proportion (%) of total cases (for respective data source) where demographic (age group/sex/ethnicity) was known.

Table 12: West Coast DHB Chemical Injury Demographic Data from NZHIS, and PHU, 2008

Demographics		NZHIS (Admitted Patients)			PHU Notifications		
		No.	Rate[1]	%[2]	No.	Rate[1]	%[2]
Intent	Intentional	26	83.0	56.5	2	6.4	40.0
	Unintentional	11	35.1	23.9	3	9.6	60.0
	Assault	0	0.0	0.0			
	Legal	0	0.0	0.0			
	Indeterminate or Unknown Intent	9	28.7	19.6	0	0.0	0.0
Age Group	0-4	3	158.2	6.5	0	0.0	0.0
	5-14	3	66.7	6.5	0	0.0	0.0
	15-24	10	295.3	21.7	1	29.5	20.0
	25-44	15	179.2	32.6	3	35.8	60.0
	45-64	12	136.1	26.1	1	11.3	20.0
	65+	3	68.7	6.5	0	0.0	0.0
Sex	Female	24	155.6	52.2	4	26.0	80.0
	Male	22	138.3	47.8	1	6.3	20.0
Ethnicity	European	40	149.9	88.9	2	7.5	100.0
	Maori	4	137.5	8.9	0	0.0	0.0
	Pacific Peoples	1	518.1	2.2	0	0.0	0.0
	Asian	0	0.0	0.0	0	0.0	0.0
	Other	0		0.0	0		0.0
	Unknown	1			3		
Overall		**46**	**146.8**		**5**	**16.0**	

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

[2] Proportion (%) of total cases (for respective data source) where demographic (age group/sex/ethnicity) was known.

Table 13: Southland DHB Chemical Injury Demographic Data from NZHIS, and PHU, 2008

Demographics		NZHIS (Admitted Patients)			PHU Notifications		
		No.	**Rate[2]**	**%[3]**	**No.**	**Rate[2]**	**%[3]**
Intent	Intentional	64	59.9	29.1	121	113.3	74.2
	Unintentional	64	59.9	29.1	37	34.6	22.7
	Assault	0	0.0	0.0			
	Legal	0	0.0	0.0			
	Indeterminate or Unknown Intent	92	86.1	41.8	5	4.7	3.1
Age Group	0-4	32	463.0	14.5	23	332.8	14.1
	5-14	11	73.9	5.0	8	53.7	4.9
	15-24	62	451.3	28.2	55	400.4	33.7
	25-44	63	202.4	28.6	62	199.2	38.0
	45-64	36	136.7	16.4	14	53.2	8.6
	65+	16	115.7	7.3	1	7.2	0.6
Sex	Female	119	222.5	54.1	107	200.1	65.6
	Male	101	189.3	45.9	56	105.0	34.4
Ethnicity	European	164	186.1	75.6	Ethnicity data not collected		
	Maori	44	388.8	20.3			
	Pacific Peoples	1	83.2	0.5			
	Asian	2	103.0	0.9			
	Other	6		2.8			
	Unknown	3					
Overall		**220**	**205.9**		**163**	**152.6**	

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

[2] Proportion (%) of total cases (for respective data source) where demographic (age group/sex/ethnicity) was known.

Table 14: National Chemical Injury NZHIS Data by ICD-10 Code, 2008

NZHIS (admitted patients)		
Primary ICD-10 External Cause Code (top 10)[1]	**No.**	**%[2]**
X61	2102	24.5
X60	1107	12.9
X44	681	7.9
X49	529	6.2
Y11	465	5.4
X41	462	5.4
X40	372	4.3
X64	310	3.6
X62	263	3.1
X42	250	2.9
Total	**8571**	

[1] Refer to Table 1 for description of each code. Primary ICD-10 External Cause Code.

