A Comprehensive Chemical Injury Surveillance System for New Zealand

Outcome of a Pilot Study and Proposal for National Implementation

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EXECUTIVE SUMMARY

This report describes the further evolution of thinking and practice towards a chemical injury surveillance system for New Zealand. In particular it summarises the outcomes of the previous two proposals, discusses the concept of a comprehensive surveillance system, presents the results of a trial in the Auckland region and outlines a proposal for national implementation of a comprehensive chemical injury surveillance system (CCISS).

For policy and practice to be derived in as robust a manner as practical, any surveillance system must be able to make useful assessments of the burden of disease. One of the prerequisites for this, in the case of chemical injury, is that data sources should span the spectrum of hazard through exposure to outcome.

To this end, a system involving the collection and analysis of data from several sources was trialled in early 2003 for the Auckland region for the 12-month period ending 30 June 2002. The trialled system incorporated data from the national Coronial Services Office (CSO), National Poisons Centre (NPC), NZHIS and the Auckland Regional Public Health Service. In addition, approaches towards obtaining data from General Practitioners and Ambulance Services were investigated.

Despite a number of issues encountered, 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 combination of data sets allows for better understanding of the underlying causes and consequences of exposures to hazardous substances. In addition, the distribution of health ‘costs’ can also be better understood.

It is therefore proposed that the comprehensive system be implemented as the national chemical injuries surveillance system and extension of the system take place during the 2003/04 financial year.

It is recommended that CSO, NZHIS, NPC and PHS data continue to be incorporated into the surveillance system on an ongoing basis and that the data systems used by local GPs and Ambulance Services be periodically reviewed to reassess the feasibility of electronic data capture.

It should however be emphasised that what worked in Auckland may not be appropriate for other settings and that local circumstances will dictate local data quality and capture. The particular circumstances of each DHB will require various solutions to data capture challenges, as this national system becomes more refined. To assist in this, it is recommended that an on-line data entry system be developed to replace standalone local databases. In the current situation, this would enable more rapid data collection and analysis providing effective sentinel surveillance of hazardous substance related hospital attendance.

It is also proposed that the Internet site developed for the online data entry system be capable of extension to enable it to receive data transferred directly from hospitals. This Internet site would also function as the main data dissemination tool.

1. INTRODUCTION

In 2001, ESR was commissioned by the New Zealand Ministry of Health (MoH) to develop a national Chemical Injury Surveillance System (CISS). The primary legislative statute for the system being the requirement of Section 143 of the Hazardous Substances and New Organisms (HSNO) Act, 1996, which states that all hospitalisations from hazardous substance injury are to be notified to the Medical Officer of Health. The CISS is intended to encompass this requirement, and extend it to achieve the greatest public health utility. Reporting to the CISS is not a requirement, but it is one mechanism through which hospitals 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 Ministry of Health[1,2]), provides some definitions, and discusses national vs. sentinel surveillance, literature reviews and the current situation.

1.1. Objectives of the CISS

a) Improved local surveillance of chemical injuries, by collecting specific data on substance/product, circumstances, and specific susceptible groups, thus allowing for prioritising resources for interventions and facilitating investigations.

b) National surveillance of chemical injuries leading to the review of appropriate controls for certain products, and areas for intervention regarding particular target areas, including restriction of access to methods of suicide, reducing the number of childhood poisonings through reviewing CRP needs for certain products, and improving workplace practices leading to a reduced number of serious acute injuries from occupational settings.

1.2. Scope of the CISS

1.2.1. Inclusions

The system **is** intended to cover:

- Injuries (poisonings and chemical burns) caused by inappropriate use of therapeutic and non-therapeutic substances
- Hospital admissions (including short stay unit admissions and presentations to Emergency Departments)
- Fatalities where the primary toxicity of the substance was the cause of death
- Both intentional and unintentional exposures

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 (e.g. car crashes)
- Biological food poisoning (e.g. salmonellosis)

1.3. Definitions

"**Hospitalisation**": The Ministry of Health has interpreted "hospitalisations" to include all hospital attendances, irrespective of whether the patient is classed as an inpatient or outpatient. The Ministry 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, explosive, or corrosive property that meet pre-defined thresholds set by the Environmental Risk Management Authority (ERMA). For administrative reasons, certain substances are excluded from ERMA's jurisdiction, even though they are clearly hazardous under the definition of the Act, because they are regulated under different legislation. Examples of these are human therapeutic drugs in finished form, which are regulated by the Ministry of Health under the Medicines 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 Ministry of Health, 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 are included in the system, even though they are not regulated by ERMA per se.

"**Injury**": Has been defined by the Ministry in 2001 as "..any physical harm or damage serious enough to warrant medical treatment".

1.4. National vs. Sentinel Surveillance

Through discussions, it has been ascertained that the Ministry of Health would prefer a national rather than sentinel surveillance system, due to the regional, socioeconomic, and urban/rural variations in types of poisonings that occur.[3]

1.5. Literature Review

A comprehensive literature review of current and/or historical experiences of overseas and local agencies in this area was not an agreed part of this pilot study. The literature has been reviewed in a previous report to the Ministry of Health[2].

1.6. Current Situation

Since 2001, two approaches for obtaining hospital notification data have been assessed and trialled with varying success, one an email and paper based system[4] and the other an electronic system. Both approaches revealed a general deficiency in the processes relating to the rate of notification of hospital presentations by hospital to the local Public Health Service (PHS).

However, even if these approaches had been technically successful, the true burden of disease attributable to chemical injury in New Zealand would not have been assessed

as only a percentage of chemical injury cases are hospitalised. Many injuries are addressed in the home, sometimes with the assistance of advice from the National Poisons Centre (NPC), others (often chronic in nature) involve visits to General Practitioners (GP's), while further cases may result in death without any preceding contact with the health system.

To try and remedy this problem, a comprehensive surveillance system involving the collection and analysis of data from several sources is proposed. The proposed system incorporates data from sources such as the national Coronial Services Office (CSO), NPC, Ambulance Services, and GP's, in addition to hospital inpatient data (NZHIS) and hospital emergency patient data where available from Public Health Services (PHS). Thus the system would extend beyond the statutory requirements of the HSNO Act to provide a comprehensive data set on chemical mortality, morbidity, hazard and exposure for use in policy and interventions at both a local and a national level.

This concept of a comprehensive chemical injury surveillance system was trialled in early 2003 for the Auckland region, for deaths/injuries/exposures occurring between 1 July 2001 and 30 June 2002.

This report summarises the outcomes of the previous two proposals, discusses the concept of a comprehensive surveillance system in more detail, presents the results of the Auckland trial and outlines a proposal for national implementation of the comprehensive chemical injury surveillance system (CCISS).

2. OTHER APPROACHES TRIALLED TO DATE

Since being commissioned by the MoH in 2001 to develop a national Chemical Injury Surveillance System, ESR has been investigating processes for obtaining data from public hospitals. Prior to the current proposal for a comprehensive chemical injury surveillance system, two other approaches were investigated.

2.1. Paper and Email Based System

In July-December 2001 a paper and email based notification system, modelled on the national notifiable disease system (EpiSurv), was trialled in six Public Health Services around the country. Notification forms were to be filled in manually at hospital emergency departments by hospital staff and sent to Public Health Services where they were to be entered into local CISS software and sent as encrypted electronic files to ESR for collation at the national level. During this six-month pilot study, the level of notification varied greatly from region to region with only one (smaller) region providing sufficient data for subsequent analysis. Results of this study were reported to the MoH in June 2002.[4]

Follow up discussions with emergency department staff at the larger hospitals indicated a number of issues with this system, principal amongst which was the time required to enter the data on the paper based notification forms. As a result, an electronic system was proposed.

2.2. Electronic System

In 2002, ESR, in consultation with some PHS and hospital ED staff, pursued the concept of an electronic system. The initial suggestion was for an electronic system involving automatic transfer of selected and agreed patient management system screen details from the hospital system directly into a CISS form via a web based interface. Additional data not available from the patient management system was then to be entered via the Internet either by hospital or PHS staff. It was also proposed that the CISS website include a link with the National Poisons Centre's TOXINZ database to assist with product identification and provide an integrated internet tool allowing surveillance of injury and case management to be readily linked. A link to the TOXINZ database would also provide a mechanism for hospital staff to quickly choose a product corresponding to the substance, so that there was uniformity (and a minimum of typographical errors) in the collection of this information. The CISS data was to be stored on a secure server and be available for selective querying online.

After discussions primarily about resource requirements with hospital staff, this initial model was re-evaluated and a simpler (and less costly) model proposed. The new proposal was to involve the periodic extraction of selected patient management details from the hospital system for cases with ICD 10 codes that matched the CISS case definition. The resulting download would be sent to ESR for collation at the national level. Although no web-based interface would be required for the collection of the chemical injury data, dissemination of the results would still be via a password-protected site, thus enabling data queries and report generation by the end user. This model was to be trialled at Middlemore Hospital.

Initial discussions undertaken with senior Middlemore staff in August 2002 indicated that:

- All patients, including outpatients would be ICD 10 coded by January 2003.
- Basic demographic and event data (e.g. ethnicity, date of presentation, length of stay) currently captured electronically would be available for electronic extraction.
- Chemical substance (or brand name) would be obtainable by either extending an existing alert function within the patient management system for corrosive injuries or by asking clinical coders to enter the details from the patient notes.

However, further prolonged discussions over the next four months with clinical analysts and staff managing the coding department revealed that the ICD 10 coding of outpatients had been delayed, the alert field did not currently exist and obtaining substance details via the clinical coders would require substantial ongoing FTE funding which ESR was not in a position to provide. Hence the data that could be obtained would be no different to that collated by the New Zealand Health Information Service (NZHIS) as part of the National Minimum Data Set (NMDS). As a consequence the pilot did not go ahead.

In addition to discussing this proposed electronic system with Middlemore Hospital, a feasibility study was conducted to assess national variations in needs and capabilities with respect to an electronic system. Questionnaires (Appendix 1) were sent to 30 public hospitals. Replies were received from 14 hospitals. Overall, the general response was that this type of system could work but would require IT changes to existing patient management systems which would involve set up costs and/or ongoing funds to enable the data to be captured. So while it appears that with appropriate funding, an electronic system may be able to be implemented as hospitals update and renew their patient management systems, such a system is not likely to be functional in all hospitals in the near future without considerable additional funding.

