Child unintentional poisoning interventions
Improving the uptake of safety practices: final report
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Commissioned by:
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Prepared by:
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Monash University Accident Research Centre

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All of the above authors contributed to the development and implementation of the project and the report. In particular, Lisa Gibbs took the lead role for the stakeholder focus group section of the study, the qualitative phase, the applied phase, and overall management of the project and the report. Dr Jenny Sherrard of the Monash University Accident Research Centre (MUARC) took the lead role in the literature review and Professor Joan Ozanne-Smith of MUARC took the lead role for the key informant interview study.

CCCH is particularly appreciative of the generosity of the Victorian families who participated in the study and willingly shared their views and experiences in relation to poison safety. CCCH also acknowledges the significant contribution of the stakeholders who participated in the focus groups. MUARC is grateful to each of the key informants interviewed for the rich information provided, and their constructive feed-back on the draft report.
Abstract

This research project was commissioned by the Department of Human Services under the Injury Prevention Research Program. The aim of the project was to identify the motivators and barriers to compliance with child poisoning safety practices by conducting a literature review, consulting with key informants and stakeholders, and conducting interviews and focus group discussions with parents of children under five years old, some of whom had experienced a poisoning incident. The final stage of the research was an applied phase designed to pilot test an innovative community intervention arising from the findings.

As a result of these four stages of research, it was found that parental uptake of safety practices is currently incomplete and vulnerable to changes in the home environment. This lack of comprehensive coverage appears to arise from poor recognition of the reality of personal risk and a reliance on parents’ perceptions of children’s likely activities. Personal or vicarious exposure to a poisoning episode is likely to increase parental awareness of risk and encourage increased safety behaviours. This is the primary focus of the recommended intervention strategies that were piloted in this study. Other recommendations that are critical to a reduction in the incidence of child unintentional poisoning are environmental measures such as a more widespread application of warning labels and child resistant containers, testing of safety products, and legislative requirements for the inclusion of a lockable poisons cupboard in new and renovated homes and public housing. Additional recommendations relate to the more consistent clinical management of poisoning incidents and further research needs in the area of child poisoning.
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Commonly used acronyms

CALD  Culturally and linguistically diverse
CRC   Child resistant container
CRP   Child resistant packaging
DHS   Department of Human Services
ED    Emergency Department
MCH   Maternal and Child Health
OTC   Over the counter
PIC   Poison Information Centre
RCH   Royal Children’s Hospital
TGA   Therapeutic Goods Administration
VPIC  Victorian Poisons Information Centre
Chapter One: Introduction

1.1 Rationale

Unintentional poisoning is a large public health problem in Australia and both national and state governments have identified childhood poisoning, in particular, as a priority issue for intervention\(^1\). It is the second most common cause of injury hospitalisations for children under the age of five in Victoria\(^2\). This rate has not decreased over the past decade despite preventative efforts.

As a result of the increasing pressure on the Victorian public acute and emergency hospital system to meet the demands of hospital care, the Department of Human Services recently established a collaborative arrangement between Partnership Development, Health Outcomes, and Monash University Accident Research Centre (MUARC) to undertake the Modelling Emergency Demand for Injury Conditions Study\(^3\). The initial injuries addressed were childhood poisoning, and hip fracture in older persons, both being examples of preventable injury or injury where improved medical management could reduce demand. Further, the Department of Human Services Public Health Group has sought to apply primary prevention and safety promotion strategies in order to develop the capacity of communities and families to prevent childhood poisoning incidents. Reviews of the intervention literature have been conducted and published previously, however qualitative research has been necessary to better understand the views of the community in informing the extent to which poisoning prevention strategies are likely to be effective.

By addressing the uptake of child poisoning interventions, the present study will complement and expand the Department’s initiative for injury prevention and help address poisoning prevention strategies by:

- Investigating the socio-environmental issues associated with children gaining access to poisons in rural and metropolitan settings
- Investigating the knowledge, attitude and behaviours of parents relating to child poisoning and poisoning prevention in rural and metropolitan settings
• Identifying the motivators and barriers to the uptake of interventions

• Identifying and pilot testing strategies and educational messages to increase the uptake of child poisoning interventions in rural and metropolitan settings.

1.2 Project overview

The main research questions for this project were:

• What are the motivators and barriers to parental uptake of child poisoning prevention strategies?

• What intervention strategies could be implemented to improve safety practices in relation to child unintentional poisoning?

The related issue of clinical management of child poisoning incidents was also explored because of its impact on incidence data and health resources.

The research questions were explored from a social constructionist perspective which acknowledges the social element in health differentials and the interacting influence of factors such as gender, socio-economic status, age, linguistic and cultural diversity, and geographic location.

The research was undertaken in four stages consisting of a:

- Literature review
- Consultative phase
- Qualitative phase
- Applied phase.

The research process and findings are presented in this report in terms of the main stages of research as outlined below:
Chapter Two contains the literature review which informed the qualitative phase of the project by identifying the profile of child unintentional poisoning in Australia and its clinical management, and by exploring the efficacy of various intervention efforts.

The findings from the consultation phase are reported and discussed in Chapter Three. Health, safety, industry and service provider representatives were consulted to benefit from their experience of child unintentional poisoning and recommendations for prevention and management strategies.

The findings from the qualitative phase are reported and discussed in Chapter Four. Parents of children who had experienced an unintentional poisoning incident were interviewed and focus groups were held with parents in the wider community to identify current practices being used in the home to prevent child poisoning and factors contributing to unintentional poisoning events.

Chapter Five contains a report and discussion on the findings from the applied phase, a pilot community intervention. This intervention explored the use of strategies to circulate stories of child unintentional poisoning incidents to raise awareness of the reality of the risk of child unintentional poisoning within the home environment.

The project conclusions and recommendations are outlined in Chapter Six.

1.3 Project structure

This project was commissioned by the Department of Human Services Victoria following a successful tender process. It was undertaken by the Centre for Community Child Health (CCCH) in partnership with the Monash University Accident Research Centre (MUARC) (see Appendix 1 for details on the breakdown of tasks between the two organisations). Emma Pritchard was appointed initially by the CCCH to manage the project but resigned soon after having received an international health promotion fellowship in Cambodia. Lisa Gibbs was subsequently appointed to the role.
An Advisory Committee was formed (see below) consisting of representatives from CCCH, MUARC, the Royal Children’s Hospital Emergency Department, and the Victorian Poisons Information Centre.

**Child Unintentional Poisoning Advisory Committee**

- **Assoc. Professor Elizabeth Waters**  Director, Research and Public Health Unit, Centre for Community Child Health
- **Professor Joan Ozanne-Smith**  Chair of Injury Prevention Monash University Accident Research Centre
- **Dr Jenny Sherrard**  Research Fellow Monash University Accident Research Centre
- **Dr Simon Young**  Director of Emergency Medicine Royal Children’s Hospital
- **Adrian Hutchinson**  Unit Manager, Emergency Medicine Royal Children’s Hospital
- **Jeff Robinson**  Manager Victorian Poisons Information Centre

1.4 **Ethics approval**

The Royal Children’s Hospital Ethics in Human Research Committee granted approval on 11 April 2003 for this project (EHRC Ref No. 23011A) to be conducted for a period of 12 months.

The Standing Committee on Ethics in Research Involving Humans at Monash University ratified approval for the project on 16 September 2003.
Chapter Two: Literature review

2.1 Introduction

The literature review updates epidemiological information on child poisoning, the effectiveness of poisoning management and poisoning prevention, identifies future research needs, and provides an informed framework for the qualitative phase of the study.

2.2 Method

The recent published literature was systematically reviewed to identify the strength of evidence for child poisoning interventions and to inform the structure and analysis of the research. It summarises current knowledge about childhood poisoning incidence, environmental and social factors associated with child poisoning, international best practice in poisoning prevention, barriers and motivators for uptake of poisoning prevention initiatives in rural and urban settings, and identifies research needs for future childhood poisoning prevention initiatives.

2.2.1 Search Strategy

Research data and issues documented in the child poisoning literature held at MUARC were identified preparatory to the literature search. Electronic databases of published literature and world wide websites on child poisoning prevention and evaluation were searched from 1966 to 2003, reference lists reviewed, and key informants requested to recommend other reports and evaluated poisoning intervention projects.

Key words used for the search included: child (under 5 years) poisoning, review, hospital admission, emergency department presentation, epidemiology in Victoria Australia and internationally, poison agents, rural, urban, risk factors, prevention (access, child resistant closures (CRCs), poisons cabinets, education, behaviour, attitude, motivation, barriers, legislation, design), evaluation, management of child poisoning, referral, and future research. Information resources included:

- World Wide Web injury prevention sites
• On-line library databases including: Medline, EBM Reviews - Database of Abstracts of Reviews of Effectiveness, EBM Reviews - Cochrane Database of Systematic Reviews, EBM Reviews - Best Evidence
• Reference lists in original articles
• MUARC reports and papers (as referenced)
• RCH Safety Centre reports (as referenced)
• Department of Human Services reports (as referenced).

2.2.2 Study selection criteria and procedures

Criteria for selection of poisoning and poisoning prevention studies for review were: children under 5 years, males and females, within Victoria, Australia and other countries with a similar economic and cultural structure (eg. UK, NZ, Canada and US). One of the MUARC team members assessed suitability of descriptive and analytical studies of child poisoning and interventions for inclusion in the review (JS). Collaboration with one of the other team members (JOS) was sought if any difficulties arose from this process.

2.2.3 Study quality assessment checklists and procedures

Non-intervention descriptive studies of poisoning epidemiology included observational, longitudinal, and cohort studies. The quality of study evidence was based on the size and representativeness of the population (eg. national, state, or convenience), data source reliability and completeness (eg. injury surveillance databases at local or national level), and applicability to other populations (based on similar culture).

Intervention studies for poisoning prevention were reviewed and rated for quality of evidence using the scheme developed by Rychetnik & Frommer4 (Table 1).

As the different designs and outcomes in intervention studies in this review were too heterogeneous to be amenable to any meta-analytic approach for the project we adopted a narrative approach to review results.
Table 1. Criteria for assessing level of evidence for the quality of an intervention study.