Table 15: Waitemata DHB Chemical Injury Data from NZHIS and PHU by Substance, 2008

NZHIS (admitted patients)			PHU Notifications		
Primary ICD-10 Code[1] (top 5)	**No.**	**%**	**Substance (top 4)**	**No.**	**%[2]**
X61	311	26.8	Ethanol	229	40.6
X60	153	13.2	Paracetamol	102	18.1
X49	101	8.7	Zopiclone	29	5.1
X44	91	7.9	Unspecified chemical	11	2.0
X41	63	5.4			
Total	**1159**		**Total**	**564**	

[1] Refer to Table 1 for description of each code. Primary ICD-10 External Cause Code.
[2] Proportion (%) of total substances where substance was known.

Table 16: Auckland DHB Chemical Injury Data from NZHIS and PHU by Substance, 2008

NZHIS (admitted patients)			PHU Notifications		
Primary ICD-10 Code[1] (top 5)	**No.**	**%**	**Substance (top 5)**	**No.**	**%[2]**
X61	251	27.3	Ethanol	1460	53.0
X60	142	15.4	Paracetamol	146	5.3
X44	91	9.9	Zopiclone	107	3.9
X49	58	6.3	Gamma-hydroxybutyrate	59	2.1
X41	55	6.0	Ibuprofen	56	2.0
Total	**921**		**Total**	**2756**	

[1] Refer to Table 1 for description of each code. Primary ICD-10 External Cause Code.
[2] Proportion (%) of total substances where substance was known.

Table 17: Wairarapa DHB NZHIS and PHU by Substance, 2008

NZHIS (admitted patients)			PHU Notifications		
Primary ICD10 Code[1] (top 6)	**No.**	**%[2]**	**Substance (top 4)**	**No.**	**%[2]**
X61	28	23.3	Ethanol	25	20.0
X60	18	15.0	Paracetamol	14	11.2
X49	9	7.5	Zopiclone	10	8.0
X233	8	6.7	Codeine phosphate	7	5.6
X62	6	5.0			
X64	6	5.0			
Total	**120**		**Total**	**125**	

[1] Refer to Table 1 for description of each code. Primary ICD-10 External Cause Code.
[2] Proportion (%) of total substances where substance was known.

Table 18: Capital and Coast DHB NZHIS and PHU by Substance, 2008

NZHIS (admitted patients)			PHU Notifications		
Primary ICD10 Code[1] (top 5)	**No.**	**%[2]**	**Substance (top 5)**	**No.**	**%[2]**
X61	49	22.8	Paracetamol	115	16.6
X60	37	17.2	Zopiclone	59	8.5
X44	18	8.4	Ethanol	36	5.2
X49	16	7.4	Quetiapine	30	4.3
X40	12	5.6	Diazepam	28	4.0
Total	**215**		**Total**	**693**	

[1] Refer to Table 1 for description of each code. Primary ICD-10 External Cause Code.
[2] Proportion (%) of total substances where substance was known.

Table 19: West Coast DHB NZHIS and PHU by Substance, 2008

NZHIS (admitted patients)			PHU Notifications		
Primary ICD10 Code[1] (top 5)	**No.**	**%**	**Substance (top 4)**	**No.**	**%[2]**
X61	13	28.3	Codeine phosphate	3	50.0
X60	6	13.0	Benzylpiperazine	1	16.7
X62	5	10.9	Ethanol	1	16.7
X40	5	10.9	Zopiclone	1	16.7
X04	4	8.7			
Total	**46**		**Total**	**6**	

[1] Refer to Table 1 for description of each code. Primary ICD-10 External Cause Code.
[2] Proportion (%) of total substances/ICD-10 codes (for respective data source) where substance/ICD-10 code was known.

Table 20: Southland DHB Chemical Injury Data from NZHIS and PHU by Substance, 2008

NZHIS (admitted patients)			PHU Notifications		
Primary ICD10 Code[1] (top 5)	**No.**	**%**	**Substance (top 5)**	**No.**	**%[2]**
Y11	44	20.0	Paracetamol	33	12.3
X61	24	10.9	Ethanol	27	10.1
X40	14	6.4	Codeine phosphate	18	6.7
X44	14	6.4	Zopiclone	16	6.0
X60	13	5.9	Citalopram	14	5.2
Total	**220**		**Total**	**268**	

[1] Refer to Table 1 for description of each code. Primary ICD-10 External Cause Code.
[2] Proportion (%) of total substances where substance was known.