2.3. Future of These two Approaches

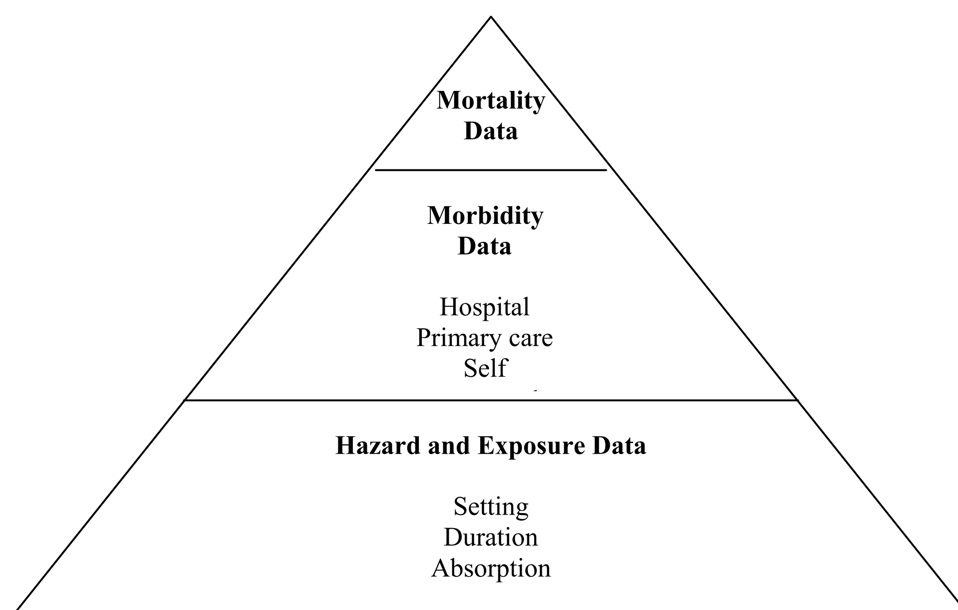
This is discussed in the section titled Proposal for National Implementation.

3. COMPREHENSIVE CHEMICAL INJURY SURVEILLANCE SYSTEM

3.1. Introduction

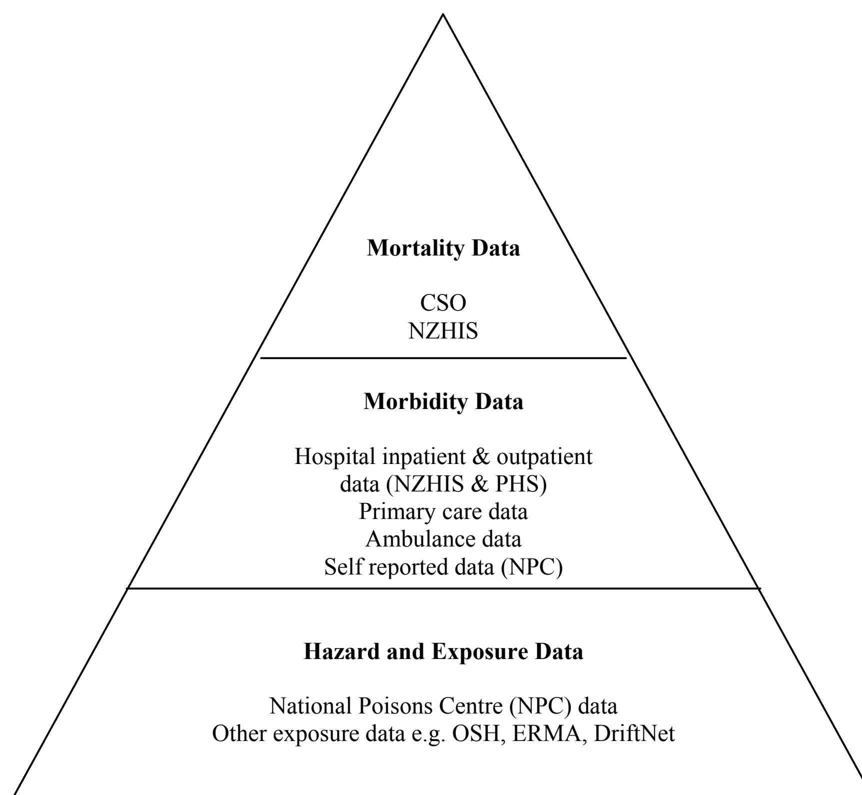
A comprehensive surveillance system monitors hazards, exposures and outcomes (mortality and morbidity), in addition to changes in associated risk factors. This can be illustrated diagrammatically (Figure 1):

Figure 1 The Comprehensive Surveillance System Pyramid



In order to obtain a comprehensive picture of the health effects attributable to hazardous substances/chemicals, each level of the pyramid needs to be included in a surveillance system. Because different health outcomes 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 GP and/or be hospitalised whilst others may die, data from several sources would need to be incorporated into a comprehensive surveillance system (Figure 2).

Figure 2 The Comprehensive Chemical Injury Surveillance System Pyramid



By implementing a surveillance system which looks at several health outcomes (as opposed to just hospital morbidity) plus exposure and hazard data, a better picture of the heath effects attributable to hazardous substances/chemicals can be gained. This will enable more relevant public health policies and interventions to be implemented. Thus the rational behind the applicable legislative requirement of the HSNO Act will be better met.

Attributes of the following data sources were investigated; Coronial Services Office, NZHIS, Public Health Services, Ambulance Service, Primary Care and the National Poisons Centre. Attributes of other exposure data from OSH, ERMA and DriftNet were not initially evaluated but have potential for future inclusion into the surveillance system.

3.2. Coronial Services Office (CSO) Data

Death is obviously the most severe outcome from a chemical exposure, therefore coronial data occupies the top of the pyramid. All deaths by acute chemical poisoning are deemed to be suspicious and thus should undergo a coroners inquest. Chronic deaths are less likely to be referred to the coroner. Those that are (predominately those due to alcoholism) usually do not undergo an actual inquest although a file is still compiled. Files for both acute and chronic deaths are stored at the national Coronial Services Office (CSO) in Wellington.

Case demographics, circumstances surrounding death including intent, and toxicology results are available from the physical reports. ESR has been manually collecting this data since 2001. It is now possible to obtain much of this data electronically. The exception is the toxicological data but avenues for obtaining this data directly from source are being explored. In the meantime it will continue to be collected manually.

While this data is currently being analysed and the results disseminated[5], the findings would be of greater value if evaluated in relation to morbidity and exposure data as proposed in the comprehensive chemical injury surveillance system.

The main drawback associated with the coronial data is timeliness. In many instances, delays occur due to the scientific and legal complexities involved in each case. It is estimated that by the end of a given year, approximately only 50% of cases for that year are available. By the end of the following year, it is anticipated that 90-95% of cases for the preceding year will be filed.

Some deaths will also be picked up through the NZHIS data. For details see next section (3.3).

3.3. NZHIS Data

Hospitals are required to provide the New Zealand Health Information Service (NZHIS) with data known as the National Minimum Data Set (NMDS) for all **inpatients**. This data, which must be sent for funding purposes, includes basic demographics, domicile code, event start and end details, and ICD 10 codes. Inpatients with ICD 10 codes of interest (see Table 21, Section 4.3.3) can be identified and the fields of relevance obtained from NZHIS.

There are several limitations associated with the NZHIS data. Firstly, only inpatients are captured. Technically, any patient who stays at a hospital for greater than three hours after being seen by a clinician should be classed as an inpatient. However this does not occur in practice, with likely differential admission practices based on severity of injury, case age, bed availability and home circumstances occurring. The Ministry of Health's interpretation of "admitted to hospital" (as required under HSNO) does not differentiate between inpatients and outpatients, and therefore a large number of pertinent cases are not captured by the NZHIS data.

The second limitation associated with the NZHIS data is that only generic information is available on any substances involved. For example, poisonings involving methylated spirits would not be distinguishable from poisonings involving ethanol as both would be coded under "alcohol".

Furthermore there is a time delay between presentation at hospital and availability of the data from NZHIS. Hospital events have to be reported to NZHIS within 21 days of the end of the month of discharge. NZHIS then have to process the data so it can be some time before the data is available to anyone outside NZHIS.

Finally the ICD-10-AM coding system is complex and inflexible with the current version the 10th since ICD coding was first used in 1901.

3.4. Public Health Services (PHS) Data

While the paper and email based system was not successful in the 2001 pilot, some Public Health Services do currently operate their own local surveillance systems based on this approach. The quality and quantity of data collected varies between PHS. While this system has poor sensitivity, any data collected would be able to be incorporated into the comprehensive system. The role of PHS within the comprehensive chemical injury surveillance system is discussed further in the Proposal for National Implementation section of this report.

3.5. Ambulance Services Data

As chemical injury events may involve ambulance call outs, ambulance services are another source of morbidity data. In New Zealand, the St John Ambulance Service provides nearly 90 per cent of the Nation's ambulance services. They receive approximately 200 phone calls per day, within the Auckland region alone. It is not known how many of these calls are chemical related.

Ambulance services collect two types of data. The first relates to computerised information collected during telephone calls to the ambulance service. The class of accident e.g. home, industrial etc is recorded and it may be possible to search the free text for key words such as 'chemical' or 'drug'.

The second type of data available is that collected in (paper) reports by ambulance officers. Any search for cases of chemical injury would have to be conducted manually. This would be a very labour intensive process and issues such as confidentiality would need to be addressed.

At this stage ambulance data is not available in an accessible form but it is proposed that options for obtaining this data continue to be investigated.

3.6. Primary Care Data

GP's are the most likely heath workers to see chemical injury cases that are of a chronic nature. An occasional paper prepared by The Royal New Zealand College of General Practitioners[6] published results from a survey involving 74 practices. Ninety seven percent of practices were computerised, 99% had an age/sex register and 74% collected ethnicity data on patients.

However, while demographic data may be available, identification of relevant cases would be problematic. Attribution of cause and effect would be subjective and influenced by the nature of the practice (traditional, non-orthodox). Another option would be to look for specific diagnoses but apart from some exceptions (e.g. mesothemioma) it is challenging as to what diagnoses one would select.