<table>
<thead>
<tr>
<th><em>Study design</em></th>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic review of all relevant Randomised Controlled Trials (RCT)</td>
<td>I</td>
</tr>
<tr>
<td>RCT</td>
<td>II</td>
</tr>
<tr>
<td>Well designed pseudo-RCT (eg alternate allocation)</td>
<td>III-1</td>
</tr>
<tr>
<td>Comparative studies (or systematic reviews of same) with concurrent controls and allocation not randomised, cohort studies, case/control studies, interrupted time series with control group</td>
<td>III-2</td>
</tr>
<tr>
<td>Comparative studies with an historical control, two or more single arm studies, or interrupted time series without a parallel control group</td>
<td>III-3</td>
</tr>
<tr>
<td>Case series, post-test or pre-test/post test, with no control group</td>
<td>IV</td>
</tr>
</tbody>
</table>

2.3 Epidemiology of poisoning in children under 5 years.

2.3.1 Deaths

Death as a result of childhood poisoning in Australia is relatively uncommon\(^5\)-\(^7\). Over the eighteen year period 1979-97, there were 60 poisoning deaths in children aged 0-4 years (33 medicinal; 27 non-medicinal) representing a national crude mortality rate of approximately 0.075 per 100,000 (1997 data)\(^8\). Victorian State Coroner’s data for the last ten years documents one pharmaceutical poisoning death of a child under five after ingesting anti-epileptic drugs while playing. Two non-pharmaceutical child poisoning deaths occurred in the same period associated with ingestion of a poisonous plant, and ingestion of a cleaning agent. In Queensland six childhood poisoning deaths were recorded for the six years to 2000\(^9\). Elsewhere, death rates range from <0.2 per 100,000 (0-4 years) in the US in the early 1990s\(^10\) to 0.27 per 100,000 in Trieste, Italy (aged 0-15 years)\(^11\).

2.3.2 Hospitalisations

Poisoning in children under 5 years of age is ranked second only to falls as a cause of injury hospitalisation in Victoria\(^2\). For the period 1987-1995, there were 5,324 Victorian public hospital admissions for unintentional poisoning in this age group. Slightly more males (53%) than females were admitted. The child-poisoning rate has steadily increased
from 196 per 100,000 in 1987/88 to 248 per 100,000 in 1998/99 and remained steady at 249/100,000 in 2001 (Victorian Admitted Episodes Dataset (VAED) data). National hospital admission statistics in 1998 identified 76% of poisonings occurred at home with 20% not recording a specified location\textsuperscript{12}.

Poisoning exposure occurred in the child’s own home or someone else’s home in 87% of cases admitted to Intensive Care at the Royal Children’s Hospital Melbourne\textsuperscript{5}, in 94.1% of all emergency presentations across three Victorian hospitals\textsuperscript{6}, and in 93% of emergency presentations amongst Queensland Injury Surveillance Unit (QISU) hospitals\textsuperscript{9}.

New Zealand (1987-96) reported a similar hospitalisation rate to Victoria of 246 per 100,000 in children aged 1-4 years\textsuperscript{13}. Admission rates range from 80 per 100,000 in the United States (0-4 years) to 188 per 100,000 in Great Britain (0-5 years)\textsuperscript{14} and 701 per 100,000 in Trieste, Italy (0-15 years)\textsuperscript{11}. These figures were derived from records for 1979-82, 1975-86 and 1975-94 respectively, and may not necessarily reflect current rates.

\textbf{2.3.3 Incidence by age}

Most childhood poisoning in Victorian children occurs in those aged 1 to 3 years\textsuperscript{5,6}. In Trieste, 66% of all poisonings to children under 5 years occurred to those aged 1-2 years\textsuperscript{11}. Toddlers (1-2 years) in New Zealand accounted for 64% of all childhood poisoning cases (<15 years)\textsuperscript{13}. Two year-olds had the greatest hospitalisation rate in Southern England\textsuperscript{14}, while data from Canada found that poisonings were most prevalent among 2 and 3 year-olds\textsuperscript{15}.

\textbf{2.3.4 Emergency Department presentations}

Over 95% of childhood pharmaceutical incidents (3,052) presenting to Victorian emergency departments during 1987-98 occurred in homes (Victorian Emergency department Minimum Dataset, VEMD). Internationally, the same pattern was observed where exposure occurred almost exclusively at home in Italy\textsuperscript{11}, and in more than 80% of cases in Stockholm\textsuperscript{14}. 
A recent Victorian study\textsuperscript{16} examined the nature and extent of ingestions with over-the-counter (OTC) medications in children <5 years. Data were analysed about enquiries to the Victorian Poisons Information Centre between 1998 and 2000 together with emergency department data (VEMD) for the period 1996-2000. Enquiries for poisons information and Emergency Department (ED) presentations were substantially higher for OTC medications than for prescribed medications. Nevertheless, a lower proportion of OTC cases were admitted (24.8\%) than prescribed medication cases (33.8\%). The study authors suggested that the causes of unintentional ingestion in children with OTC medicines may include lack of Child Resistant Closure (CRC), inadequate design of CRC, attitudes concerning OTC toxicity or lack of vigilance by parents and carers in storage and administration.

2.3.5 \textit{Regional differences}

Incidence rates of Victorian childhood poisoning admissions are higher in rural and remote areas than in metropolitan areas\textsuperscript{17}. Similarly, Queensland data for 1998/99 shows urban admission rates of 106 per 100,000 in South Brisbane, and rural admission rates of 279 and 386 per 100,000 in Mackay and Mt Isa respectively\textsuperscript{7}. Overall admission rate for the three regions was 144 per 100,000. Nationally, remote and rural areas have more than double the rate of medicinal poisoning admissions compared with metropolitan centres\textsuperscript{8}. It is unclear whether there are actual differences in poisoning rates between rural and metropolitan areas, or whether the observed differences are a reflection of poison management practices and criteria for hospital referral and admission\textsuperscript{6}.

In general, the quality of evidence from these epidemiological studies is high. They are based on large data sets collected at regional and national levels. Nevertheless, the variation in health care systems’ criteria for presentations and admissions between regions and states and also in other countries creates difficulties in conducting accurate comparative studies. Further, poisoning and other systemic injuries are excluded from the Abbreviated Injury Scale (AIS) used to quantify and rank the severity of injuries according to probability of death.
2.3.6 Common agents

Differences have been reported in the incidence of child poisonings between medicinal substances and other chemicals. Different agents are associated with different developmental ages. For example, crawling children are more likely to access non-medicinal chemicals than pharmaceuticals. In Victoria, between 1992 and 1998, 73% of all child poisoning admissions were caused by medicinal substances and 19% by other chemicals (VAED). In Queensland, 48% of ED presentations were due to medicinal products, and 31% to other chemicals. In New Zealand, 61% of admissions were associated with medications. In Trieste, Italy, of the 1037 children aged under 5 years treated for poisoning, 42% were for medicinal and 42% were for chemical substances. In the United Kingdom almost 50% of children presenting to ED ingested either capsule or liquid medication rather than tablets.

Changes in drug prescription patterns, and modifications to the packaging and the constituents of medicines and household chemicals (eg. kerosene coloured blue) have seen a shift in the types of agents involved in child poisonings admissions over time. Common agents 50 years ago at the Children’s Hospital in NSW were kerosene, pesticides, aspirin and digoxin. A study at the same hospital from 1983-88 found the most common agents were benzodiazepines, iron preparations, paracetamol and anticonvulsants. The proliferation of new medications and household chemicals and the diminished use of some existing agents will result in changes in the distribution of causes of child poisoning incidents.

Analgesics were the most common agent group identified both in presentations data and admissions data for child poisonings, with paracetamol the most common sole agent. In Victoria, most agents are pharmaceuticals (over 70% of both admissions and presentations). In Victoria, five medicinal agent groups represent over a third (35%) of presentations: paracetamol, cold and flu preparations, benzodiazepines, anti-histamines and cardio-vascular drugs. Other leading non pharmaceuticals agents associated with admission were household chemicals and oils and essences.
Table 2. Agents involved in poisoning by presentation and admission rate.

<table>
<thead>
<tr>
<th>Agent</th>
<th>Presentations</th>
<th>Admissions</th>
<th>Admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>455</td>
<td>115</td>
<td>25</td>
</tr>
<tr>
<td>Inhalational</td>
<td>154</td>
<td>90</td>
<td>58</td>
</tr>
<tr>
<td>Asthma medication</td>
<td>146</td>
<td>91</td>
<td>62</td>
</tr>
<tr>
<td>Benzodiazapines</td>
<td>114</td>
<td>63</td>
<td>55</td>
</tr>
<tr>
<td>Cough/cold medicines (excl. paracetamol)</td>
<td>99</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>76</td>
<td>41</td>
<td>54</td>
</tr>
<tr>
<td>Contraceptive</td>
<td>43</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>Iron preparations</td>
<td>41</td>
<td>22</td>
<td>54</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>38</td>
<td>31</td>
<td>82</td>
</tr>
<tr>
<td>Anti-inflammatories</td>
<td>37</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>Tricyclic antidepressants</td>
<td>43</td>
<td>29</td>
<td>67</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>34</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Tobacco</td>
<td>30</td>
<td>16</td>
<td>53</td>
</tr>
<tr>
<td>Antidiarreal/laxatives</td>
<td>23</td>
<td>12</td>
<td>52</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>24</td>
<td>11</td>
<td>46</td>
</tr>
<tr>
<td>Cardiac (excl. migraine, antihypertensives)</td>
<td>33</td>
<td>16</td>
<td>48</td>
</tr>
<tr>
<td>Migraine</td>
<td>22</td>
<td>11</td>
<td>50</td>
</tr>
<tr>
<td>Diet</td>
<td>20</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>Aspirin</td>
<td>18</td>
<td>9</td>
<td>50</td>
</tr>
<tr>
<td>Antispasmodic</td>
<td>18</td>
<td>10</td>
<td>56</td>
</tr>
<tr>
<td>Alcohol</td>
<td>17</td>
<td>11</td>
<td>65</td>
</tr>
<tr>
<td>Other (NEC,NS)</td>
<td>475</td>
<td>245</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>1960</td>
<td>896</td>
<td>45</td>
</tr>
</tbody>
</table>

*VISS: RCH,WH,PANCH (5 yrs), LRH (4 yrs)*

High admission rates occurred for anticonvulsants, tricyclic antidepressants, alcohol, asthma medications, diet tablets, inhaled medications, antispasmodics, benzodiazepine, and iron (Table 2)\(^{21}\). Lower admission rates for other agents does not necessarily mean these agents are less toxic but may represent a more limited exposure rate.
Although agent toxicity and dose are pivotal to childhood poisoning, many social and environmental factors contribute to the problem of access to hazardous agents\textsuperscript{5,22}. A limited number of studies have investigated the role of social factors in poisoning incidence.