Table 21: Summary Demographic Data for Injuries in Children Aged Less than Five Years, 2008

Demographics		NZHIS National		North Shore/ Waitakere		Masterton Hospital		Wellington Hospitals		Grey Hospital		Invercargill Hospital	
		No.	**%[1]**	**No.**	**%[1]**	**No.**	**%[1]**	**No.**	**%[1]**	**No.**	**%[1]**	**No.**	**%[1]**
Intent	Intentional	0	0.0	0	0.0	0	0.0	3	7.7	No injuries for children aged less than five years		0	0.0
	Unintentional	765	95.5	65	98.5	12	85.7	35	89.7			23	100.0
	Indeterminate or Unknown	36	4.5	1	1.5	2	14.3	1	2.6			0	0.0
Sex	Female	324	40.4	31	47.0	4	28.6	16	41.0			13	56.5
	Male	477	59.6	35	53.0	10	71.4	23	59.0			10	43.5
Ethnicity	European	467	58.5	51	81.0	8	66.7	26	66.7			Ethnicity data not collected	
	Maori	227	28.4	3	4.8	4	33.3	8	20.5				
	Pacific Peoples	64	8.0	6	9.5	0	0.0	4	10.3				
	Asian	29	3.6	2	3.2	0	0.0	1	2.6				
	Other	11	1.4	1	1.6	0	0.0	0	0.0				
	Unknown	3		3		2		0					
Overall	**No. of cases and % of total cases**	**801**	**9.3**	**66**	**9.8**	**14**	**15.2**	**39**	**6.8**	**0**	**0.0**	**23**	**19.5**

Note: ARPHS data are excluded because notifications from Starship Hospital are not received.
[1] Proportion (%) of total cases where demographic (sex/ethnicity) was known.

Table 22: Substance by Emergency Department for Injuries in Children Aged Less Than Five Years, 2008

Substance (top 12)	Northshore/ Waitakere	Masterton Hospital	Wellington Hospital	Invercargill Hospital	Total	%[1]
Paracetamol	22	1	14	3	40	28.0
Amoxicillin/clavulanate	4	2	1	0	7	4.9
Diclofenac	0	2	1	2	5	3.5
Caustic soda	0	3	1	0	4	2.8
Cetirizine	0	0	1	2	3	2.1
Codeine phosphate	0	1	0	2	3	2.1
Unspecified cough and cold medication	3	0	0	0	3	2.1
Hypochlorite	1	0	2	0	3	2.1
Ibuprofen	0	0	1	2	3	2.1
Quetiapine	1	1	1	0	3	2.1
Smoke inhalation	0	0	2	1	3	2.1
Zopiclone	2	0	1	0	3	2.1

[1] Total of 143 substance occurrences (69 individual substances).