Obtainment of data from GPs has been trialled. Although due to wind up, GPSURV is a system developed by the Auckland Regional Public Health Service, working with local doctors to monitor four acute or episodic conditions and four chronic diseases: asthma, COPD, congestive heart failure, diabetes, gastro-enteritis, skin and subcutaneous tissue infection (cellulitis), influenza like illness, and depression. Since the beginning of 2001, an average of 18 doctors from seven practices have been participating in GPSURV. Doctors were asked to routinely record diagnoses (Read Codes) for all patient consultations where one of the eight target diagnoses is relevant to the consultation. Data on these consultations were automatically extracted, anonymised and sent to Auckland Regional Public Health Service via Healthlink.

However, the following issues pertaining to the current GPSURV system were identified in the Auckland Public Health Quarterly Report, January 2002, Vol. 8, Issue 1[7]:

- Patients in New Zealand may attend as many different doctors as they wish and not all doctors are currently participating in GPSURV. It is therefore difficult to know what the true population is to calculate incidence rates.

- Not all doctors within GPSURV practices record diagnosis codes and some record codes less frequently than others. Codes are recorded for a greater proportion of chronic disease visits than for visits associated with acute conditions.

- In many practices patients will often be seen by more than one doctor over time. It is therefore difficult to interpret data based on individual doctor rather than practice.

- The PMS (Patient Management System) used by GPSURV participants does not currently allow GPs to distinguish between new diagnoses and follow-up visits. GPSURV identifies new acute diagnoses by determining the interval between consecutive matching patients and diagnosis codes. When the interval is greater than 8 weeks the diagnosis is treated as new.

- These issues limit the usefulness of current comparisons between doctors and districts and affect the validity of absolute levels of illness occurrence.

It may be possible to trial the incorporation of chronic chemical injury as a condition of this or a similar system and extend its use to other regions around the country, but given the inherent nature of chronic chemical injuries and the issues surrounding GPSURV, this would require substantial more deliberation. In the meantime, the NPC data may serve as a reasonable proxy for primary care data.

3.7. National Poisons Centre (NPC) Data

Data on hazard and exposure can be extrapolated from the NPC. The NPC in Dunedin operates a 24 hours a day, 365 day per year telephone service that fields enquiries regarding **actual** or **potential** toxic exposures including general queries about potential toxic hazards in domestic, occupational and other settings. While there is no

requirement to phone the NPC in the event of a poisoning, about 21,000 phone calls are received per year, covering a range of different chemical exposures.

The NPC has developed a computerised database. A poisoning incident report format is used and each telephone call is logged into the database. Information on the patient, the caller, the site of exposure, the substance, incident details, and symptoms are recorded. In addition, the assessment and treatment advice given is also documented. The existing system is currently being upgraded (expected to be completed by 2004). The upgrade will include switching over to internationally recognised substance classification codes.

The data collected, which better than other sources represents the vast bulk of population level exposure, provides a very good base for a comprehensive national surveillance system.

The NPC also operates an Internet database known as TOXINZ. The system contains poisons management advice for over 60,000 chemical products, pharmaceuticals, plants and hazardous creatures. Users can subscribe to various levels (First Aid, Primary Management and Full Management). The system is being promoted in hospitals and database use can be queried by hospital. Although not included in the Auckland trial, this data could also be incorporated into the comprehensive surveillance system. Specifically, it has been suggested that it may be possible to assess emerging issues passively through monitoring website queries for specific substances.

4. RESULTS FROM THE PILOT OF THE COMPREHENSIVE SURVEILLANCE SYSTEM

4.1. Introduction

The concept of a comprehensive chemical injury surveillance system was trialled in early 2003 for the Auckland region (Waitemata, Auckland Central and Counties Manukau DHB's).

Data on chemical exposures, injury, and deaths between 1 July 2001 and 30 June 2002 for the Auckland region were obtained from the CSO, Auckland Regional Public Health Service (ARPHS), NZHIS and the NPC. In addition, approaches towards obtaining data from GP's and Ambulance Services were investigated, but not concluded in time for this report.

The data fields, which were available at the **national** level for each data source, are presented in Table 1.

Table 1 Data Fields Currently Available at the National Level for each Data Source[1]

Description of Field	CSO	ARPHS	NZHIS	NPC
Identifier	✓	✓	✓	✓
Date of death/incident/hospitalisation/notification	✓	✓	✓	✓
Town/City	✓	✓	✓	✓
DHB	✓	✓	✓	Can be derived
Date of birth or age	✓	✓	✓	✓
Ethnicity	✓	✓	✓	X
Sex	✓	✓	✓	✓
Intention	✓	✓	✓	✓
Occupation	✓	X	X	X
Pregnant or breastfeeding	X	X	X	✓
Admission details	N/A	✓	✓	N/A
Outcome	✓	✓	✓	X
Causes/circumstances or description of incident	✓	X	✓	✓
Assessment/treatment/advice	X	X	✓	✓
Substance name	✓	✓	X	✓
Substance class	✓	✓	✓	✓
Substance state	X	X	X	✓
Amount	X	X	X	✓
Route	X	X	X	✓
Acute/chronic	✓	X	X	✓
Notifying hospital	N/A	✓	✓	N/A
Coroner	✓	N/A	N/A	N/A
Caller details	N/A	N/A	N/A	✓

[1] Additional fields are available at the local level, for example ARPHS also collects name, address and NHI number. The ARPHS database contains the following fields but they are only completed for between <1% to 15% of cases; hospital doctor, place, date of discharge, container type, child resistant, referred & action. The field 'patient weight' is available in the NPC database but is only completed for 17% of cases.

4.2. Summary of Key Statistics

4.2.1. CSO Data

- A total of 63 deaths from chemical exposures occurred during this period – a rate of 5.4 deaths per 100 000 population.
- 68% (43/63) of these deaths were deemed intentional by the coroner. The remaining 32% (20 deaths) were deemed unintentional (intent based on outcome).
- The 30-59 year age group accounted for the greatest number of deaths (45/63) and the highest rate (9.2 per 100 000).
- Males accounted for 71% of deaths (rate 7.9 per 100 000).
- 78% (49/63) deaths were of European ethnicity (rate 7.1 per 100 000).
- All Maori deaths were deemed unintentional.
- Carbon monoxide was the leading cause of intentional deaths (27).
- Morphine, heroin or a combination of the two was the leading cause of unintentional deaths (7).

4.2.2. ARPHS Data

- Ninety one percent of notified cases (1546/1696) were from Auckland Hospital.
- No cases were notified from Middlemore Hospital and notifications from North Shore and Starship hospitals were low. Estimated 1240 un-notified cases.
- Rate for Auckland Central DHB of 420.4 per 100 000.
- 60% of total notifications classified as intentional, 32% as indeterminate, and 7% as unintentional (intent based on exposure, not necessarily on intent to injure).
- Age specific rates (calculated for Auckland Central DHB only) were highest in the 15-29 year age group (841.0 per 100 000) but absolute numbers were similar to those in the 30-59 year age group (744 and 725 cases respectively).
- Rates and number of cases were similar between males and females.
- The number of cases by ethnic group was highest for cases of European ethnicity (1048/1696, 61.8% for all notifications and 1020/1546, 66% for Auckland Hospital notifications).

- The number of actual Auckland Hospital notifications for Maori (136) is very close to that for Asian people (138) although the Asian rate (218.2 per 100 000) is less than half that for Maori (466.7 per 100 000).
- Over three quarters of cases were seen in ED only and not admitted.
- Ethanol was the most common substance, followed by paracetamol and GHB.
- Ethanol was the leading substance for cases classified as intentional and indeterminate (exposure) intent. The top unintentional substance was isocyanate.

4.2.3. NZHIS Data

- 2479 poisonings – a rate of 211.3 per 100 000 population.
- 1461 (59%) cases coded as intentional, 1018 (41%) as unintentional.
- Eleven deaths recorded.
- Highest overall and intentional age specific rate amongst 15-29 year olds (335.4 and 222.8 per 100 000 respectively), highest unintentional rate among 0-4 year olds (224.4 per 100 000).
- Greatest number of cases overall and for both intents amongst 30-59 year olds.
- 62% of cases were females, with the highest proportion (69%) amongst intentional cases where females outnumbered males in all age groups.
- Maori had the highest overall rate (247.3 per 100 000), followed by Europeans (who had the highest number of cases – 1587).
- Highest unintentional rate was amongst Maori (123.6 per 100 000) but the number of cases for Maori was the same for unintentional and intentional.
- Average length of stay in hospital was 2 days (38% stayed for less than 1 day).
- The largest number of intentional poisonings (857) were coded to 'antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified'.
- Unintentional poisonings were highest for 'other and unspecified drugs, medicaments and biological substances' (291 cases).

4.2.4. NPC Data

- 3840 calls (classified as human poisoning/exposure).
- Virtually all of the calls related to acute poisoning/exposure (98.8%).

- The reason for nearly two thirds of the NPC calls was ‘child exploration’. For the remainder, the ratio of unintentional to intentional cases was 4:1.
- The majority of calls involved cases aged 0-4 years (2238 cases, 58.3% of cases where exact age was known).
- The number of male and female cases was similar (1824 vs. 1749 respectively).
- Home was the exposure site for over 90% of the calls.
- Household and therapeutic agents accounted for nearly 70% of calls.
- Just under half of the substances were liquids (1670). A further 19% were capsules/tablets.

4.3. Detailed Analysis

4.3.1. CSO Data

Tables 2 to 11 relate to Coronial Services Office data for the Auckland region for the period 1 July 2001 to 30 June 2002.

A total of 63 cases from the Auckland region with a date of death between 1 July 2001 and 30 June 2002 were filed at the Coronial Services Office as of 28 January 2003 giving a death rate for the Auckland region of 5.4 per 100 000 population. It must be remembered the coronial data is not complete, as coronial cases can take up to 2 years to be filed at the Coronial Services Office.

The case numbers and rates were similar between the three District Health Boards.

The number of deaths per month varied from nine (14.3%) in November to one (1.6%) in February with an average of 5.25 deaths per month over the 12 month period.

Forty-three (68.3%) of the 63 deaths were deemed intentional by the coroner (Table 2). The remaining 20 (31.7%) were classed as non-intentional (accidental). (Note that intent for coronial data is based on outcome, as opposed to exposure).

There were no deaths amongst infants, toddlers, or the 5-14 year age group (Table 2). The highest number of deaths (45/63, 71.4%) and rate (9.2 per 100 000) was in the 30-59 year age group, where two thirds (30/45, 66.7%) of the deaths were male (rate 12.7 per 100 000) (Table 5). Overall, males accounted for 71.4% (45/63) of the fatalities (Table 3).