### 2.3.7 Socio-economic status

Socio-economic status may be a key factor associated with child poisoning. Issues such as illiteracy may affect the parent’s ability to read warning labels or directions for use. In America, in a group of illiterate adults with reading levels of 0-3\textsuperscript{rd} grade, 30\% were unable to interpret caution statements and directions of 3 separate products, thereby potentially increasing the susceptibility of their children to poisoning\textsuperscript{23}. With 60 million Americans functionally or marginally illiterate\textsuperscript{23} and almost half of Australians aged 15-74 with poor or very poor literacy skills\textsuperscript{24} the issue of reading product labels becomes important in addressing child poisoning prevention strategies. This is an even greater issue among culturally and linguistically diverse (CALD) communities due to the strong relationship between first language spoken and English literacy skills\textsuperscript{24}.

One of the problems associated with targeting preventative strategies to high risk children, is that, to date, research on factors associated with socio-economic and social factors has failed to consistently identify major risk factors\textsuperscript{25,26}. In Greece, it was found that socio-economic factors were not risk indicators for child poisoning\textsuperscript{26}. In America, there was a skew towards higher socio-economic groups utilising the Middle Tennessee Poison Center. However this may have reflected a greater concern for minor poisonings, or greater access to telephone facilities, rather than a higher incidence of child poisoning amongst that group\textsuperscript{25}. In South Africa, children in the lower socio-economic group are more prone to experience poisoning from paraffin (the most common cause of accidental child poisoning), often drinking it in mistake for water\textsuperscript{27}.

### 2.3.8 Family structure

There is inconclusive evidence as to whether one-parent families are at higher risk for child poisoning than two-parent families. In Greece, children who live with other than both parents, have an increased risk of poisoning\textsuperscript{26}. This finding was not supported in Thailand where parental separation was not identified as a risk factor. However when there were more than two siblings, the risk of poisoning increased 2.37-fold, possibly indicating
inadequate supervision\textsuperscript{28}. Children with fathers in non-manual occupations were over-represented in poisoning presentations in North East Bristol from 1970-73\textsuperscript{29}, possibly a reflection of different service utilisation behaviours rather than actual difference in incidence.

### 2.3.9 Other social factors

The type of caretaker present at the time of the poisoning episode may be a risk factor for child poisoning. Almost 12\% of child poisoning cases at the Pittsburgh Poison Center occurred when the caretaker was someone other than the child’s own parents, and the poisoning occurred away from the child’s home\textsuperscript{30}. There was an over-representation of cardiovascular drugs poisoning when grandparents were caretaker (12.3\%) as opposed to parents (0.7\%), a finding in keeping with the greater use of these drugs in the older age group. A history of previous poisoning episodes requiring medical treatment was found to increase the risk for subsequent child poisoning\textsuperscript{26}, perhaps due to continued inappropriate storage and/or supervision by the parents, or the child’s familiarity with where the product is kept. In a study of child unintentional poisonings reported to three regional poison centres in the USA, it was found that 30.1\% of cases involved children (aged 5 and under) who had been involved in a prior poisoning episode\textsuperscript{31}. The authors noted that younger children (under 1) were more likely to ingest household and personal care products while children were increasingly likely to ingest medications with increasing age. It was suggested that age related development and its impact on accessibility of products was likely to be the explanation for the relationship between substance and age. A tendency to re-ingest similar types of substances was also found to be significant. The authors speculated that this might be due to behavioural reinforcement or familiarity.

It was also found in a prospective study of poison centre cases (n=7,058) involving 5-15 month old infants that 2.8\% were associated with infant walkers\textsuperscript{32}. Nearly all (95\%) cases were asymptomatic.

### 2.3.10 Limitations

In Victoria, current information on poisoning is obtained through the VAED and the VEMD. Admissions data (VAED) covers 100\% of cases admitted to public and private
hospitals within Victoria. Aetiological information on these cases is based upon the physician’s diagnosis and restricted to the nature of the injury, agent group, location, age, and gender. Emergency department data (VEMD) includes information such as injury cause, location, activity, nature of main injury, body region, human intent and a descriptive narrative of the event. Currently, around 80% of Victorian hospitals collect VEMD data, and the estimated capture rate from these hospitals is 82%. As a result, incidence rates cannot be reliably calculated from VEMD data at present. However calculations such as percentages by cause, type of injury, and location may be used effectively. Narrative data specified the agent involved in 78% of child poisoning cases presenting to EDs in a random sample of 700 cases in 2002.

Comparisons across studies may be limited by the differing age groups studied and the varying sources of poisoning information used to define a child poisoning case. These information sources include databases of records from poisons information centres, callback surveys by poisons information centres, emergency department presentations, hospital admissions and death certificates. There is no routine data collection for visits to general practice, or calls/visits to pharmacies.

2.3.11 Epidemiology summary

Death due to childhood poisoning is uncommon, however hospitalisation rates of childhood poisoning incidents are a public health concern. Victoria’s admission rate of 248 per 100,000 may be higher than both the US and Great Britain (80 and 188 per 100,000 respectively) though the periods covered differ. One and two-year olds are most likely to be poisoned with most poisonings occurring in the home. Males are slightly more likely than females to experience a poisoning episode. Poisoning by medicines is more common than poisoning by other chemicals. In Australia, admission rates in rural areas are higher than metropolitan areas. Child poisoning rates have not declined in Victoria over the last decade. Further research is warranted to assess contributing factors to the lack of a decreasing trend and to inform improved intervention strategies for child poisoning prevention.
2.4 The role of parents

Poisoning research has generally focused on environmental risk factors, however there is increasing recognition that examination of human risk factors (parental knowledge, attitudes and behaviours) is also important to improve the understanding of child poisoning.26,33

2.4.1 Knowledge, Attitudes & Behaviours of Parents

Two Australian studies examining parental behaviour and knowledge of toxicity of agents found that in many instances of unintentional childhood poisoning, parents were undertaking preventative behaviours and were well aware of the toxicity of the substances involved. A study by Cornish, Parsons & Dobbin investigated poisoning of children aged 6 to 29 months by ingestion of dishwashing machine detergent.34 Sixty-one parents who had contacted the Victorian Poisons Information Centre with this problem were interviewed by telephone regarding the circumstances leading to their call. This was a self selected group so it was not unexpected that 72% of parents were aware of the dangers of dishwashing detergent and that 90% reported safe storage practices by keeping the detergent in a cupboard more than 1.5m high. Eighty-seven percent of children in the study accessed the detergent directly from the machine and parents were present in the room at the time of ingestion for 78% of the incidents. The investigators concluded that the problem was more one of access to the agent, rather than issues of storage or supervision, and that additional efforts to educate parents about toxicity would be unlikely to contribute to a decline in such poisoning events.

Similarly, in a study surveying parents/guardians of children under five years who had ingested a rodenticide, 90% reported awareness of some of the associated dangers.35 One hundred and twenty-eight parents were identified via hospital emergency departments participating in the Victorian Injury Surveillance System and via the Victorian Poisons Information Centre and were interviewed over the telephone using a questionnaire similar to that used in the dishwasher detergent study. It was found that in most cases, children accessed the poison at the site where it had been laid and that in 69% of cases this site was not a normal place for the child to be playing. Parents incorrectly believed that the site was inaccessible and therefore safe. As a result, the authors suggested that information on
rodenticide packaging should recommend the placement of baits in specific, inaccessible locations such as under refrigerators or in specially designed bait stations.

A study in Victoria investigated the circumstances and means of access to leading poisoning agents by children under 5 years using structured interviews with parents of 523 poisoning cases. These agents were paracetamol, eucalyptus oil, rodenticides, benzodiazepines, tricyclic antidepressants, and theophylline. Cases were identified through the poisons information centre and hospital emergency departments. Most children (94.1%) accessed the agent in their own or another’s home with the parent or caregiver present nearby at the time. Where the child was alone, the caregiver was reportedly involved in household activities (51%) undertaking leisure activity (10%) or on the telephone (8%). Most (79.5%) of these children were alone for 5 minutes or less. Overall, children accessed the agents while in use (75.3%), including agents just purchased. They were less likely to access agents when stored in their usual place. The authors concluded there was little scope for improved supervision as a major intervention. General interventions aimed at design and regulatory change for safe storage, and improved labelling and packaging including CRCs, are required. Agent specific interventions for rodenticides and vapourisers are more likely to prevent poisoning.

An American study considered a taxonomy of behavioural and environmental variables leading to the unintentional poisoning of three to seven year olds in Tennessee. The most frequently reported antecedent condition was improper storage of the substance by the parent, with the four next most commonly occurring conditions being child related variables such as non-compliant behaviour and imitation. Lack of knowledge of toxicity of the substances, associated with only 5% of cases, was found not to be a major antecedent condition for child poisoning.

In an unpublished qualitative study examining child unintentional poisoning, semi-structured interviews were conducted with 18 families of children under five who had experienced an unintentional poisoning incident. The study identified a range of environmental, social and behavioural contributory factors. A relationship between housing design (floorplan) and parental supervision was found, which was particularly evident in double-storey homes. Public housing was raised as a possible risk because of potential delays in home maintenance and its impact on poison safety. Recent administration of
medicine to a child was found to increase children’s propensity to try to access the medicine. The need for increased efficacy of CRCs was noted, as was the tendency for some parents to interpret the term ‘child resistant’ to mean ‘child proof’. The author also noted that the need to have medication conveniently accessible during use highlights the need to promote both safe ‘storage’ and ‘in use’ locations for medication. The study found that safety messages about locked cabinets had not been adopted by parents of young children. Siblings were also found to be a factor in poisoning risk.