Table 23: Summary Demographic Data for Paracetamol Poisonings, 2008

Demographics		North Shore/ Waitakere		Auckland City Hospital		Masterton Hospital		Wellington Hospitals		Grey Hospital		Invercargill Hospital	
		No.	%[1]	No.	%[1]	No.	%[1]	No.	%[1]	No.	%[1]	No.	%[1]
Intent	Intentional	67	65.7	15	10.3	12	85.7	96	83.5	No paracetamol notifications		29	87.9
	Unintentional	22	21.6	1	0.7	2	14.3	17	14.8			3	9.1
	Indeterminate or Unknown Intent	13	12.7	130	89.0	0	0.0	2	1.7			1	3.0
Age Group	0-4	22	21.6	0	0.0	1	7.1	14	12.2			3	9.1
	5-14	2	2.0	0	0.0	3	21.4	6	5.2			4	12.1
	15-24	41	40.2	66	45.2	2	14.3	59	51.3			14	42.4
	25-44	19	18.6	63	43.2	7	50.0	26	22.6			12	36.4
	45-64	18	17.6	17	11.6	1	7.1	10	8.7			0	0.0
	65+	0	0.0	0	0.0	0	0.0	0	0.0			0	0.0
Sex	Female	76	74.5	109	75.2	9	64.3	86	74.8			26	78.8
	Male	26	25.5	36	24.8	5	35.7	29	25.2			7	21.2
	Unknown	0		1		0		0				0	
Ethnicity	European	83	81.4	96	66.7	11	84.6	88	79.3			Ethnicity data not collected	
	Maori	7	6.9	13	9.0	2	15.4	11	9.9				
	Pacific Peoples	4	3.9	5	3.5	0	0.0	3	2.7				
	Asian	6	5.9	24	16.7	0	0.0	4	3.6				
	Other	2	2.0	6	4.2	0	0.0	5	4.5				
	Unknown	0		2		1		4					
Overall	No. of cases and % of total substances[2]	**102**	**18.1**	**146**	**5.3**	**14**	**11.2**	**115**	**16.6**	**0**	**0.0**	**33**	**12.3**

Note: Paracetamol combinations such as dextropropoxyphene/paracetamol or paracetamol/codeine not included in paracetamol counts.

[1] Proportion (%) of total paracetamol poisoning cases where demographic (age group/sex/ethnicity) was known.

[2] Proportion (%) of total paracetamol poisonings (for respective data source) where substance was known

Table 24: Summary Demographic Data for Acute Ethanol Poisonings, 2008

Demographics		North Shore/ Waitakere		Auckland City Hospital		Masterton Hospital		Wellington Hospitals		Grey Hospital		Invercargill Hospital	
		No.	%[1]	No.	%[1]	No.	%[1]	No.	%[1]	No.	%[1]	No.	%[1]
Intent	Intentional	31	13.6	21	1.4	22	88.0	31	86.1	1	100.0	25	92.6
	Unintentional	1	0.4	53	3.6	1	4.0	0	0.0	0	0.0	0	0.0
	Indeterminate or Unknown Intent	196	86.0	1386	94.9	2	8.0	5	13.9	0	0.0	2	7.4
Age Group	0-4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	5-14	12	5.3	0	0.0	1	4.0	0	0.0	0	0.0	0	0.0
	15-24	98	43.0	587	40.2	9	36.0	5	13.9	0	0.0	11	40.7
	25-44	55	24.1	511	35.0	9	36.0	21	58.3	1	100.0	13	48.1
	45-64	52	22.8	304	20.8	6	24.0	10	27.8	0	0.0	3	11.1
	65+	11	4.8	58	4.0	0	0.0	0	0.0	0	0.0	0	0.0
Sex	Female	120	52.9	543	37.4	18	72.0	18	50.0	0	0.0	17	63.0
	Male	107	47.1	910	62.6	7	28.0	18	50.0	1	100.0	10	37.0
	Unknown	1		7		0		0		0		0	
Ethnicity	European	169	75.4	961	68.2	17	85.0	24	72.7	0	0.0	Ethnicity data not collected	
	Maori	22	9.8	157	11.1	3	15.0	6	18.2	0	0.0		
	Pacific Peoples	14	6.3	135	9.6	0	0.0	2	6.1	0	0.0		
	Asian	15	6.7	133	9.4	0	0.0	1	3.0	0	0.0		
	Other	4	1.8	23	1.6	0	0.0	0	0.0	0	0.0		
	Unknown	4		51		5	85.0	3		1			
Overall	No. of cases and % of total substances[2]	**228**	**40.6**	**1460**	**53.0**	**25**	**20.0**	**36**	**5.2**	**1**	**12.5**	**27**	**10.1**

[1] Proportion (%) of total ethanol poisonings (for respective data source) where demographic (age group/sex/ethnicity) was known.
[2] Proportion (%) of total ethanol poisonings (for respective data source) where substance was known.