Seventy eight percent (49/63) of the deaths were of European ethnicity (rate 7.1 per 100 000) (Table 4). As number of cases for the remaining ethnicities are low, care should be taken when interpreting the associated rates. Although the numbers are small, all Maori deaths were deemed unintentional while the ratio of unintentional to intentional deaths among Europeans was almost 1:3.

Table 2 Deaths by Age & Intent

Age Group	Intentional	Un-intentional	Total	Rate[1]
0-4	0	0	0	0.0
5-14	0	0	0	0.0
15-29	10	4	14	5.5
30-59	30	15	45	9.2
60+	3	1	4	2.5
Unknown	0	0	0	-
TOTAL	**43**	**20**	**63**	**5.4**

Table 3 Deaths by Sex & Intent

Sex	Intentional	Un-intentional	Total	Rate[1]
Male	27	18	45	7.9
Female	16	2	18	3.0
TOTAL	**43**	**20**	**63**	**5.4**

Table 4 Deaths by Ethnic Group and Intent

Ethnic Group[2]	Intentional	Un-intentional	Total	Rate[1]
European	36	13	49	7.1
Maori	0	2	2	1.5
Pacific People	2	3	5	3.6
Asian	2	0	2	1.4
Other	1	0	1	-
Unknown	2	2	4	-
TOTAL	**43**	**20**	**63**	**5.4**

Table 5 Deaths by Age & Sex

	Age Category					
Sex	**5-14**	**15-29**	**30-59**	**60+**	**Unk**	**Total**
Male	0	11	30	4	0	45
Female	0	3	15	0	0	18
TOTAL	**0**	**14**	**45**	**4**	**0**	**63**

[1]Rate is expressed per 100 000 population and is calculated using 2001 Census data
[2]Ethnicity was obtained by Coronial Services staff from either the post mortem report or Police 47 report. If not in either of these reports, it was determined by staff from the briefs of evidence. If a discrepancy occurred between reports, the Coronial Service staff contacted the coroner for clarification.

Persons classified as unemployed (13, 20.6%), trades (9, 14.3%) and beneficiary (7, 11.1%) accounted for nearly half of the fatalities.

A total of 121 substances were involved in the 63 deaths. Most deaths involved either one (47.6%) or two (34.9%) substances. More than one substance was involved in just over half of the deaths (33/63, 52.4%). The greatest number of substances involved with a death was seven (one instance).

A summary of the substance class data is given in Table 6. Nearly half of these substances were therapeutics (53, 43.8%). Household/domestic substances and chemicals/drugs of abuse were second and third respectively. Together these three classes accounted for 100% of the substances involved in the fatalities. Carbon monoxide accounted for 82.3% (29/35) of the substances classified as household/domestic.

Note: some substances, most notably morphine, can be considered both therapeutic and drug of abuse. For this analysis morphine is classified as a drug of abuse.

Table 6 Substance Class Frequencies

Substance Class	No. of Occurrences	% of Total
Therapeutics	53	43.8
Household/Domestic	35*	28.9
Chemical/Drugs of Abuse	33	27.3
Agrichemicals	0	0.0
Herbal Remedy/Dietary Supplement	0	0.0
TOTAL	**121**	**100**

* Includes 29 cases of carbon monoxide poisoning

There were a total of 41 distinct substances identified from the total 121 reported substances. The most common substances were carbon monoxide (29 cases), ethanol (20), and morphine & morphine/heroin (9) (Table 7).

There were 21 different primary substances identified (substance primarily, but not necessarily singly involved in fatality) (Table 8). Again the most common was carbon monoxide (29 cases), followed by morphine, heroin, or a combination of the two (8) and methadone (4).

In all of the deaths involving carbon monoxide, carbon monoxide was found to be the primary substance (29/29, 100%). Similarly, in all of the deaths involving methadone, methadone was found to be the primary substance (4/4, 100%) and for the deaths involving morphine, heroin or a combination of the two, only in one instance was morphine, heroin or a combination of the two, not the primary substance. By comparison, in only one of the 20 deaths involving ethanol, was ethanol found to be the primary substance.

Table 7 Substances (Total) involved in Deaths

Frequency	Total Substances
29	Carbon Monoxide
20	Ethanol
9	Morphine, Heroin, Morphine/Heroin
4	Dextropropoxyphene/Paracetamol, Diazepam, Fluoxetine, Methadone
3	Amitriptyline, Dothiepin, Zopiclone
2	Benzene/Toluene (Petrol), Citalopram, Clonazepam, Nortriptyline, Temazepam, Marijuana, Triazolam
1	Amphetamine, Atracurium, Boric Acid, Carbamazepine, Chlorpheniramine, Chlorpromazine, Clozapine, Codeine, Ethanol/Methanol (Methylated Spirits), Methamphetamine, Methanol, Mexilitine, Olanzapine, Oxazepam, Paracetamol, Paroxetine, Pethidine, Prochlorperazine, Propanolol, Propofol, Pseudoephedrine, Risperidone, Turpentine, Venlafaxine

Table 8 Primary Substances involved in Deaths

Frequency	Primary Substance
29	Carbon Monoxide
8	Morphine, Heroin, Morphine/Heroin
4	Methadone
3	Dextropropoxyphene/Paracetamol
2	Benzene/toluene (petrol), Nortriptyline
1	Amitriptyline, Boric Acid, Carbamazepine, Chlorpromazine, Clozapine, Dothiepin, Ethanol, Methanol, Mexilitine, Paracetamol, Pethidine, Propanolol, Propofol, Triazolam, Turpentine

Carbon monoxide was the leading cause of intentional deaths (only 2/29, 6.9% were deemed unintentional) (Table 9). The leading cause of unintentional deaths was morphine, heroin or combinations of the two. Only one of eight deaths involving morphine, heroin or a combination of the two was deemed intentional.

Table 9 Top 4 Primary Substances for each Classification of Intent[1]

Intentional	Unintentional
Carbon Monoxide (27)	Morphine, Heroin, Morphine/Heroin (7)
Nortriptyline (2)	Methadone (3)
Benzene/toluene (2)	Dextropropoxyphene/ Paracetamol (2)
Remaining 12 primary substances (1)	Carbon Monoxide (2)

[1]Number of instances in brackets

The primary substances involved in chemical injuries by gender is presented in Table 10. A noticeable trend for all substances presented, with the exception of methadone, is that males had higher counts than females (males accounted for between 79% and 100% of the fatalities). However, the distribution of methadone deaths by sex was 1:1.

Table 10 Primary Substances (Top 4) by Gender

	Gender		
Primary Substance	**Male**	**Female**	**Total**
Carbon Monoxide	23	6	29
Morphine, Heroin, Morphine/Heroin	7	1	8
Methadone	2	2	4
Dextropropoxyphene/Paracetamol	3	0	3
TOTAL	**35**	**9**	**44**

The 30-59 year age group accounted for 69.0% (20/29) of the carbon monoxide cases (Table 11).

Table 11 Primary Substances (Top 4) by Age

	Age Group					
Primary Substance	**0-14**	**15-29**	**30-59**	**60+**	**Unk**	**Total**
Carbon Monoxide	0	7	20	2	0	29
Morphine, Heroin, Morphine/Heroin	0	2	6	0	0	8
Methadone	0	2	2	0	0	4
Dextropropoxyphene/Paracetamol	0	0	3	0	0	3
TOTAL	**0**	**11**	**31**	**2**	**0**	**44**

4.3.2. ARPHS Data

Tables 12 to 20 relate to Auckland Regional Public Health Service notification data for the period 1 July 2001 to 30 June 2002.

A total of 1696 poisoning cases that presented at the Auckland region hospitals between 1 July 2001 and 30 June 2002 were notified to the Auckland Regional Public Health Service (ARPHS) as of 11 February 2003. While 1546 cases (91.2%) were notified from Auckland Hospital, only 144 cases (8.5%) were notified from North Shore Hospital and no cases were notified from Middlemore Hospital. Only six cases were notified from Starship Hospital.

Middlemore ceased notifying cases to ARPHS part way through 2001. ARPHS also suspect that North Shore is not notifying all applicable cases. During 1999 and 2000 Auckland Hospital accounted for (on average) 57.9% of the total Auckland cases, North Shore 14.9% and Middlemore 27.3%. Based on this historical data, and assuming that the trend is the same, it is estimated that approximately 720 cases should have been notified from Middlemore Hospital and 400 cases from North Shore Hospital during the year 1 July 2001 till 30 June 2002. In addition, it is estimated that Starship Hospital treats about 270 poisoning cases per year, a large proportion of which are not notified. Had all these cases been notified, it is estimated that the total number of cases would be around 2936.

Due to the lack of notifications received from Middlemore, North Shore and Starship hospitals, results are presented both for the combined ARPHS notification dataset and Auckland Hospital. However, rates have only been calculated for Auckland Hospital, using the Auckland Central DHB population data as the denominator. Age specific rates have not been calculated for 0-14 years since it is expected that most of this age group would have attended Starship.

The overall rate for Auckland Central DHB is 420.4 per 100 000. There were no deaths reported from any of the Auckland hospitals.

Based on the date of hospital attendance (as opposed to date notified to ARPHS), the number of cases by month for all notifications and those for Auckland Hospital only, was fairly constant throughout the year. December had the greatest number of cases followed by October and June. The least number of cases occurred in April.

Of the 1696 total notifications, 1020 (60.1%) were classified as intentional, 550 (32.4%) as indeterminate intent and only 112 (6.6%) as unintentional. A further 14 cases did not have the intent recorded. The figures were very similar for the Auckland Hospital notifications (59.1% intentional, 33.4% indeterminate, 6.7% unintentional, 0.8% unknown intent). Note that intent is determined by ARPHS staff and is based on exposure as opposed to outcome. ARPHS cases involving alcohol are usually classed as indeterminate.

Age specific rates (calculated for Auckland Hospital notifications only) were highest in the 15-29 year old age group (841.0 per 100 000, 744 cases) (Table 12). However, the absolute number of cases was only slightly greater than that for the 30-59 year old age group (725 but corresponding age specific rate of 464.3 per 100 000).