2.4.2 Barriers to parental preventative behaviours

There has been limited investigation into barriers to parental preventative behaviours. Several American studies have addressed the issue of under-utilisation of poisons centres, as use of such centres can reduce unnecessary visits to hospital emergency departments and result in a likely reduction in health care costs, though this needs further evaluation. In the context of under-utilisation of poisons centres, low self-efficacy (confidence in one’s ability to perform a given task) and negative outcome expectations have been identified as barriers in a qualitative (focus groups) study of 43 English and Spanish speaking mothers in Houston, Texas\textsuperscript{38}. However no reports could be found of studies looking at barriers to direct preventative behaviours such as use of lockable poisons cabinets. McLennan and Kotelchuck examined general injury prevention practices in the context of depression among 7,537 mothers in the 1989 National Maternal and Infant Health Survey and the linked 1991 Longitudinal Follow-up Survey. They looked at four preventative practices, including presence of syrup of Ipecac in the home as a poisoning prevention behaviour\textsuperscript{39}. (It should be noted that while Ipecac is no longer recommended, the researchers at the time named it as a prevention target of the American Academy of Pediatrics Injury Prevention Program.) They found depression to be a barrier to preventative behaviours: mothers reporting high level depressive symptoms were less likely to keep Ipecac in the home.

In general the quantitative studies in section 2.4 were well designed (randomisation or with control groups) and had good sample sizes. These criteria indicate good levels of evidence for the reported study results.
2.5 Clinical management of child poisoning and referral practice

An essential factor impacting on the incidence of child poisoning hospitalisations is the clinical management of cases and the adequacy of hospitalisation protocols.

Clinicians working in acute paediatric care require current knowledge of the fundamental principles of childhood poisoning\textsuperscript{40-42}. These principles include poison identification and recognition of poison syndromes to inform observation and/or admission to hospital. Knowledge of the principles of prevention of poison absorption, enhanced excretion, laboratory investigations, supportive management, and clinical management of arrhythmias and corrosive injury are important for successful outcome of symptomatic poison ingestion. Access to expert sources of information and further advice, as well as an understanding of prevention and the role of hospital staff in health promotion and injury prevention, can improve management approaches\textsuperscript{43} and outcomes.

2.5.1 Poison identification

In young children the active substance may be easily identifiable by the package, bottle or container nearby, or by asking the child. Estimating dosage ingested may be more difficult\textsuperscript{44}. The maximum dosage can be extrapolated from what remains of the substance in the package or bottle and an estimate of the patient body weight. The possibility of more than one child ingesting the substance should not be overlooked\textsuperscript{42}.

2.5.2 Poison syndromes

Detailed physical examination and neurological assessment of patients for signs known to be associated with specific agents of poisoning may help confirm identification of the substance\textsuperscript{42}. Awareness that certain poisons produce symptoms that mimic common diseases can assist in a differential diagnosis of poisoning\textsuperscript{42}. 
2.5.3 Factors associated with referral and hospital admission

Decisions concerning the need to admit children presenting with suspected poisoning can be difficult. A full history may clearly indicate the level of risk in young children. Most children are asymptomatic and are likely to need a short period of observation in emergency or when admitted once the risk of ingestion of a toxic dose has been determined\textsuperscript{45}. The period of observation for asymptomatic children should be related to the likely time for development of symptoms associated with the suspected substance\textsuperscript{45}. Children should be admitted if they have signs or symptoms of significant toxicity or there is a possibility of delayed symptoms. Circumstances surrounding the suspected poisoning may raise the possibility of poisoning abuse or child neglect. Other considerations, related to the decision whether or not to admit a child, include family circumstances, parental confidence, and the availability of emergency care should the child’s condition deteriorate unexpectedly.

Victorian children from rural and remote areas presenting to hospital with possible poisoning are admitted to hospital for poisoning management at close to double the rate of children in the metropolitan area\textsuperscript{46}. This difference has cost implications for the health care system. It has been attributed to more limited access to 24 hour emergency services, greater distance to travel if medical treatment is required, and reduced availability of rural clinicians and paediatric specialists\textsuperscript{46}. However other explanations, including the possibility of actual differential poisoning rates as well as the barriers and influences, require investigation. The latter will be examined in this current study.

Several studies have examined the issue of unnecessary referral to hospital for childhood poisoning. In a study of records of acute paracetamol child poisoning from 11 poison centres in the US, 866 of 2091 patients had results of serum paracetamol estimations\textsuperscript{47}. Of these, only three were considered to be at probable risk for paracetamol hepatotoxicity. Based on these results, a strategy to refer only children who ingest 200mg/kg or more of an adult preparation could eliminate 82% of referrals without missing any of the probable risk patients. The results indicate that if children ingest less that 200mg/kg of an adult preparation they may be safely managed at home without referral to hospital. This strategy could result in substantial reduction in health services costs and prevent unnecessary
inconvenience to many patients and families. The lowest dose at which the Victorian Royal Children’s Hospital Clinical Practice Guidelines on poisoning recommend treatment for acute ingestions of paracetamol is 150mg/kg\textsuperscript{43}.

Another recent US study examined the extent to which poison centre triage guidelines influence healthcare facility referral rates for acute, unintentional paracetamol poisoning and iron poisoning\textsuperscript{48}. Poison centre managers provided triage threshold values for each substance. These values and healthcare referral rates were fitted to a logistic regression model for paracetamol and iron. Triage threshold values (range 120-201 mg/kg for paracetamol, 16-61 mg/kg for iron) and referral rates (range 3.1-24\% for paracetamol, 3.7-46.7\% for iron) varied substantially. There was a statistically significant inverse relationship between the triage value and the referral rate for both paracetamol (p<0.001) and iron (p=0.0013). Poisoning centre guidelines play an important role in the variation of referral rates. Effort to determine and utilise the highest, safe triage threshold value could substantially decrease healthcare costs for poisoning.

A recent 5 year study of tricyclic antidepressant (TCA) ingestion in children under 6 years presenting to a US regional poison control centre evaluated the manifestations, referral patterns, hospital management and medical outcomes of ingestion\textsuperscript{49}. Of the 48 patients, nearly all (92\%) were asymptomatic and all involved single drugs. Most (90\%) ingested a dose less than the normally prescribed paediatric dose. Of the five children ingesting more than this dose only one was mildly symptomatic prior to admission. Thirty-one were sent to emergency departments and 14 were admitted for 12-24 hour observation. None developed symptoms. Activated charcoal was given to twenty-three children. There was no difference in outcome between those who did and did not receive activated charcoal in this relatively small sample. The authors conclude that further study is necessary to develop clinical guidelines for the appropriate referral of unintentional child ingestions of TCAs.

The same authors conducted a nationwide survey of the management of low dose TCA ingestions involving asymptomatic children in 44 major regional poison control centres\textsuperscript{50}. The survey response rate was 68\%. Most centres sent children, regardless of dose ingested, to the emergency department. Only four centres recommended observation based on dose ingested. Twenty-seven centres recommended 6 hours observation time in ED, one centre recommended 6-12 hours and 2 centres recommended 24 hours. Only one centre
recommended obtaining drug plasma levels. Further research is needed to determine the probable dose of TCA that requires observation in ED.

A recent Copenhagen study to evaluate the possible impact of poison centre advice on physician’s treatment and referral of non-drug exposures used rate ratios to measure effects. Doctors seeking advice were asked to describe their management plan before advice was given. The risk was estimated as minor in 90% of 175 exposures. Physicians had intended to treat 43 more cases than the poison centre recommended (Rate Ratio 1.6, 95% CI 1.3-2.0). Physicians would have observed 42 more cases in hospital (RR 2.3, 95% CI 1.6-3.3) and 28 other cases in an outpatients facility (RR 2.0, 95% CI 1.3-2.6) prior to poison centre recommendations. A more active attitude to treatment and referral was independently associated with patients 14 years and under, being asymptomatic on presentation, and with insignificant exposures.

A prospective telephone survey in 1998 to determine how often poison prevention information was provided to 100 parents/carers who presented to a hospital with a child suspected of being exposed to a poison found only 20% had received poison prevention information. In recognition that children who have had a poisoning incident are at increased risk for a subsequent incident, it was recommended that families be provided with a poisons prevention discharge package which includes information on safe storage, child-resistant-containers, and the role of the Poisons Information Centre to improve child poison management by health professionals. Evaluation of the effectiveness of this type of initiative would be valuable for informing poisoning prevention.

It is clear that there is substantial variability in referral rates, poisons information centre advice, triage threshold levels and approaches to management of childhood poisoning. These issues should be investigated to underpin the development of a standardised efficient and effective approach to the management of children who access poisons. Further research is required to determine whether the differences in serious poisoning rates between geographic regions are the result of patient management practices or reflect true differences in poisoning rates. The application of best practice management models in major paediatric teaching hospitals to rural and remote areas could prove to be an effective means of reducing poisoning admissions.
2.5.4 Prevention of poison absorption

It is important that emetics are not used to manage the poisoned patient in hospital practice\(^{41;43;54}\). Although syrup of Ipecac was one recommended for all households with young children\(^{41;54;55}\), experimental studies indicate variability in the amount of toxin removed and there is no evidence that Ipecac administration in EDs improves outcome. Indeed it could delay or reduce the effectiveness of other gastrointestinal treatments. Ipecac is no longer recommended as an emetic for paediatric poisoning. Activated charcoal which can absorb various agents and increase clearance from the body is the treatment of choice for most ingestions\(^{43;56}\). It is contraindicated for poisoning by alcohol, essential oils, petrochemicals, iron, lithium or bleach. Gastric lavage may be useful in early management of specific substances but should not be used routinely\(^{57}\).

2.5.5 Enhanced excretion

The role of active elimination techniques in the management of acute poisoning should be limited to situations where other supportive measures are insufficient\(^{42}\). Repeated doses of activated charcoal are simple and useful but require careful monitoring for possible bowel obstruction and perforation\(^{58}\). Forced diuresis should be avoided because of the risk of fluid overload. Urinary alkalinisation can enhance the excretion of weakly acidic substances. Urinary acidification can be used to enhance excretion of some agents but there is a risk of acidosis\(^{42}\). Iron and sustained release or enteric-coated preparations may be eliminated using whole bowel irrigation\(^{59}\). Chelating agents can be used to manage iron ingestions\(^{43}\). The efficiency of elimination by dialysis, haemoperfusion and haemofiltration are difficult to clinically assess. It is generally accepted that these techniques are useful if they increase total body clearance by 30% or more\(^{42}\).

Other therapies can play a specific antidote role in the poisoned child\(^{41}\). The few antidotes that are necessary or beneficial in poisoning incidents include acetylcystine for paracetamol, fomepizole for ethylene glycol and methanol poisoning, octreotide for sulfonylurea poisoning, and flumazenil for benzodiazepines.
2.5.6 Laboratory investigations

In general, poisons identification tests are expensive, rarely provide immediate results, and generally do not influence the management of a poisons case. Serum chemistries and osmolarity are of more help than toxicology screening in a patient with altered mental status and suspected, but unknown, ingestion. By contrast, agents such as paracetamol, highly toxic in substantial overdose, must be screened by blood test in the emergency department if indicated by potential dose. Many other presentations associated with highly toxic agents involve minimal or no actual ingestion, are asymptomatic on observation over several hours, and therefore are unlikely to require admission providing patient medical outcomes are not compromised. Acute blood and urine samples may be stored for possible important medico-legal consequences of poisoning.