Table 25: HSNO Substances from Combined PHU Hospital Notification Data, 2008

Frequency[1]	Substances
30	Carbon monoxide
16	Hydrocarbon
13	Unspecified chemical
12	Hypochlorite
11	Methylated spirits
10	All purpose cleaner
8	Solvent
6	Dishwashing liquid, weed killer
4	Caustic soda
3	Ammonium hydroxide, chlorine, fly spray, paint
2	Antifreeze, glue, laundry powder, rodent killer, sodium chlorate, trichloroethylene
1	Air freshner, alkaline solution, ammonia, ammonium sulphate, ant killer, argon, benzalkonium chloride, carbaryl, carprofen, concrete polish, degreaster, dimethyl sulfoxide, drano, fabric softener, floor cleaner, fly strike powder, glyphosate, household fumigation fumes, hydrogen peroxide, isopropyl alcohol, kleer klenz acid, mercury, methanol, moss killer, nitrous oxide, pesticide, pool chemicals, silica, sodium bisulphate, trichloroisocyanuric acid, white spirit

[1] Total of 171 notifications involving approximately 51 HSNO substances

Table 26: HSNO Substances Injury Data from PHU, 2008

Demographics		PHU Notifications		
		No.	Rate	%[1]
Intent	Intentional	37	2.8	21.6
	Unintentional	55	4.2	32.2
	Indeterminate or Unknown Intent	79	6.1	46.2
Age Group	0-4	23	26.8	13.5
	5-14	1	0.6	0.6
	15-24	46	23.6	26.9
	25-44	58	14.3	33.9
	45-64	38	12.8	22.2
	65+	5	3.6	2.9
Sex	Female	71	10.7	41.5
	Male	100	15.8	58.5
Ethnicity	European	89	12.1	60.5
	Maori	21	20.1	14.3
	Pacific Peoples	16	16.7	10.9
	Asian	14	7.6	9.5
	Other	7		4.8
	Unknown	24		
Overall		**171**	**13.2**	

[1] Proportion (%) of total HSNO substance poisonings where demographic (age/sex/ethnicity) was known.

Table 27: Injury Claim Data from ACC, 2008

Demographics		ICD10 Primary Diagnosis Codes							
		J61	**J68[1]**	**L2[2]**	**T3[3]**	**T5[4]**	**T70.3**	**T96**	**T97**
Age group	0-4		≤3	0	112	60	0	≤3	
	5-14		5	0	10	22	0	0	
	15-24		8	0	22	54	0	0	
	25-44		11	4	34	74	5	≤3	
	45-64		9	≤3	18	34	≤3	≤3	
	65+		≤3	≤3	≤3	7	≤3	≤3	
Sex	Female		14	4	101	114	≤3	≤3	
	Male		23	4	97	137	5	≤3	
Ethnicity	European		16	4	141	161	5	≤3	
	Maori		7	0	36	42	≤3	≤3	
	Pacific Peoples		6	≤3	≤3	6	0	0	
	Asian		≤3	≤3	6	10	0	0	
	Other		4	0	9	16	≤3	≤3	
	Unknown		≤3	≤3	4	15	0	0	
Overall[5]		**0**	**37**	**8**	**198**	**251**	**7**	**5**	**0**

[1] J68.0 – J68.3
[2] L23.0 – L23.5, L23.7, L23.8, L24.0–L24.5, L24.7, L24.8, L25.0–L25.3, L25.5, L23.8, L27.0, L27.1
[3] T36.0 – T50.9
[4] T51.0 – T65.9
[5] Where counts are equal to 3, this could reflect a number between 1 and 3 and thus the overall total may not be the actual total of cases.