Table 12 Notifications by Age & Intent

Age Group	Intentional	Un-intentional	Indeterminate Intention	Intent Not Recorded	Total	Rate[1]
0-4	0 (0)	6 (0)	1 (0)	0 (0)	7 (0)	-
5-14	2 (1)	0 (0)	4 (0)	0 (0)	6 (1)	-
15-29	492 (437)	38 (36)	275 (260)	12 (11)	817 (744)	(841.0)
30-59	480 (437)	57 (56)	242 (231)	1 (1)	780 (725)	(464.3)
60+	42 (35)	11 (11)	27 (24)	1 (1)	81 (71)	(140.0)
Unknown	4 (4)	0 (0)	1 (1)	0 (0)	5 (5)	-
TOTAL	**1020 (914)**	**112 (103)**	**550 (516)**	**14 (13)**	**1696 (1546)**	**(420.4)**

() Auckland Hospital data only
[1]Rate is expressed per 100 000 population and is calculated using 2001 Census data. Rates are only calculated for Auckland Hospital data (using Auckland DHB as the denominator) due to the lack of notifications from North Shore and Middlemore Hospitals. Rate for 0-4 and 5-14 year olds has not been calculated because of the low numbers notified in these age groups.

In contrast to the CSO findings, the number of cases by gender for the ARPHS notifications were distributed more evenly between the two sexes although there were slightly more female cases (916, 54% for all notifications, 806, 52% for Auckland Hospital notifications). Consequently the rate for Auckland Hospital notifications was also slightly higher for females than males (424.8 per 100 000 vs. 414.6 per 100 000 respectively) (Table 13).

When taking intent into account, females had higher numbers of intentional, unintentional and 'intent not recorded' cases, for both total notifications and Auckland Hospital notifications. Males accounted for 54% of the total notifications classified as indeterminate intention cases and 55% of the indeterminate Auckland Hospital notifications.

Table 13 Notifications by Sex & Intent

Sex	Intentional	Un-intentional	Indeterminate Intention	Intent Not Recorded	Total	Rate[1]
Male	430 (404)	45 (44)	297 (284)	6 (6)	778 (738)	(414.6)
Female	590 (510)	67 (59)	251 (230)	8 (7)	916 (806)	(424.8)
Unknown	0 (0)	0 (0)	2 (2)	0 (0)	2 (2)	-
TOTAL	**1020 (914)**	**112 (103)**	**550 (516)**	**14 (13)**	**1696 (1546)**	**(420.4)**

() Auckland Hospital data only
[1]Rate is expressed per 100 000 population and is calculated using 2001 Census data. Rates are only calculated for Auckland Hospital data (using Auckland DHB as the denominator) due to the lack of notifications from North Shore and Middlemore Hospitals.

Age by sex data (Table 14) shows that the ratio of female to male cases is very similar across the three main age groups (15-29, 30-59 and 60+ years).

Table 14 Notifications by Age & Sex

	Age Category						
Sex	**0-4**	**5-14**	**15-29**	**30-59**	**60+**	**Unk**	**Total**
Male	2 (0)	2 (0)	341 (322)	392 (379)	37 (33)	4 (4)	778 (738)
Female	5 (0)	4 (1)	475 (421)	387 (345)	44 (38)	1 (1)	916 (806)
Unknown	0 (0)	0 (0)	1 (1)	1 (1)	0 (0)	0 (0)	2 (2)
TOTAL	**7 (0)**	**6 (1)**	**817 (744)**	**780 (725)**	**81 (71)**	**5 (5)**	**1696 (1546)**

() Auckland Hospital data only

The number of cases by ethnic group was highest for cases of European ethnicity (1048/1696, 61.8% for all notifications and 1020/1546, 66% for Auckland Hospital

notifications). The highest ethnicity specific rate (Auckland Hospital notifications) was for Europeans (494.0 per 100 000), closely followed by Maori (466.7 per 100 000). The number of actual Auckland Hospital notifications for Maori (136) is very close to that for Asian people (138) although the Asian rate (218.2 per 100 000) is less than half that for Maori.

The percentage of total notifications classed as intentional and indeterminate was similar for cases of European, Maori and Asian ethnicity (average of 61.7% for intentional cases and 30.2% for indeterminate) (Table 15). By contrast, only 36% of Pacific Peoples cases were classed as intentional while 50% were classed as indeterminate. Percentages for unintentional cases ranged from 5% for Europeans to 19.6% for Pacific Peoples (average 10%). The trends were similar for Auckland Hospital notifications.

Table 15 Notifications by Ethnic Group and Intent

Ethnic Group	Intentional	Un-intentional	Indeterminate Intention	Intent Not Recorded	Total	Rate[1]
European	662 (642)	51 (48)	327 (322)	8 (8)	1048 (1020)	(494.0)
Maori	80 (79)	14 (14)	40 (40)	3 (3)	137 (136)	(466.7)
Pacific People	40 (35)	21 (21)	48 (48)	0 (0)	109 (104)	(238.3)
Asian	88 (86)	8 (8)	43 (43)	1 (1)	140 (138)	(218.2)
Other	18 (18)	2 (2)	12 (12)	0 (0)	32 (32)	-
Unknown	132 (54)	16 (10)	80 (51)	2 (1)	230 (116)	-
TOTAL	**1020 (914)**	**112 (103)**	**550 (516)**	**14 (13)**	**1696 (1546)**	**(420.4)**

() Auckland Hospital data only
[1]Rate is expressed per 100 000 population and is calculated using 2001 Census data. Rates are only calculated for Auckland Hospital data (using Auckland DHB as the denominator) due to the lack of notifications from North Shore and Middlemore Hospitals.

The majority of total and Auckland Hospital notifications (75.6% and 77.5% respectively) were not admitted to hospital.

Two thirds of the notifications (total and Auckland Hospital) involved only one substance.

The substance classes used by the ARPHS are more extensive than those for the CSO and NPC data. Substances classed as alcohol, stimulants and street drugs, sedatives/ hypnotics/antipsychotics and analgesics accounted for three-quarters of the total substances associated with both the total notifications and Auckland Hospital notifications (Table 16).

There were 2623 substances comprising over 200 different substances involved with the 1696 total notifications and 2381 substances associated with the 1546 Auckland Hospital notifications. The top five individual substances (excluding unknown drugs) for the total notifications were ethanol (879 cases, 33.5%), paracetamol (155, 5.9%), gamma-hydroxybutyrate (131, 5.0%), zoplicone (107, 4.1%) and marijuana (63, 2.4%) (Table 17). The same top five substances feature in the Auckland Hospital notifications although there were more notifications involving gamma-hydroxybutyrate than paracetamol (131 and 118 respectively). While none of these substances featured in the top five primary CSO substances, ethanol was the second most common CSO substance overall.

Table 16 Substance Class Frequencies for Total Notifications

Substance Class	No. of Occurrences	% of Total
Alcohol	879	33.5
Stimulants and street drugs	413	15.7
Sedative/hypnotics/antipsychotics	358	13.6
Analgesics	336	12.8
Antidepressants	194	7.4
Fumes	76	2.9
Anticonvulsants	75	2.9
Unknown drugs	51	1.9
Fuel	30	1.1
Miscellaneous drugs	27	1.0
Household Cleaner	22	0.8
Cardiovascular drugs	20	0.8
Antimicrobials	20	0.8
Gastrointestinal preparations	18	0.7
Antihistamines	18	0.7
Cough and cold preparations	12	0.5
Household Chemical	10	0.4
Anticholinergic drugs	10	0.4
Hormones/ hormone antagonists	8	0.3
Vitamins	8	0.3
Insecticide	7	0.3
Personal Care	6	0.2
Solvent	4	0.2
Home Chemical	3	0.1
Herbicide	3	0.1
Pesticide	3	0.1
Asthma therapies	2	0.1
Miscellaneous Substances	2	0.1
Plant	2	0.1
Heavy Metal	2	0.1
Diuretics	1	0.0
Industrial chemical	1	0.0
Anticoagulants	1	0.0
Radiopharmaceuticals	1	0.0
TOTAL	**2623**	**100**

Table 17 Top 30 Substances involved in all Notifications

Frequency	Total Substances
879	Ethanol
155	Paracetamol
131	Gamma-hydroxybutyrate (GHB)
107	Zopiclone
77	Unknown drugs
63	Marijuana
60	Ecstasy
53	Methamphetamine
52	Clonazepam
51	Paroxetine
39	Ibuprofen
36	Opiates (morphines, heroin, homebake, opium)
34	Diazepam
31	Isocyanate
30	Triazolam
28	Amitriptyline, Methylated Spirits, Nortriptyline, Risperidone
27	Fluoxetine, Temazepam
24	Citalopram
22	Lorazepam
21	Diclofenac
20	Amphetamines
19	Dextropropoxyphene/Paracetamol
18	Chlorpromazine
17	Aspirin, Codeine
14	Solvent Inhalation

For all notifications and Auckland Hospital notifications only, ethanol was the leading substance for cases classified as intentional and indeterminate intent. The top unintentional substance was isocyanate (Table 18).

Table 18 Top 5 Substances for each Classification of Intent for Total Notifications[1]

Intentional	Unintentional	Indeterminate Intention	Intent Not Recorded
Ethanol (394)	Isocyanate (31)	Ethanol (476)	Ethanol (4)
Paracetamol (141)	Ammonium hydroxide 3 (13)	GHB (12)	GHB (4)
GHB (115)	Chlorine gas inhalation (9)	Ecstasy (10)	Ecstasy (3)
Zopiclone (101)	Ethanol (5)	Marijuana (9)	Methamphetamine (2)
Marijuana (52)	Paracetamol (5) Smoke inhalation from burning vehicle (5)	Paracetamol (8)	Clonazepam (2)

[1]Number of instances in brackets

Eighty percent (124/155 of total notifications and 95/118 Auckland Hospital notifications) of the cases involving paracetamol were female (Table 19).

Table 19 Top 5 Substances by Sex for Total Notifications

	Sex			
Substance	**Male**	**Female**	**Unknown**	**Total**
Ethanol	461	416	2	879
Paracetamol	31	124	0	155
Gamma-hydroxybutyrate	80	51	0	131
Zopiclone	42	65	0	107
Marijuana	38	25	0	63
TOTAL	**652**	**681**	**2**	**1335**

For total notifications, three of the seven cases among the 0-4 year old age group involved paracetamol while 70% of the paracetamol cases were aged 15-29 (Table 20). Just over half of the ethanol cases were aged 30-59.