2.5.7 Supportive management

Children developing symptoms after ingestion, other than mild nausea, vomiting or diarrhoea, require hospital admission. Treatment is supportive for most poisoning cases and may include fluid replacement, antihypotensives, dextrose, and therapy for convulsions. If supportive measures prove inadequate for arrhythmias and corrosive injury, specific therapy must be considered. In cases where patient symptoms are deteriorating, the Intensive Care Unit should be contacted.

2.5.8 Further expert information

National and international Poison Control Centres have been instrumental in identifying hazardous household products and toxic drugs which form the basis of some preventive initiatives. They have proven benefit in reducing the number of medically treated patients of all ages and the number of poisoning hospitalisations.

The Victorian Poisons Information Centre (VPIC) website contains information about poisoning prevention and first aid advice if a poisoning occurs: http://www.rch.org.au/poisons/
Home Medicines Review (HMR) is a service provided by the Pharmacy Guild of Australia. It provides a home-based review of individuals’ and families’ medication to ensure safe, effective and appropriate use and storage of medications. It is a collaborative service typically involving a GP referral to a Community Pharmacist. It is most relevant to people who are confused or concerned about their medication, take more than 5 medications a day, or have recently spent time in hospital.

The RCH Education Institute and the Clinical Pharmacology Unit of the RCH in Victoria, Australia are currently collaborating on a ‘Medication in Schools’ project. This project aims to develop best practice guidelines that strengthens the advice given to schools with regard to the transportation, safe storage and administration of medications. The results of this project are likely to be released in 2005.

2.5.9 Clinical management summary

Appropriate management of paediatric poisoning is an important means of reducing the incidence of hospitalisation for child poisoning. Physicians’ knowledge of agents, symptoms and syndromes, and treatment protocols including the role of laboratories are the basic tools for effective management. Guidelines for referral and admission to hospital are integral to effective poisoning management. Most research clearly shows an over representation of asymptomatic admissions with excellent outcome after observation. Research is needed to determine differences in management practice likely to influence admission rates and to inform a standardised approach to the management of poisoning incidents. The development of referral and management protocols for the most frequent and toxic substances involved in child poisoning would assist with initial assessment and management of suspected cases. Protocol development could be undertaken and endorsed by appropriate medical colleges. Evaluation of protocol effectiveness would inform future strategies.

2.6 Prevention of child poisoning

Strategies to prevent childhood poisoning and other injuries can be implemented at a number of levels. Some countries have identified the need to adopt a coordinated approach and have established organisations whose specific focus is child injury prevention. The
provision of poisoning information services is a strategy employed for both treatment and prevention of poisoning. Counselling and education have targeted the raising of awareness of poisoning risks and aim to change behaviour. At the product level, design and legislative interventions have been introduced to limit children’s access to dangerous substances. The following sections summarise the limited published information available on the effectiveness of poisoning prevention strategies.

2.6.1 Safe storage of poisons

An accepted environmental approach to prevent childhood poisoning in the home is to reduce exposure to agents through the safe storage of medicines and chemicals out of reach and sight of children, up high (at least 1.5 metres) in a locked or child-resistant cupboard (VPIC website). Purpose designed poisons cabinets are likely to be equally effective as existing lockable child-resistant cabinet (particularly those which automatically locks on closing). Various devices are available, for example at the Victorian Royal Children’s Hospital Safety Centre, to convert an existing cupboard into one for safe storage of poisons. Nevertheless, effective storage to prevent child access is dependent on the compliance of users to always place poisons in the cabinet and ensure that it is secured/locked. In a comparative study (N= 205) examining family compliance with the use of free plastic cupboard locking devices, those receiving supporting safety education (N=101) did not utilise the device at a greater rate than those not receiving education (N=104)65.

The ability of 3-5 year olds to open a medicine cabinet, an under-the-sink cabinet and a vanity box all fitted with child resistant locks was tested66. Only 2 of 300 children were able to open the receptacles. All 50 adults tested could open all containers. These results indicate that locked cabinets provide a resistant depository for the safe storage of hazardous substances for this age group. It is important however to consider that the peak age for child poisoning with pharmaceuticals is 2 years and for non-pharmaceuticals is 1 year12,67. Tests for child resistant locks haven’t factored in these age groups to date.

In Saudi Arabia, 289 parents with infants attending routine well baby clinics were interviewed to ascertain their safety practices68. Up to 74% of families reported storing detergents and medications in a high or locked cabinet. Most of these families (74%) had older children suggesting that these parents were already aware of childhood poisoning
through raising their earlier children, which may partly explain the high level of reported safe storage.

Another study of 205 poisoning cases investigated the factors influencing compliance with recommendations received from poison centres. Reasons given by 34 callers for non-compliance with the recommended use of Ipecac syrup for paediatric cases included the influence of another family member (29%). The potential risk of exposure was not accurately perceived (47%). In 90 cases of non-compliant child poisoning referrals to emergency departments, 60% of parents minimised the threat of the explained serious outcome. Sequelae developed in 31% of the children. Willingness to comply with a recommended behaviour was influenced by motivation, concern, perceived threat of the exposure, and perceived barriers. The authors recommended the development of a compliance model to reduce poisoning risk and promote favourable outcomes.

Few studies of the efficacy of poisons cabinets have been published although many child safety organizations and authors of papers on child safety recommend the use of locked cupboards (preferably out of reach) together with other precautions to prevent child poisoning. The efficacy of poisons cabinets and locked cupboards is dependent on the extent to which parents and carers use them for the storage of medicines and for placement of the medicines while in use.

2.6.2 Child resistant containers

The use of re-closable and non-closable child-resistant packaging for pharmaceuticals and chemicals has a positive effect in reducing the likelihood of child poisoning. Reclosable packages include the common push-and-turn and squeeze-and-turn, the less common align two arrows, align a tab with a notch, and reversible depress tab and turn. Non-reclosable packages protect the product and user only until opened and include the strip pack, blister pack, pouch and sachet varieties.

The Australian Standard for child-resistant packages (AS 1928-2001) encompasses both reclosable and non-reclosable types. Testing protocols for the different types of packages stipulate samples of 200 children aged 42-51 months and 100 adults aged 18-65. Packages complied with the standard if not more than 30 of the 200 children gained access to the
placebo before demonstration and 40 of the 200 after demonstration, and not more than 10 of the 100 adults failed to open and re-engage the child-resistant feature, following the instructions\textsuperscript{75}. Importantly, the stipulated age of children for the testing protocol does not represent the age group at highest risk for poisoning. In addition, 30 or 40 out of 200 children as a test ‘failure rate’ is a high tolerable risk. A key issue is raised within the standard – “child-resistant” is not necessarily “child-proof”. Child-resistant packaging is designed to delay the access of the child to the product\textsuperscript{75}. Other precautionary measures should not be neglected under the impression that the child-resistant packaging is solely adequate.

A number of US studies have established that certain child-resistant packages are too difficult for the elderly to open\textsuperscript{74,76,77}. Further, the US Consumer Product Safety Commission review of poisoning data indicated some grandparents either did not use the child-resistant feature properly or had removed it completely. These findings may be, in part, a consequence of the difficulty the older persons encountered in opening some CRCs\textsuperscript{78}. As a result, the US testing methods were revised (to include 60-75 years age group) and since 1998, now include packaging which can be opened by the elderly, whilst maintaining its child-resistance features\textsuperscript{78}.

### 2.6.2a Effectiveness of child-resistant packaging

The US Poison Prevention Packaging Act (PPPA), enacted in the early 1970s, was designed to reduce child poisoning from five substances commonly used or stored about the house (eg aspirin)\textsuperscript{79}. A decrease of approximately 50% in child aspirin ingestions attributed to child-resistant packaging occurred between 1969-72\textsuperscript{79}. In the following 5 years there was a 44% decline in unintentional ingestions of all drugs\textsuperscript{80}. Fatalities due to oral prescription medicines also decreased\textsuperscript{78}. Between 1973 and 1978, ingestions of regulated products declined by 45%\textsuperscript{81}. Those involving unregulated products gradually increased until 1978 at which stage a significant decrease occurred but not to the 1973 level (1.8/1,000 in 1973; 1.9/1,000 in 1978).

Children aged 1 and 2 years have the highest rate of poisoning episodes in studies conducted in Victoria\textsuperscript{12,36,67,82}, New Zealand\textsuperscript{83}, Italy\textsuperscript{84}, England\textsuperscript{85} and Canada\textsuperscript{86}. The
criterion for children aged between 42 and 51 months to be the subjects for Standards testing of CRCs is unrealistically narrow and inconsistent with the age dependent mechanisms used by children to open packages. Children under 5 years were found in a prospective study to be more likely to use their teeth when attempting to open small child resistant containers than large containers. The same authors reported results of a clinical trial in which children aged 23-28 months found it harder to open larger containers while those aged 32-38 months found it harder to open smaller containers. The interaction between child age and container characteristics was significant. Further, children aged 4 to 5 years are twice as likely to open safety packaging as younger children. Again, younger children were not included in the Standards testing procedures.

### 2.6.2b Agents requiring child-resistant packaging

Specifications as to which agents need to be stored in child-resistant packaging differ between countries. Implementation of the US PPPA resulted from an attempt to decrease the incidence of aspirin poisoning throughout the US in the 1950s and 1960s. Initially, 5 substances were covered by the Act, and within 2 years a further 6 were added. Since then, substances mainly prescribed medicines have been added to the Act as deemed necessary, often depending upon exposure rates and severity of toxicity.

In Australia, poisoning legislation is divided between national and state acts with responsibility for action divided between different departments and agencies. At the national level, the relevant legislation is covered by the Therapeutic Goods Act 1966 (with amendments). Within Victoria, the relevant legislation is the Drugs, Poisons and Controlled Substances Act 1981 (with amendments). It has been recommended that prescription medications be packaged with child-resistant packaging. Of the most common agents resulting in ED presentations in Victoria, those requiring child-resistant packaging include antihistamines, tricyclic antidepressants, aspirin, paracetamol, cardiac medication, some antidiarrhoeals, carbamazepines and iron compounds. A taskforce established in New Zealand in 1994 identified methods of and barriers to implementing a child-resistant packaging.
strategy. A list of 12 medicine classes was recommended for mandation based on their toxicity and/or frequency of poisoning.