Table 28: CSO Chemical Injury Data by DHB, 2006 and 2007

DHB	2006					2007				
	"A"	"I"	"U"	Total	Rate[1]	"A"	"I"	"U"	Total	Rate[1]
Northland	1	7	0	8	5.4	1	5	1	7	4.7
Waitemata	4	16	0	20	4.2	2	4	2	8	1.7
Auckland	4	9	6	19	4.7	1	3	4	8	2.0
Counties Manukau	2	12	4	18	4.2	2	4	3	9	2.1
Waikato	3	11	3	17	5.0	2	1	3	6	1.8
Lakes	1	2	0	3	3.1	0	2	0	2	2.0
Bay of Plenty	0	6	0	6	3.1	0	4	1	5	2.6
Tairawhiti	0	1	0	1	2.3	0	0	0	0	0.0
Taranaki	1	3	2	6	5.8	0	2	1	3	2.9
Hawke's Bay	0	3	1	4	2.7	1	1	0	2	1.3
Whanganui	0	1	0	1	1.6	1	2	1	4	6.4
MidCentral	3	7	2	12	7.6	1	4	2	7	4.4
Hutt	0	2	1	3	2.2	1	1	1	3	2.2
Capital and Coast	1	7	2	10	3.8	3	3	6	12	4.5
Wairarapa	0	0	1	1	2.6	0	0	0	0	0.0
Nelson Marlborough	1	5	1	7	5.4	0	5	1	6	4.6
West Coast	0	2	1	3	9.6	0	0	0	0	0.0
Canterbury	15	15	8	38	8.1	4	11	3	18	3.9
South Canterbury	0	1	1	2	3.7	1	0	0	1	1.9
Otago	3	5	3	11	6.1	3	4	0	7	3.9
Southland	0	5	1	6	5.6	0	2	0	2	1.9
National	**39**	**120**	**37**	**196**	**4.9**	**23**	**58**	**29**	**110**	**2.7**

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

"A" = Accidental or Unintentional, "I" = Intentional and "U" = Unknown Intent

Table 29: CSO Chemical Injury Demographic Data, 2006 and 2007

Demographics		2006					2007				
		"A"	"I"	"U"	Total	Rate[1]	"A"	"I	"U"	Total	Rate[1]
Age Group	0-4	0	0	1	1	0.4	0	0	0	0	0.0
	5-14	1	0	0	1	0.2	0	0	1	1	0.2
	15-24	7	14	3	24	4.2	1	4	4	9	1.6
	25-44	17	47	15	79	7.0	14	23	10	47	4.1
	45-64	12	44	15	71	7.4	6	25	13	44	4.6
	65+	2	14	3	19	3.8	2	6	1	9	1.8
	Unknown	0	1	0	1		0	0	0	0	
Sex	Female	9	37	11	57	2.8	15	23	9	47	2.3
	Male	30	83	26	139	7.1	8	35	20	63	3.2
Ethnicity	European	31	103	29	163	6.1	17	45	21	83	3.1
	Maori	7	8	6	21	3.7	3	8	5	16	2.8
	Pacific Peoples	1	2	0	3	1.3	1	0	0	1	0.4
	Asian	0	4	0	4	1.2	0	1	1	2	0.6
	Other	0	0	0	0		2	2	0	4	
	Unknown	0	3	2	5		0	2	2	4	
National		**39**	**120**	**37**	**196**	**4.9**	**23**	**58**	**29**	**110**	**2.7**

[1] Rate calculated using 2006 Census data and expressed per 100 000 population. Caution advised when interpreting rates based on counts less than ten.

"A" = Accidental or Unintentional, "I" = Intentional and "U" = Unknown Intent

Table 30: CSO Chemical Injury Data by Substance Class[1], 2006 and 2007

Substance Class	2006		2007	
	No.	%[2]	No.	%[2]
Household/Domestic Chemicals[3]	93	50.0	39	38.2
Therapeutics	55	29.6	40	39.2
Chemical/Drugs of Abuse	33	17.7	21	20.6
Agrichemicals	5	2.7	1	1.0
Industrial Chemicals	0	0.0	1	1.0
Unknown	10		8	
Total	**196**		**110**	

[1] Substance class assigned using primary substance identified as involved in death.
[2] Proportion (%) of total substances (for respective year) where substance class was known.
[3] Includes carbon monoxide (vehicle exhaust).