Table 20 Top 5 Substances by Age for Total Notifications

	Age Group						
Substance	**0-4**	**5-14**	**15-29**	**30-59**	**60+**	**Unk**	**Total**
Ethanol	0	4	387	450	36	2	879
Paracetamol	3	2	108	35	5	2	155
Gamma-hydroxybutyrate	0	0	94	34	0	3	131
Zopiclone	0	0	27	73	7	0	107
Marijuana	0	0	46	16	1	0	63
TOTAL	**3**	**6**	**662**	**608**	**49**	**7**	**1335**

4.3.3. NZHIS Data

Tables 21 to 28 relate to NZHIS data for the Auckland region for the period 1 July 2001 to 30 June 2002.

Discharge data for publicly funded hospitals was obtained from NZHIS for people domiciled in the Waitemata, Auckland and Counties-Manakau DHB regions between 1 July 2001 and 30 June 2002. While the overall data request included all events with any of the codes in Table 21, only records where the first five external cause codes included X40-49 (Accidental poisonings) and X60-69 (Intentional poisonings) have been analysed in detail (2479 cases). These are the codes that NZHIS use to derive their published data on national poisonings.

Of the 2479 poisoning cases analysed, 1461 (58.9%) were coded as intentional, the remaining 1018 as accidental (term unintentional to be substituted from herein). Eleven events resulted in death.

Table 21 Number of Cases by ICD 10 Code

ICD 10 Codes	Code Description	Number[1]
External cause codes		
X60 – 69	*Intentional self-poisoning*	*1461*
X40 – 49	*Unintentional poisoning by and exposure to noxious substances*	*1018*
Y10 – Y19	Poisoning, undetermined intent	41
Y90, Y91	Evidence of alcohol involvement determined by blood alcohol level or level of intoxication	6
Toxic effect codes		
T36 - T50	Poisoning by drugs, medicaments and biological substances	2109
T51 - T65, excluding T61	Toxic effects of substances chiefly nonmedicinal as to source excluding noxious substances eaten as seafood	887
T96	Sequalae of poisoning by drugs, medicaments and biological substances	10
T97	Sequalae of toxic effects of substances chiefly nonmedicinal as to source	3
Other codes		
F10 - F19 with fourth digit 2 except F17	Dependence syndromes due to psychoactive substance abuse, excluding use of tobacco	1403
Z86.41 and Z86.42	Personal history of alcohol use disorder or drug use disorder	289
External cause code for adverse effects in therapeutic use[2]		
Y40 – 59	Drugs, Medicaments and biological Substances causing adverse effects in therapeutic use	5223
Y88.0 (therapeutic only)	Sequalae of adverse effects caused by drugs, medicaments and biological substances in therapeutic use	3
TOTAL		**9321**

[1] These numbers have been determined from analysis of the first 15 diagnostic codes and the first five external cause codes only. By comparison, the overall total was derived from all the available codes. In addition, the codes are not mutually exclusive. Hence the sum of each groups of codes does not equal 9321.

[2] These codes would not normally form part of the surveillance system but have been included on this occasion out of interest.

The largest number of intentional poisonings (857) was coded to ‘antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified’ (X61) (Table 22). Intentional poisoning by alcohol was ranked third (319 cases).

Table 22 Number of Cases by External Cause Codes for Intentional Poisoning

ICD 10 Code	Description - Intentional poisoning by and exposure to:	Number (First E code only)	Number[1] (First 5 E codes)
X60	Nonopioid analgesics, antipyretics and antirheumatics	372	486
X61	Antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified	693	857
X62	Narcotics and psychodysleptics [hallucinogens], not elsewhere classified	52	114
X63	Other drugs acting on the autonomic nervous system	12	50
X64	Other and unspecified drugs, medicaments and biological substances	139	264
X65	Alcohol	47	319
X66	Organic solvents and halogenated hydrocarbons and their vapours	6	8
X67	Other gases and vapours	47	56
X68	Pesticides	18	22
X69	Other and unspecified chemicals and noxious substances	34	50
TOTAL		**1420**	**1461**

[1] The codes are not mutually exclusive. Hence the sum of the individual codes does not equal 1461.

Unintentional poisonings were highest for X44 – ‘other and unspecified drugs, medicaments and biological substances’ (291 cases) (Table 23). Unintentional poisoning by alcohol ranked fifth (130 cases).

Table 23 Number of Cases by External Cause Codes for Unintentional Poisoning

ICD 10 Code	Description - Unintentional poisoning by and exposure to:	Number (First E code only)	Number[1] (First 5 E codes)
X40	Nonopioid analgesics, antipyretics and antirheumatics	125	141
X41	Antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified	224	259
X42	Narcotics and psychodysleptics [hallucinogens], not elsewhere classified	55	80
X43	Other drugs acting on the autonomic nervous system	28	35
X44	Other and unspecified drugs, medicaments and biological substances	248	291
X45	Alcohol	59	130
X46	Organic solvents and halogenated hydrocarbons and their vapours	13	13
X47	Other gases and vapours	36	38
X48	Pesticides	16	16
X49	Other and unspecified chemicals and noxious substances	178	186
TOTAL		**982**	**1018**

[1] The codes are not mutually exclusive. Hence the sum of the individual codes does not equal 1018.

Overall, the greatest number of cases reported were in the 30-59 year age group (Table 24). However, the associated rate (227.3 per 100 000) was second highest behind that for the 15-29 year old age group (335.4 per 100 000).

The overall rate for the 0-4 year old age group was a close third (224.4 per 100 000). All of the cases in this age group were unintentional, giving, by a factor of 2, the highest age specific rate for unintentional cases.

Table 24 Intentional and Unintentional Poisonings by Age

Age Group	Intentional		Unintentional		Total	
	Number	Rate	Number	Rate	Number	Rate
0-4	0	0.0	201	224.4	201	224.4
5-14	19	10.6	50	27.8	69	38.3
15-29	564	222.8	285	112.6	849	335.4
30-59	796	162.4	318	64.9	1114	227.3
60+	82	51.2	164	102.3	246	153.5
TOTAL	**1461**	**124.5**	**1018**	**86.8**	**2479**	**211.3**

In stark contrast to the CSO data where males dominated, 61.8% (1533/2479) of the NZHIS poisoning cases were female (Table 25). This proportion was highest for intentional cases (68.5%).

Table 25 Intentional and Unintentional Poisonings by Sex

Sex	Intentional		Unintentional		Total	
	Number	Rate	Number	Rate	Number	Rate
Male	460	80.7	486	85.2	946	165.9
Female	1001	166.1	532	88.3	1533	254.3
TOTAL	**1461**	**124.5**	**1018**	**86.8**	**2479**	**211.3**

For intentional cases, there were more females than males in all age groups (range 63.4% to 84.2%) (Table 26).

Table 26 Intentional Poisonings by Age & Sex

Sex	Age Category					Total
	0-4	5-14	15-29	30-59	60+	
Male	0	3	178	249	30	460
Female	0	16	386	547	52	1001
TOTAL	**0**	**19**	**564**	**796**	**82**	**1461**

Sex by age group for unintentional cases were more evenly distributed (Table 27). There were slightly more females in all age groups except the 0-4 year old age group (11 more males) and 5-14 year old age group (25 cases each).

Table 27 Unintentional Poisonings by Age & Sex

Sex	Age Category					Total
	0-4	5-14	15-29	30-59	60+	
Male	106	25	139	150	66	486
Female	95	25	146	168	98	532
TOTAL	**201**	**50**	**285**	**318**	**164**	**1018**

Overall rates were very similar between Maori and European ethnic groups (247.3 and 231.2 per 100 000 respectively) and also between Pacific Peoples and Asians (137.1 and 136.9 per 100 000 respectively) (Table 28). By far the largest number of events occurred among Europeans (1587), nearly five times that for Maori, the second highest ethnic group.

Europeans and Asians had more intentional then unintentional events, the split was even for Maori, and there were more unintentional than intentional deaths for Pacific Peoples. This is generally consistent with results from ARPHS. Maori had the highest unintentional rate and Europeans the highest intentional rate. Numbers in both groups by intent were largest for Europeans.

Table 28 Intentional and Unintentional Poisonings by Ethnicity

	Intentional		Unintentional		Total	
Ethnicity	**Number**	**Rate**	**Number**	**Rate**	**Number**	**Rate**
European	987	143.8	600	87.4	1587	231.2
Maori	161	123.6	161	123.6	322	247.3
Pacific People	84	60.3	107	76.8	191	137.1
Asian	125	85.6	75	51.3	200	136.9
Other	65	-	52	-	117	-
Unknown	39	-	23	-	62	-
TOTAL	**1461**	**124.5**	**1018**	**86.8**	**2479**	**211.3**

Average length of stay for both intentional and unintentional events was two days. Thirty eight percent of cases stayed for less than one day.

Nearly all cases (95.9%) were coded as ‘non-psychiatric inpatient events (including day patients)’.

Eleven cases died. Eight (72.7%) were coded as intentional, three as unintentional. Most events (88.9%) ‘ended routinely’ (were discharged home).

4.3.4. NPC Data

Tables 29 to 31 relate to NPC data for the Auckland region for the period 1 July 2001 to 30 June 2002.

There were 3840 human poisoning/exposure type calls from the Auckland region to the National Poisons Centre (NPC) in Dunedin between 1 July 2001 and 30 June 2002. In addition there were 237 poisoning/exposure calls where the victim was classed as animal and 1096 calls otherwise classified: Poison Information (497), Drug Information (116), Haz Chem Information (64), Spill (21) and Other (161).

For the purpose of this report only the human poisoning/exposure cases are included in the analyses. Virtually all of these calls related to acute poisoning/exposure (3795, 98.8%).

The number of calls per month ranged from 221 (5.8%) in July to 371 (9.7%) in October.

The reason for nearly two thirds of the NPC calls was 'child exploration'. For the remainder, the ratio of unintentional to intentional cases was 4:1.

Age of cases involved in calls to the NPC were either classed as adult or child with unspecified age, or exact age was recorded (in months for those aged less than 3 years, otherwise in years).

The majority of calls involved cases aged 0-4 years (2238 cases, 58.3% of cases where exact age was known), consistent with the 'child exploration' data above.

Table 29 Cases by Age

Age Group	Number	% of Total
0-4	2238	58.3
5-14	293	7.6
15-29	179	4.7
30-59	138	3.6
60+	37	1.0
Child (age unspecified)	144	3.8
Adult (age unspecified	807	21.0
Unknown	4	0.1
TOTAL	**3840**	**100**

The number of male and female cases was similar (1824 vs. 1749 respectively).

Ethnicity data was not available.

Home was the exposure site for over 90% of the calls.