2.6.2c Failure of child-resistant packaging

In the US, a time-series study over two decades observed a decrease in the child mortality rate due to ingestion of oral prescription drugs following the implementation of the PPPA in 1970\textsuperscript{70}. The authors noted that greater reductions in child poisonings could be achieved if more consumers (especially the elderly) used child-resistant packaging correctly. As some, especially older persons, may find it difficult to open CRCs it is not surprising that they may leave packages open. A study in 1976 found that almost half of the safety packages involved in 96 poisoning cases were improperly used\textsuperscript{88}. Nearly a fifth of these poisonings involved the child opening the bottle\textsuperscript{88}. In Canada, a study in 1974 found that of 88 ingestions involving child-resistant packaging in Essex County, Canada in 1974, 66 (3/4) were caused by parents leaving the top off or loose, or transferring the medicine to a different container, and 22 (1/4) were caused by the child opening the bottle\textsuperscript{71}. More recently, in 1994-95, 168 children presented to The Children’s Hospital of Alabama, USA, with exposure from substances stored in child-resistant packages\textsuperscript{90}. Over 20% of the exposures were reported by parents as resulting from the child opening a properly closed child-resistant package\textsuperscript{90}.

Children who have previously experienced a poisoning episode are more likely to experience a subsequent poisoning episode and are twice as likely to open a safety package\textsuperscript{88}. Further other children, often older siblings, may open a CRC providing access to a younger child\textsuperscript{12}. There is little indication that child-resistant packages are more likely to be stored unsafely (i.e. left out on a bench ) than non child-resistant packages, thus weakening the suggestion that CRCs induce a false sense of security\textsuperscript{73}. More widespread use of CRCs, safe local storage, and agent-specific counter-measures such as child-resistant rodenticide bait stations and eucalyptus vaporiser covers are likely to be effective measures for child poisoning reduction\textsuperscript{35;36;91}.
2.6.2d Conclusion

The research literature is clear that child resistant packaging reduces the incidence of poisoning. US data has shown a decrease in the rate of child poisoning after the introduction of child-resistant package legislation in the 1970s particularly in the early years. Victorian data suggests that child poisoning has remained relatively stable over the 12 years between 1987-98. The key research question to address is why do child poisonings continue to occur with agents regulated to have child-resistant packaging? Much of the literature in the field dates back to the 1970s, when regulations were being implemented. There are significant gaps in knowledge of the effectiveness, and perhaps more significantly, the mechanisms of failure of child-resistant packaging. For the current status of child poisoning rates to decrease, the identified issues relating to the effectiveness of child-resistant packaging in poisoning prevention need to be examined in greater detail. It is recommended in the US that legislation requiring child-resistant packaging be expanded to all drugs dispensed by pharmacies as well as OTC medications, such as cough syrups, aspirin and cold tablets. In Australia, identification of which other agents warrant child-resistant packaging based on toxicity or frequency of presentations for medical assessment has been undertaken and may require some updating. The marginal cost of CRCs is now very low (personal communication US Consumer Product Safety Commission) and tooling (manufacturing process) for CRCs is widespread, suggesting that cost should not be a major barrier to implementation.

2.6.3 Poison safety interventions and strategies

2.6.3a Child injury prevention organisations

A number of countries have established organisations that specifically address the issue of prevention of injuries in children. Kidsafe and the Child Safety Centre at the Royal Children’s Hospital (RCH) are examples in Australia of organizations playing primarily an advocacy, education and training role.

Sweden has a long history of a systematic approach to child injury prevention, having established a central organisation and a program for child accident prevention in the 1950’s and the Child Accident Commission in 1977. This function has since been transferred to the Office of the Children’s Ombudsman. Its
BUS network (network for Safety of Children and Young People) involves 30 authorities and organisations allowing for consensus and coordination of approach.

In the UK, the Child Accident Prevention Trust was established in 1981\textsuperscript{95}. The Trust conducts public awareness campaigns, publishes materials, provides an information service for the public and professionals, and provides training to multi-disciplinary and specialist groups\textsuperscript{95}.

The US Harborview Injury Prevention and Research Centre has a web-based service providing updated systematic reviews of childhood injury prevention interventions\textsuperscript{92}. Information on child poisoning prevention includes reviews of child-resistant packaging and the Poison Packaging Prevention Act, Poison Control Centres, physician-based education programs, community-based education programs, and warning labels\textsuperscript{92}. Also in the US the Injury Free Coalition for Kids (IFCK) was established in the 1990’s. IFCK is a coalition of paediatricians, paediatric surgeons, other health care providers, city and state agency staff, local foundations, community organisations and parents\textsuperscript{96}. Safekids is a large and important US and international organization with a focus on community education.

The extent to which these structures contribute to the prevention of specific injuries has not been specifically examined.

2.6.3b Poison centres

A number of countries have established poisons centres that generally include the following functions:

- a Poisons Information Centre hotline giving emergency advice to the public in response to a poisoning incident, ideally a 24 hour service accessible nationally by a single telephone number
- poisons information to health professionals and the public
- poisoning prevention activities including development of school based programs, distribution of literature and materials, and instructor training
- poisoning incident data collection and monitoring
- source of data and subjects for research.
The US has an extensive network of 86 regional poison control centres (PCCs)\textsuperscript{97}. In addition to their emergency response function, American PCCs undertake a broad range of preventive and educational activities. A key feature of their system is a call-back service. Canada also has a similar, though smaller, system of regional poison information centres.

Other countries have used a more centralised approach than that employed in America. The UK has a National Poisons Information Service\textsuperscript{98}. Access to this service is only available to health care staff for advice on the diagnosis, treatment and management of patients. Poisoning advice to the public is available through the NHS Direct helpline\textsuperscript{99} through a national telephone number or through the NHS Direct Online website. This service provides information for all health concerns including poisoning.

A number of countries, both developed and developing, have national poisons information services available to health professionals and the public. These include New Zealand, Sweden, Yugoslavia, Malaysia, India, Indonesia, Nepal and Thailand.

There are five state-based Poison Information Centres operating in Australia – Brisbane, Sydney, Melbourne, Canberra, and Perth. They are available to both health professionals and the public and can be accessed through a single national number (131126) that directs the calls to the relevant state Centre. The Sydney Centre handles the Tasmanian calls and the Perth Centre handles calls from Western Australia, South Australia and the Northern Territory. All calls after hours are directed to the Sydney based Centre, which is the only 24 hour Centre operating in Australia. The Australian Centres are also involved in preventive and informational activities including distribution of telephone stickers, information pamphlets, and poison information websites:

There is some information available concerning the effectiveness of such strategies. It has been shown that there is a high level of compliance with advice given by poison control centres\textsuperscript{100}. There is also evidence to suggest they are effective in reducing the need for attendance to a medical facility in response to a poisoning incident\textsuperscript{101} with substantial reductions in hospital presentations and admissions, and resulting estimated savings in treatment costs for poisonings\textsuperscript{64}.

\subsection*{2.6.3c Interventions to increase parental preventative behaviours}

A US study in 1992 investigated the effectiveness of a poison centre-initiated mailed intervention to improve preventive practices of families who had contacted the centre for advice about a poisoning exposure in their preschool child\textsuperscript{102}. The prevention package included telephone stickers, a coupon for syrup of Ipecac (no longer recommended), one slide-style cabinet lock, a nine-step checklist for poison proofing the home, and pamphlets. Parents without Ipecac in the house (336) were randomised so that half received the intervention. The response rate for the follow up telephone interviews conducted 3 months later was 90\%. Parents who received a poisoning prevention package after a poisoning incident were significantly more likely to engage in preventative measures involving use of telephone stickers (78\% vs 39\%, \textit{p}<0.0001). Intervention families were also more likely to use at least one slide lock (59\% vs 40\%, \textit{p}<0.001). On the basis of these findings the researchers concluded that poisons-centre based interventions can be effective in changing parental behaviour. However, there was no difference between the intervention and control groups with regard to compliance with preventative suggestions on a nine-point checklist and purchase of syrup of Ipecac. Although Ipecac is now no longer recommended, the results for this measure emphasises the problem of compliance where more than a minimal additional effort is required to achieve potential poisoning prevention. The study also showed that there was no significant difference between the intervention and control groups in the rate of recurrent child poisoning in the three month surveillance period following the original poisoning event. The study results may indicate that even after a poisoning event parents may not be sufficiently motivated to take poisoning prevention measures on their own. However, it is also possible that the experience of the poisoning motivated both groups to adopt increased poisoning prevention measures.
of behaviour change for either group, the results on this measure are inconclusive. It
is also possible that the poisoning experience and/or the mailed intervention shifted
parents’ position on a behaviour change continuum according to the Stages of
Change Model for health behaviours. According to this model, people progress
through five stages to make lasting change: pre-contemplation, contemplation,
determination, action, and maintenance\textsuperscript{103}. Therefore, increased safety behaviours
would only be seen in those parents who were shifting into the action stage.

An earlier US study\textsuperscript{104} involved a brief (less than 5 minute) intervention involving a
poisons education session and provision of a free bottle of ipecac, Poison Centre
television stickers and a poison prevention pamphlet, to parents in an emergency
clinic. Of the 403 families recruited, 262 families completed the 6 month follow-up
interview. The intervention was successful in achieving greater levels of storage of
ipecac (68% vs 42%, $\chi^2 = 7.65$, $P = .005$), knowledge of use of ipecac (40% vs
25%, $\chi^2 = 4.04$, $P = .04$), and placement of the Poison Centre sticker on the
telephone (62% vs 49%, $\chi^2 = 4.60$, $P .03$), in intervention families. However, it had
less impact on poison recognition and safe storage.

A randomised control trial (RCT) in the United States found the use of a videotape
intervention effective in changing knowledge, attitudes, behaviours and behavioural
intentions in relation to use of Poisons Control Centres (PCCs) in a low-income,
predominantly Spanish-speaking population\textsuperscript{105}. After the intervention, parents were
found to be more likely to contact a PCC in the event of a poisoning and given that
most incidents of unintentional childhood poisoning can be managed at home, use
of PCCs can reduce health care costs (especially in the US where a call-back service
operates through PCCs)\textsuperscript{105}. However not all parents in a controlled study (N=205)
were likely to act on advice even when provided with free safety items\textsuperscript{65}.