Table 31: CSO Chemical Injury Data by Primary Substance[1], 2006 and 2007

Year	Unintentional		Intentional		Unknown		Total	
	Primary Substance (Top 5)	No.	Primary Substance (Top 4)	No.	Primary Substance (Top 4)	No.	Primary Substance (Top 5)	No.
2006	Morphine or Heroin	8	Carbon Monoxide	80	Ethanol (chronic)	6	Carbon Monoxide	84
	Methadone	7	Amitriptyline	6	Ethanol	4	Hydrocarbon	12
	Ethanol	5	Hydrocarbon	6	Methadone	4	Morphine or Heroin	12
	Hydrocarbon	4	Venlafaxine	3	Morphine or Heroin	3	Methadone	12
	Carbon Monoxide	2					Ethanol	9
	Primary Substance (Top 3)	No.	Primary Substance (Top 5)	No.	Primary Substance (Top 5)	No.	Primary Substance (Top 5)	No.
2007	Hydrocarbon	5	Carbon Monoxide	31	Ethanol (chronic)	6	Carbon Monoxide	32
	Morphine or Heroin	3	Hydrocarbon	5	Ethanol	4	Hydrocarbon	12
	Methadone	3	Codeine	4	Hydrocarbon	2	Codeine	7
			Dihydrocodeine	2	Codeine	2	Ethanol (chronic)	6
			Zopiclone	2	Methadone	2	Methadone	5

[1] Primary substance identified as involved in death where substance was known

Table 32: Demographics for CSO HSNO Substances, 2006 and 2007 Combined
Note: Where count of substance is not greater than one, details are not included in the table to protect privacy. Relevant substances include: clandestine methamphetamine laboratory chemicals, methylated spirits, paraquat, pentachlorophenol and diquat.

Characteristics	HSNO Substances		
	Carbon Monoxide	Hydrocarbon[1]	Cyanide
Number (primary substance[2])	116	24	3
DHB			
Northland	9	1	0
Waitemata	13	3	0
Auckland	4	2	0
Counties Manukau	10	3	1
Waikato	12	1	1
Lakes	4	0	0
Bay of Plenty	5	2	0
Tairawhiti	1	0	0
Taranaki	1	1	1
Hawke's Bay	2	0	0
Whanganui	0	0	0
MidCentral	11	1	0
Hutt	2	1	0
Capital and Coast	5	0	0
Wairarapa	0	0	0
Nelson Marlborough	6	1	0
West Coast	1	1	0
Canterbury	21	6	0
South Canterbury	0	0	0
Otago	5	1	0
Southland	4	0	0
Intent			
Intentional	111	11	2
Unintentional	2	9	0
Indeterminate/Unknown	3	4	1
Age			
0-4	0	1	0
5-14	0	2	0
15-24	12	7	0
25-44	45	6	1
45-64	43	4	1
65+	15	4	1
Unknown	1	0	0
Sex			
Female	27	7	1
Male	89	17	2

[1] Hydrocarbon includes petrol, turpentine, LPG, butane etc.
[2] Primary substance identified as involved in death

APPENDIX 2

Chemical category working definitions with examples:

- **Therapeutics**: Prescription or non-prescription drugs are included in this category even if they are used inappropriately (i.e. deliberately with intent to injure, or with intent to abuse but not injure).

- **Agrichemicals**: Includes pesticides and licensed veterinary medicines.

- **Industrial chemicals**: For instance, solvents and caustic chemicals used in an industrial or occupational setting. The same chemicals may also be found in the home (for example, isopropyl alcohol), and be covered under household/domestic.

- **Household/domestic chemicals**: cleansers, detergents, methylated spirits (accidents only), carbon monoxide, etc...

- **Chemicals/drugs of abuse**: Includes chemicals of addiction. Methylated spirits, ethanol, methadone, heroin, cocaine, methamphetamine, fantasy, ecstasy, etc…

- **Herbal remedies/dietary supplements**: vitamins, natural product remedies, etc…

- **Plants**: garden plants

- **Bites/Stings:** spider bites, bee stings

- **Other/Unknown**