The route of poisoning/exposure for nearly 80% of the calls was ingestion.

Half of the calls were made by the case's parent. Doctors/nurses accounted for just over a quarter of the calls, and approximately 10% were made by the actual cases.

In nearly all of the calls (96.4%), the number of substances involved was one.

There were a total of 3947 substances involved in the NPC calls. Again the substance class categories differ from the other data sources. Household agents and therapeutics accounted for nearly 70% of calls (Table 30).

Table 30 Breakdown of Substance Class

Substance Class	Number	% of Total
Household Agents	1477	38.5
Therapeutics	1171	30.5
Plants	293	7.6
Cosmetics	274	7.1
Agricultural Agents	212	5.5
Industrial Agents	205	5.3
Miscellaneous	100	2.6
Animal	76	2.0
Fungus	32	0.8
TOTAL	**3840**	**100**

Just under half of the substances were liquids (1670). A further 19% were capsules/tablets (Table 31).

Table 31 Breakdown of Substance Type

Substance Type	Number	% of Total
Liquid	1670	43.5
Capsules/Tablets	720	18.8
Plant	300	7.8
Cream	188	4.9
Solid	170	4.4
Mist/Spray	165	4.3
Powder	159	4.1
Granules	142	3.7
Vapour/Gas	119	3.1
Venom	59	1.5
Unspecified	59	1.5
Other	50	1.3
Food	39	1.0
TOTAL	**3840**	**100**

4.3.5. Combined Analysis

Inclusion of several data sets in a comprehensive surveillance system enables comparison of data relating to specific public health issues possible and the resulting picture is more representative of the associated burden of disease than would have been obtained when examining one data set alone. This has been illustrated in the following two examples: paracetamol poisonings and poisoning in children aged less than 5 years.

4.3.5.1. Paracetamol Poisonings

The following analysis of paracetamol poisonings highlights one of the major limitations of the NZHIS data set. While there were 486 intentional and 141 unintentional cases coded to "Nonopioid analgesics, antipyretics and antirheumatics" the actual number involving paracetamol is unable to be determined. Hence the following table only contains CSO, ARPHS and NPC data.

Table 32 Summary Demographic Data from CSO, ARPHS and NPC for Paracetamol Poisonings

	CSO		ARPHS		NPC	
DEMOGRAPHICS	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Number of cases & % of total cases	1[1]	2	155[2]	9	147[3]	6
Intent						
Intentional	1	100	141	91	32	22
Unintentional	0	0	5	3	24	16
Indeterminate	0	0	8	5	0	0
Intent Not Recorded	0	0	1	1	2	1
"Child Exploration"	N/A	N/A	N/A	N/A	89	61
Age Group (years)						
0-4	0	0	3	2	92	63
5-14	0	0	2	1	13	9
15-29	0	0	108	70	11	7
30-59	1	100	35	23	6	4
60+	0	0	5	3	1	1
Unknown	0	0	2	1	0	0
"Child (unspecified age)"	N/A	N/A	N/A	N/A	3	2
"Adult (unspecified age)"	N/A	N/A	N/A	N/A	21	14
Sex						
Female	1	100	124	80	78	53
Male	0	0	31	20	53	36
Unknown	0	0	0	0	16	11
Ethnicity						
European	1	100	86	55		
Maori	0	0	9	6		
Pacific People	0	0	7	5	**Data Not Collected**	
Asian	0	0	15	10		
Other	0	0	8	5		
Unknown	0	0	30	19		

[1]Paracetamol was the primary substance involved in this death. Paracetamol combinations such as dextropropoxyphene/paracetamol not included in this total.
[2]Paracetamol combinations such as dextropropoxyphene/paracetamol and paracetamol/codeine not included in this total.
[3]Paracetamol total based on a search of the NPC data for 'paracetamol', 'pamol' and 'panadol' only.

4.3.5.2. Poisonings in Children Aged Less Than 5 Years

There were no deaths in the CSO data for children aged <5 years although one of the NZHIS cases is recorded as having died. The number of cases aged <5 years in the ARPHS data is likely to be under-representative of actual poisonings in this age group because Starship Hospital is currently not notifying all cases.

Table 33 Summary Demographic Data from ARPHS, NZHIS and NPC for Poisonings in Children Aged Less Than 5 Years

	ARPHS		NZHIS		NPC	
DEMOGRAPHICS	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Number of cases & % of total cases	7[1]	<1	201	8	2238[2]	58
Intent						
Intentional	0	0	0	0	1	<1
Unintentional	6	86	201	100	96	4
Indeterminate	1	14	N/A	N/A	0	0
Intent Not Recorded	0	0	N/A	N/A	0	0
"Child Exploration"	N/A	N/A	N/A	N/A	2141	96
Sex						
Female	5	71	95	47	958	43
Male	2	29	106	53	1113	50
Unknown	0	0	0	0	167	7
Ethnicity						
European	3	43	116	58		
Maori	0	0	42	21		
Pacific People	0	0	27	13	**Data Not Collected**	
Asian	0	0	10	5		
Other	0	0	5	2		
Unknown	4	57	1	<1		
Site of Exposure			**Code available but not obtained from NZHIS for this pilot.**			
Home	3	43			2196	98
Other	0	0			42	2
Unknown	4	57			0	0

[1] Four of these cases were notified by Starship Hospital, the remaining three from North Shore.
[2] Possibly also some children aged <5 years in the Child (unspecified age) category.

Table 34 Summary Substance Data from ARPHS, NZHIS and NPC for Poisonings in Children Aged Less Than 5 Years

ARPHS			NZHIS			NPC		
Substance	Number	Percent	Substance Class[1]	Number[2]	Percent	Substance Class	Number	Percent
Paracetamol	3	43	X44	60	29	Household	945	42
Ant killer	1	14	X40	52	25	Therapeutic	762	34
Xylmetazoline	1	14	X49	36	17	Cosmetic	216	10
Dicloxacillin	1	14	X41	29	14	Plant	155	7
Prednisone	1	14	X42	11	5	Agricultural	76	3
			X43	11	5	Industrial	29	1
			X46	6	3	Miscellaneous	20	1
			X48	3	1	Fungus	19	1
			X47	2	1	Animal	16	1
			X45	0	0			

[1] Refer to Table 23 for descriptions of each code.
[2] Numbers total to greater than 207 because multiple E codes can be selected for each hospitalisation.

The substance type for just under half (47%) of the NPC calls for children aged less than 5 years was liquids. In three of the seven ARPHS cases the substance type was bottle/jar. Substance type information is not collected by NZHIS.

4.4. Key Issues Identified

Key issues identified from the Auckland trial are summarised below. Each is discussed further in the next section: Proposal for National Implementation.

- Different systems for coding substances are used by the various data providers. This limits the comparisons that can be made between the data sets.

- The timeliness of the data varies significantly between the data providers. As a result, it may only be possible to examine all data sets together many months after the period of interest.

- At the aggregate national level, personal identifiers are unavailable, hence the data sets cannot be directly linked. Therefore detecting overlaps between data sets is near impossible.

- The criteria used to determine if a case is intentional or unintentional is not standard across the various data sets. For example, with the coronial data, intent is based on whether the death (outcome) was intentional or unintentional whereas with the ARPHS data, intent is based on whether the exposure was intentional or unintentional. Intent measured by outcome is only a subset of those cases where there is intent to expose but not to injure. This means, for example, that the ARPHS data would not be able to provide a direct measure of suicide attempts. This inconsistency limits the ability to compare by intent between the different data sources. With the extension of the system nationally, this issue may be further exacerbated if there is not a consistent definition between Public Health Services.

5. PROPOSAL FOR NATIONAL IMPLEMENTATION

The piloted comprehensive chemical injury surveillance system was able to provide detailed data on mortality, morbidity and exposures attributable to hazardous substances/chemicals in the Auckland region. Although we were not able to directly link the data sets, the system provided much more functional analysis for local policy and practice than in the scope of the other systems trialled to date.

The combination of data sets allows for better understanding of the underlying causes and consequences of exposures to hazardous substances. In addition, the distribution of health costs can also be better understood. As far as we are aware, such a comprehensive assemblage of data of this nature on a national scale is unique. It is therefore proposed that the comprehensive system be implemented as the national chemical injuries surveillance system and extension of the system take place during the 2003/04 financial year. It is recommended that CSO, NZHIS, NPC and PHS data continue to be incorporated into the surveillance system and that the data systems used by local GPs and the ambulance service be periodically reviewed to reassess the feasibility of electronic data capture.

One issue which remains a concern is the less than optimal capture of the hospital data, particularly outpatient data, and chemical substance details for inpatients. While the paper and email based pilot was unsuccessful and the electronic system failed to eventuate, this does not mean that these approaches should be ruled out. However, what can be concluded is that no one approach will work in all settings and that local circumstances will dictate local data quality and capture practicalities.

Many smaller PHS do receive paper-based notifications from their affiliated hospitals. It is therefore recommended this be encouraged to continue but that an on-line data entry system be developed to replace standalone local databases. In the current situation, this would enable more rapid information collection and analysis in the form of sentinel surveillance of hazardous substance related hospital attendance. In the meantime, we propose to contact several PHS and ask that they periodically send us their data in its current format for incorporation to a national comprehensive chemical injury surveillance system.

An electronic system may still be viable, especially for the larger hospitals. It is recommended that as hospitals upgrade their patient management systems they be encouraged to explore and consider options for electronic capture and transfer of data pertaining to hazardous substance cases. It is therefore proposed that the Internet site developed for the online data entry system be capable of extension to enable it to receive data transferred directly from hospitals.

However, while ESR is proposing to develop this Internet tool, successful participation by hospitals and PHS in a national system of the type discussed above would require policy, regulatory/enforcement actions and resourcing by central government. Such issues fall under the MoH/DHB contractual and funding relationships and require action at that level, with needs likely to vary from region to region. It is expected that the marginal costs associated with the extension of the CSO, NZHIS and NPC data sets would be low. For example, the cost of obtaining data from

NZHIS is the same regardless of whether data for one DHB or the whole country is obtained.

While the CSO, NZHIS and NPC data sets can be quite easily and promptly expanded nationally with little additional costs, we foresee a gradual increase in the provision of PHS and ED data, due primarily to the issue of resourcing. Thus sentinel surveillance, ideally comprising of data from a major metropolitan city, provincial town and rural area will serve to inform policy in the short-medium term. Currently, several PHS in addition to ARPHS have indicated an interest in joining in this effort, particularly Hawkes Bay and West Coast.