Passive interventions that require minimal effort on the part of the caregiver have
traditionally been found to be the most effective injury prevention strategies.
However, some injuries, including certain child poisoning scenarios, cannot be
prevented through passive means\textsuperscript{106}. Therefore, interventions that include both
passive and active strategies are required in the prevention of child unintentional
poisoning. A review of injury prevention interventions found that the most successful interventions combine legislative, environmental and educational approaches and are focussed on a single injury type, e.g. poisoning. Evaluations of interventions need to account for the fact that self-reported safety behaviours may not be accurate predictors of child unintentional injuries. A RCT in the UK examined the validity of using self reported safety behaviours as a proxy for injuries. This study found that families that were identified as high risk on the basis of a safety practices score were no more likely than low risk families to sustain an injury (odds ratio (OR) 1.08; 95% confidence interval 0.65 to 1.79) over the two years of the study. However, safety practices were only assessed at the beginning of the study and the authors acknowledged that involvement in the study may have caused a change in the safety behaviours of the high risk families.

2.6.3d Counselling for poisoning prevention

Injury prevention counselling by physicians and health practitioners has been seen as a way of raising poisoning prevention awareness and changing attitudes and behaviours of parents, carers and families. There have been a number of studies addressing the effectiveness of this strategy.

The adequacy of the counselling given by physicians has been brought into question. A study of injury prevention counselling provided by paediatric residents found that the counselling offered was minimal and superficial with an average discussion length of 33 seconds per topic. It has been suggested that printed prompts that address the content and the counselling process may be beneficial in improving the quality of the information provided by physicians.

Clinician injury counselling behaviour during well-child examinations of children under 5 years was determined from mailed self-report in a random sample of 465 paediatricians, family physicians, and paediatric nurse practitioners in the US. Injury topics included toxic ingestion, motor vehicle crashes, drowning and firearm injuries. The response rate was 69.9%. Most clinicians counselled on toxic ingestion (62.1%) and motor vehicle occupant protection (66.2%) with less discussion on drowning (31.8%) and firearm injury prevention (15.7%). Female respondents were
more likely to counsel on poisoning than males (OR 1.82, p=0.05). The authors suggested that clinicians might benefit by using programs such as The Injury Prevention Program (TIPP American Academy of Paediatrics) to help them standardise their approach to injury prevention counselling during well-child examination.

In the US it is currently recommended that doctors include Poison Prevention Anticipatory Guidance (PPAG) as part of their routine preventive paediatric care. A cross-sectional mail survey conducted throughout the US and Puerto Rico compared current opinion and practices of family practitioners and paediatricians regarding PPAG (N=2000)\textsuperscript{111}. The response rate was 51% (227 family practitioners and 273 paediatricians). Over 80% of each group believed they were responsible for providing parents with PPAG. The adjusted Odds Ratio for family practitioners (66.5%) compared with paediatricians (91.9%) providing parents with PPAG was 0.19 (95%CI 0.9-0.37). They cited lack of training on poisoning prevention as the reason for non-provision of PPAG. Post residency training, but not residency training, on PPAG increased the likelihood of both groups of doctors providing PPAG. Greater emphasis on training residents in family practice and paediatrics should increase the impact of this training on actual PPAG practices.

A cross sectional mailed survey of paediatric chief residents to assess counselling practices on injury prevention and barriers to patient counselling also examined the effect of educational aids to promote this activity in accredited US residency programs\textsuperscript{112}. Most residents counselled their patients and families on a variety of injury prevention topics particularly if they had received education on a topic. Common barriers to counselling included lack of information on the topic and lack of time. Focused education on specific topics not being taught, and educational intervention to promote counselling during patient visits, were recommended.

An American randomised study of 1596 parents examined the impact of injury prevention counselling on preventative safety practices, including poisoning prevention behaviours\textsuperscript{113}. Quinlan, Sacks and Kresnow conducted a random digit-dial telephone survey of the US population, and spoke to 410 parents of children 0-6 years about two poison prevention behaviours – keeping Ipecac in the home and
posting the poison control centre number. They found that parents who had received counselling were significantly more likely to keep Ipecac in the home (73.4% vs 32%) and significantly more likely to display the telephone number (79.3% vs 52.6%).

Counselling has been found to be more effective when coupled with other strategies such as access to low cost injury prevention products¹¹⁴, demonstrations, subsidised safety devices and reinforcement¹¹⁶, and educational materials¹¹⁷. It is difficult to assess the degree of efficacy for physician based education programs. Research using a randomised controlled design for evaluation of these initiatives could address this issue.

2.6.3e Community based education programs

A number of education programs have been conducted with both children and the broader community to alert people to the dangers of poisons, help them to recognise poisons, inform them of prevention strategies and appropriate responses should a poisoning occur. The outcomes for most studies include calls to poisons information centres, changes in the number of unsafe areas in the home, and changes in poisoning incidence recorded in databases.

There is some evidence to suggest that the provision of poisons information may translate into a modest reduction in poisonings. An education campaign in a community of 21,950 children under 15 years and their parents reported a tendency (compared with a control community) toward a decrease in number of calls made to poison centres and the frequency of injury events. Sources of data included parents, children, private doctors, hospitals, clinics, insurance companies and poison centres¹¹⁸. Methodological difficulties tended to limit the reliability of results.

Home visits by health practitioners or educators have also been employed as a means of assessing home hazard levels and educating families as to poison hazards and appropriate prevention practices. Several studies have addressed the effectiveness of this type of strategy.
One Canadian study\textsuperscript{119} employed a single home visit that included the provision of an information package, discount coupons, and specific instruction regarding home safety measures. A follow up at 4 months found that the group receiving the interventions had significantly less injury visits to the doctor compared to the control, with significantly lower costs of care for injuries.

In another program, teams of nurses and educators conducted home visits to low income mothers and infants, with 2 to 4 visits per month through the infant’s first year to provide a range of information including injury prevention\textsuperscript{120}. It was found that the children receiving the intervention were less likely to be injured than those who did not.

Several programs have specifically addressed the issue of poisoning prevention. Home visits were conducted as part of a preschool Head Start Program\textsuperscript{121}. Trained school personnel conducted home safety inspections and offered educational materials and safety equipment as required. A comparison group only received written information encouraging safety practices. Poisoning prevention was included as a component of the program. The results from this aspect of the study showed that, at a 3-month follow up, intervention families were twice as likely to have removed poisonous substances from the home than comparison families, and four times more likely to report the presence of Ipecac.

Similar findings were shown in another injury prevention program employing home visits to assess and inform home safety practices\textsuperscript{92:122}. Following the interventions significantly larger numbers of homes showed improvement on several poisoning related aspects: poison centre sticker on telephone, removal of poisonous substances from homes, calls to poisons centres, safety latches on cabinets and drawers and presence of syrup of Ipecac.

Several studies have reported positive effects from programs aimed at older children at kindergarten and school. The effects of a school-based program was evaluated in an American study with kindergarten and third grade students\textsuperscript{123}. The kindergarten program aimed to assist students to identify poisons and their locations, recognise poison look-alikes, and to always ask before touching or tasting unfamiliar
substances. Third grade students were expected to be able to identify poisons in their environment, describe what to do in a poisoning emergency and discuss how to poison proof their homes. Both year groups showed substantially greater knowledge of poison hazards and appropriate behaviours than control students.

Most community-based studies were non-randomised and showed little effect on poisoning incidence. Rigorous randomised controlled trials would be necessary to assess the effectiveness of the community based parent education approach to prevent child poisoning.

2.6.3f Tailored messages

Computer technology has enabled the development of messages tailored for the individual reader. Tailored messages are individually customised and can, for example, address a person’s particular motivational or behavioural characteristics\textsuperscript{124}. They may offer greater relevance to the individual, less redundant information, more involvement with message, greater message recall. A number of studies involving various health issues have found that tailored messages may result in greater change or message retention than generic, or non-tailored messages\textsuperscript{125-127}.

A recent study specifically addressed the effectiveness of tailored messages for pediatric injury prevention\textsuperscript{124} including poisoning prevention. Computer generated tailored messages were based on the individuals’ responses to computer presented assessment questionnaires relating to personal details of the child and current conditions and safety practices at home. A tailored injury prevention handout was immediately printed out on completion of the assessment. The handout referred to the child concerned by name and gave an assessment of the child’s current home and car safety rating and suggestions for improvements with regard to the identified risks. The study found that those who had received tailored information reported greater adoption of home and car safety behaviours than those receiving generic information. In addition those who discussed the information with their physician showed significantly greater change than those who did not.
2.6.3g Poison Prevention Week

The declaration of National Poison Prevention Week, introduced by legislation in the USA in 1961\(^{128}\), coordinates a focus on poisoning prevention. The efficacy of this strategy has not been clearly demonstrated. One study, looking at the impact of Poison Prevention Week on the incidence of poisonings for children less than 15 years, found no significant effect of the intervention\(^{129}\).

The efficacy of Poisoning Prevention Week held in Victoria is also not known.

2.6.3h Stickers/warning labels

Stickers have been used in a number of ways to assist in promoting poisoning prevention. Stickers displaying the telephone number of poisoning advice services and as reminders for safe use of medication are widely used. The Pharmacy Guild of New Zealand produces warning labels, for oral medicines covered with safety caps, with the slogan “check the click” to ensure that caps are placed back on medicine bottles correctly\(^{130}\).

Stickers have also been used as warning labels directed specifically at children. In the USA, Mr Yuk stickers (see Figure 1) are promoted as a means of warning children of dangerous substances. Stickers are placed on containers, beyond the point of sale, to help children identify toxic products. While this strategy is currently actively promoted in some regions of the USA, there are several questions concerning its efficacy and desirability. One earlier study\(^{131}\) found no significant difference in subsequent poisonings following use of Mr Yuk warning labels. Further, it has also been suggested that the labels may actually attract the attention of young children rather than deter them\(^{132}\).

Application of warning labels beyond the point of sale also raises a potentially serious problem. If children who are accustomed to the labels encounter dangerous substances not displaying the label (parent has forgotten to put sticker on or in an

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Figure 1. Mr Yuk
Source: www.southeastmissourihospital.com/generations/mryuk.htm
environment where stickers are not used) they may incorrectly judge the substance to be safe by virtue of the absence of the label. It would be preferable, if warning labels for children are to be used, that a suitable standard design be developed and that it be used across the board on all hazardous substances as part of their normal labelling during manufacture. Evaluation of these initiatives to assess the deterrent effect on young children would inform the utility of this approach. The ability of young children to recognise and respond to such stickers would need to be assessed.