It is intended that any Internet site developed for data capture would also function as the main data dissemination tool. Any hospital data captured by the Internet could be displayed almost immediately after simple quality checks have been performed. The NPC data could also be disseminated reasonably frequently, e.g. monthly. Due to the time lags associated with the NZHIS and CSO data, it is proposed that this data be updated quarterly. A query tool would be built into the website to enable selective querying of the data by fields such as DHB, date, age, ethnicity, sex, and substance. All data would be summarised in an annual report that would be made available on the website as a PDF file, with hard copies made available to PHS, hospitals and other key stakeholders as requested.

A number of possible solutions exist for the issues identified in the previous section. As part of its system upgrade the NPC is switching over to internationally recognised substance classification codes. It is recommended that the website incorporate the same system and that it also be extended to the CSO data.

The lack of timeliness associated with the CSO and NZHIS data will remain problematic by its very nature. The Internet site should enable timely capture of the hospital notifications and will be used to disseminate all data in as timely a function as possible, incorporating near real time, monthly, quarterly and annual reports as discussed above.

Collection of personal identifiers, e.g. name and NHI number, at the national level is not desired for confidentiality reasons. However, when numbers are small it may be possible to match based on other fields such as date of birth, sex, DHB etc. Therefore this option may be particularly relevant for a) deaths and b) hospitalisations in less populated DHBs. It may also be possible to make use of data encryption mechanisms. It is proposed that the practicalities of these two options be explored during the extension of the system.

The issue associated with the different criteria used to determine if a case is intentional or unintentional could be remedied if a standard definition was developed. The nature of the CSO and NZHIS data sources makes any changes with regard to these unfeasible, but it should be possible to implement a standard definition for use by the various Public Health Services. However, we must reiterate that the primary objective of the surveillance system is not ascertainment of intent but of exposure to hazardous substances.

It could be argued that effort should not be spent broadening the system at the expense of progressing resolutions for the issues identified in the pilot. However, we feel that solutions to these issues may be facilitated through further implementation. Taking into account the low marginal cost associated with expanding the geographic coverage of the CSO, NZHIS and NPC data sets and the added value that would result from incorporating existing PHS data into the national system, we feel that the issues identified should not hinder expansion of the system.

6. RECOMMENDATIONS

- That the comprehensive chemical injury surveillance system trialled in Auckland, be extended nationally during the 2003/04 financial year and beyond.

- That CSO, NZHIS, NPC and PHS data continue to be incorporated into the surveillance system but that means of obtaining better quality hospital data be pursued and that the data systems used by GPs and the ambulance service be reviewed to reassess the feasibility of electronic data capture.

- That in recognition that no one system for obtaining hospital data will suit all hospitals, ESR develop a website with a data capture function to accommodate both manual data entry and electronic transfer of hospital data. This will allow hospitals/PHS to have a degree of flexibility with regard to which option they prefer.

- That those PHS that are identified in 2003/2004 as capable of providing complete and timely hospital attendance data be used as sentinel sites for near-real time surveillance of chemical injury cases. The eventual goal being to extend this level of surveillance nationally.

- That ESR provide the mechanism for hospitals/PHS to notify hazardous substance injury cases, but that other issues e.g. funding, are the responsibility of relevant MoH/DHB contracts.

- That analysed results be disseminated via the Internet on a near real time, monthly, quarterly and annual basis as feasible given the timeliness attributes of each data source.

- That the international substance classification system being implemented by the NPC be incorporated into the web-based data capture tool and applied to the CSO data.

APPENDIX 1

The following questionnaire was sent to 30 public hospitals to assess national variations in needs and capabilities with regard to the feasibility of the proposed electronic data capture system that was to be piloted at Middlemore Hospital.

CHEMICAL INJURY SURVEILLANCE SYSTEM (CISS) FEASIBILITY QUESTIONNAIRE

This questionnaire is to be used to enable ESR to assess the feasibility of the proposed electronic chemical injury surveillance system for national implementation. Your assistance in completing this questionnaire is greatly appreciated.

SECTION 1: Identification

Q1: Hospital Name: ____

Q2: Key CISS contact person: ____

SECTION 2: Data Collection

The scope of this surveillance system includes acute injury from therapeutics, agrichemicals, industrial chemicals, cosmetics, household/domestic chemicals, chemicals/drugs of abuse, herbal remedies/dietary supplements, plants, and bites/stings. At present it does not include chronic injury (e.g. cancer), biological food poisoning and adverse reactions to medication when used as intended.

Q3: Given the above criteria, approximately how many chemical injury patients would your hospital see **per week** as:

ED presentations (not admitted) __________________

Admitted patients __________________

Other __________________

TOTAL __________________

Q4: Please briefly describe your current system (if any) for notifying chemical injury cases.

____
____
____
____
____

Q5: Please indicate which patient types are currently ICD 10 coded? For example:

In patients ………………………………… Yes ☐ No ☐ N/A ☐

ED patients which stay for > than 3 hours ... Yes ☐ No ☐ N/A ☐

ED patients which stay for < than 3 hours … Yes ☐ No ☐ N/A ☐

ED patients who are not admitted ………… Yes ☐ No ☐ N/A ☐

DOA's …………………………………….. Yes ☐ No ☐ N/A ☐

Other (specify) ____

Q6: Are the ICD 10 coded patient types specified above likely to change in the next few years?

Yes ☐ No ☐

If yes, please specify: ____

____

____

____

Q7: If a patient type, (for example ED patients who are not admitted) are not ICD 10 coded, is an alternative coding system used?

Yes ☐ No ☐

If yes, please specify: ____

Q8a: Are the following data fields extractable from your hospital system? (Fields in **bold** are those we would most like to capture).

Q8b: If, yes, please indicate the data type available, e.g. free text, as ICD 10 code etc.

NHI number ……………………………Yes ☐ No ☐ Data type ________________

Suburb and Town/City of address …… Yes ☐ No ☐ Data type ________________

Date of Birth …………………………… Yes ☐ No ☐ Data type ________________

Sex ……………………………………… Yes ☐ No ☐ Data type ________________

Ethnicity ……………………………….. Yes ☐ No ☐ Data type ________________

Product Brand Name …………………. Yes ☐ No ☐ Data type ________________

Main Chemical Ingredient ……………. Yes ☐ No ☐ Data type ________________

Chemical Class ………………………… Yes ☐ No ☐ Data type ________________

Date of Exposure ……………………… Yes ☐ No ☐ Data type ________________

Product/Chemical Manufacturer ……….. Yes ☐ No ☐ Data type ________________

Type of Exposure ………………………. Yes ☐ No ☐ Data type ________________
(e.g. *poisoning, corrosive burns, explosive damage*)

Poisoning Route …………………………Yes ☐ No ☐ Data type ________________
(e.g. *ingested, inhaled, absorbed through skin/eye*)

Symptoms/signs …………………………Yes ☐ No ☐ Data type ________________

Intent (e.g. *intentional, unintentional*) …. Yes ☐ No ☐ Data type ________________

Exposure Setting ……………………….. Yes ☐ No ☐ Data type ________________
(e.g. *private home, school, workplace*)

Suburb & Town/City of exposure ……… Yes ☐ No ☐ Data type ________________

Occupation ……………………………... Yes ☐ No ☐ Data type ________________

Date presented at hospital ……………… Yes ☐ No ☐ Data type ________________

Hospital Name …………………………. Yes ☐ No ☐ Data type ________________

Name of Hospital Doctor ………………. Yes ☐ No ☐ Data type ________________

Admitted to Ward/Short Stay Unit ……... Yes ☐ No ☐ Data type ________________

Length of stay (days) …………………… Yes ☐ No ☐ Data type ________________

Outcome (e.g. *discharged, died*) ……….. Yes ☐ No ☐ Data type ________________

Follow up action taken with regard to further investigation or medical management
(e.g. *referred to GP, reported to PHS*) .. Yes ☐ No ☐ Data type ________________

Q9: For the fields which are unable to be extracted from your current system, are there any options available which could make this possible, for example adding a field to the patient management system? Please include an approximate cost associated with any options given. (We are particularly interested in options for the **bold** data fields).

Q10: Are NHI numbers available in encrypted form?

Yes ☐ No ☐

Q11: How would you see a link with the National Poisons Centres TOXINZ database working within your system?

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SECTION 3: Data Dissemination

Q12: How often would you like the data collected to be updated on the website?

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Q13: A draft website containing a reporting component already exists (http://gisportal.esr.cri.nz/ciss) but requires further development/modification. What modifications would you like to see implemented to the reporting component in order to maximise the utility of the surveillance system for you?

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SECTION 4: Comments/Overview

Please add any further comments you may have relating to the feasibility of the proposed system within your environment.

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Thank you for completing this questionnaire. Please return it to Rebecca McDowell, ESR, PO Box 50-348, PORIRUA in the envelope provided.

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 all pesticides and licensed animal remedies (from MAF list)

- **Industrial chemicals**: i.e. solvents and caustic chemicals used in an industrial or occupational setting. The same chemicals may also be found in the home (e.g. ispropryl alcohol), and be covered under household/domestic.

- **Cosmetics**: make-up, nail polish, hand lotions, etc…

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

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

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

- **Plants**: garden plants

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

- **Other/Unknown:**

REFERENCES

1 Fowles J. 2001. The Notification of Injuries from Hazardous Substances: Draft Guidelines and Reference Material for Public Health Services. ESR Report to the Ministry of Health. Unpublished report.

2 Bates B, Fowles F. May 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.

3 Chirasirisap K. 1995. Problems with poisoning in New Zealand. Doctoral thesis, University of Otago, Dunedin.

4 Fowles J, Phillips D, McDowell R, Gilmore K, De Feijter J, Boyle K. June 2002. A Chemical Injury Surveillance System for New Zealand: Report of a Pilot Study. ESR report to the Ministry of Health. Unpublished report.

5 McDowell R, Fowles J, Phillips D. April 2003. Surveillance of Chemical Induced Mortality in New Zealand: Updated 2001 and Initial 2002 Coronial Services Office Data. ESR report to the Ministry of Health. Unpublished report.

6 Talboys S, Buetow S, Gillon M. The Royal New Zealand College of General Practioners – A profile of New Zealand General Practices – 2001. October 2002.

7 Public Health Quarterly Report, Auckland District Health Board. January 2002. Vol. 8, Issue 1.