2.7 Conclusion: Literature review

The literature review has highlighted the significance of child unintentional poisoning as a public health issue. While deaths from poisoning are uncommon, Victorian child injury hospitalisation rates due to poisoning were found to be second only to falls. The profile of the poisoning events was explored revealing that the child unintentional poisoning most commonly affects children between the ages of 1 and 3 in the home environment involving a medicinal substance that has been in use rather than in storage.

The evidence-base for preventative measures was explored revealing the efficacy of child resistant containers. The role of lockable poisons cupboards is widely supported although not well researched. Research studies have highlighted a range of promising initiatives targeting parental preventative behaviour through Poison Information Centre based interventions, counselling, tailored computer messages and education programs. The efficacy of Poison Information Centres in encouraging appropriate management of poisoning incidents is also well established. Aspects of the clinical management of child poisoning were also explored as an important means of minimising child poisoning hospitalisations.

These findings will be used in conjunction with the consultative, qualitative and applied findings to develop recommendations for future interventions targeting the uptake of poison safety practices.
Chapter Three: Consultative phase

The previous chapter reported on the first stage of the research - the literature review. This section will detail the research activities and findings from the consultative phase. The aim of this phase of the project was to elicit expert views on the current status of the childhood poisoning problem in Victoria and the potential for prevention by improving the uptake of safety practices.

3.1 Method

The research team invited a cross section of experts to act as ‘key informants’ on child poisoning and its prevention. The informants were identified by the research team, from published reports, and by means of recommendations by senior staff of key agencies. They represented relevant Commonwealth and State government departments, health care, research sectors and safety organisations. They were divided into two groups as indicated below. Representatives of medical, educational, and government bodies were interviewed by Professor Joan Ozanne-Smith and Dr Jennifer Sherrard of MUARC.

The respondents for the key informant interviews were:

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization and Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms Pam Albany</td>
<td>NSW Health – Injury Prevention Policy Branch</td>
</tr>
<tr>
<td>Prof Colin Chapman</td>
<td>Dean – Victorian College of Pharmacy, Monash University</td>
</tr>
<tr>
<td>Dr Malcolm Dobbin</td>
<td>Public Health Physician – Drugs and poisons (Department of Human Services)</td>
</tr>
<tr>
<td>Ms Liz Hender</td>
<td>Department of Human Services (SA) Environmental Health Branch (Former Deputy Director, Victorian PIC)</td>
</tr>
<tr>
<td>Dr Daryl Pedler</td>
<td>Head, School of Rural Health Gipsland Campus, Monash University (Former Emergency Department Director Warrnambool Base Hospital)</td>
</tr>
<tr>
<td>Mr Jeff Robinson</td>
<td>Poisons Information Centre (PIC) Manager – Royal Children’s Hospital</td>
</tr>
</tbody>
</table>
Ms Kerry Smith  Assistant Director – Injury Prevention Unit  
(Commonwealth Department of Health & Aging)

Dr Jim Tibballs  Intensive Care Unit – Royal Children’s Hospital

Dr Simon Young  Emergency Department Director – Royal Children’s Hospital

The structured interview protocol is attached (Appendix II). Additional interviews were conducted to follow-up specific issues raised by the initial key informants, notably in the area of medical education.

The respondents for the medical education interviews were:

Professor Richard Doherty  Professor of Paediatrics, Monash University

Dr Michael Marks  Curriculum Coordinator, Department of Paediatrics, University of Melbourne

Information from the medical education interviews is outlined in Appendix III.

Scope to interview all of the recommended additional informants (listed at question 9 in section 3.2: Key informant interviews) was limited by the available resources.

All persons contacted participated in the key informant interview study and the responses were compiled and summarised under each of the survey questions. Reporting of responses was collapsed where duplication occurred in the individual responses and where similar responses were elicited across more than one question. Strengths and limitations of the study are reviewed in section 3.2.4 and the recommendations arising from the key informant interviews are synthesized. Because there were many additional specific recommendations, these are cross-referenced in the text to sections 3.2.2 Key informant major recommendations and 3.2.3: Other key informant specific recommendations. Recommendations of particular relevance for implementation in Victoria are identified. Potential indirect roles are also identified where the recommendations fall within the jurisdiction of others, particularly the Commonwealth Government. Where responses were multiple and complex, these were synthesized into specific recommendations.
The key informant interviews utilised open-ended questions based on the child poisoning literature review that was undertaken early in the study as a major component of the overall project, knowledge of existing infrastructure, and relevant poisoning data.

The findings from the key informant interviews were circulated to the respondents for the correction of any errors or misinterpretations by the interviewers or the author and the addition of relevant comment. The Department of Human Services also provided comment. This report includes the corrections, and addresses the comments received.

Stakeholders, including representatives of health practitioners and safety organisations, also participated in focus group discussions facilitated by Ms Lisa Gibbs of CCCH. These groups were conducted in Melbourne and Ballarat to capture both a metropolitan and a rural perspective.

The participants for the Melbourne stakeholder focus group were:

Ed Szwaja   Executive Director, KidSafe
Bill Barger   Manager, Clinical Standards and Audit
Metropolitan Ambulance Service
Helen Rowan   Operations Manager, Resource Centres for Child Health and Safety, Royal Children's Hospital
David Phillips   FarmSafe Alliance Manager

The participants for the Ballarat stakeholder focus group were:

Tony Walker   Manager, Clinical and Education Services
Rural Ambulance Victoria
Janet Murray   Coordinator, Ballarat and District Pharmacy Alliance
Louise Chapman   Family Services Coordinator, Family Day Care
Colin Crook   Coordinator, Ballarat GP Division
Deb Greenslade   Project Worker, SafeStart, City of Ballarat
Sue Van Styn   Maternal and Child Health Coordinator, Ballarat
The focus group discussions were guided by an interview protocol (see Appendix IV) and recorded and transcribed.

Emergency Department representatives were unable to attend either the Ballarat or the Melbourne focus group so a separate combined interview was conducted to capture the experience of Emergency Department practitioners.

The participants in the stakeholder combined interview were:

- Milli McLeish Nurse, Emergency Department, RCH
- Naomi Oborne Nurse, Emergency Department, RCH

Notes were taken during this discussion and retained as a record of interview. The interview was conducted before the nurses underwent training as qualitative parent interviewers for this study.

The stakeholder focus group (and combined interview) findings were combined and organised into categories to allow identification of major issues, as reported and discussed in section 3.3: Research findings – Stakeholder focus groups.

3.2 Research findings – Key informant interviews

1. What is the broad nature of your/your organisation’s interest in poisoning among children under 5 years of age? (policy, regulations, intervention, surveillance, medical management, research)

The respondents indicated their wide range of interests in child poisoning and its prevention. These include the provision of acute medical management in urban and rural settings including intensive care, pharmaceutical training, research and practice, policy development, regulatory control including enforcement and monitoring, and licensing of manufacturers. Collectively the key informants’ agencies also have functions and responsibilities related to the provision of emergency advice services (State funded Poisons Information Services) and the National Poisons Register, a register of commercial in-
confidence information on products (for which funding is provided jointly by the Commonwealth and State Governments). State governments maintain regulatory control of household chemicals and medications packaging and have involvement with the National Drugs and Poisons Schedule Committee.

Governments also jointly develop child poisoning prevention policy and action plans. Government takes responsibility for primary prevention of child poisoning in NSW and South Australia, with investment at selected targets. Prevention research was also a function mentioned by one (non-Victorian) state health department. Injury prevention strategic plans are under development by health departments in Victoria (child) and NSW, but these have not yet been implemented. The issue of government leadership in child poisoning prevention is further addressed under question 7 below.

The Melbourne Royal Children’s Hospital (RCH) provides clinical practice guidelines for poisoning on its website. The RCH website receives thousands of hits per week on the guidelines overall, though specific results are not available for the poisoning guidelines and this should be monitored in the future. In addition, the Better Health Channel links to the RCH practice guidelines.

Child poisoning is responsible for a ‘reasonable clinical workload’ at major paediatric facilities (1-2 children per day). Medical management skills and services include diagnostic acumen (particularly looking for “soft” signs of poisoning eg cardiovascular signs), intensive care management (infrequently), medical advice to the Poisons Information Centre (PIC), organisation of follow-up care if needed, identification of any acts of intentional harm and provision of expert evidence in courts.

The Pharmacy College’s undergraduate curriculum includes clinical components on medication safety including over-use, under-use, and misadventure and a recent post-graduate thesis focussed on hospital admissions for misadventure due to medication. Future research leadership is expected to be provided by the Centre of Medication Safety to be established at Monash Pharmacy College (to be led by Prof Roger Nation).

The medical undergraduate curricula are quite similar at Victoria’s two medical schools with regard to child poisoning management and prevention. This teaching is located
principally within the paediatrics component of the courses. Each University provides some
teaching (Appendix III) but clinical experience is highly dependent on whether poisoning
patients present during the students’ exposure to wards and the respective emergency
departments.

The Victorian PIC does not undertake a formal surveillance function, though occasional
studies are conducted. Most PIC calls (62%) relate to children under three years of age.

Some respondents believed that the PIC should serve a surveillance function in the future
(see section 3.2.3 Other key informant specific recommendations).

The public is encouraged to ring the PIC for information rather than presenting directly to
hospital unless it seems necessary. That is, it is PIC policy and practice to minimise
inappropriate presentations and admissions, which are frequently related to non-toxic
agents or small dose incidents (eg. rat bait pellets).

The toxicology databases used at the Victorian Poisons Information Centre include
Poisindex, Hypertox, National Poisons Register and Chemwatch. Victorian public
hospitals have on-line access to Poisindex and various Clinical Management Guidelines via
the Clinicians Health Channel. DHS and the Health Communication Network maintain the
Clinicians Health Channel.

2. **What do you believe to be the explanation for the rate of child poisoning
admissions remaining stable over the period 1996-2001 (policy / poor preventive
effect / lack education / lack resources / lack co-ordination)?**

There was considerable consensus in responses to the identified state of stability
(rather than any real progress in reducing child poisoning rates) and these fell into
several categories:

1) There have been no new effective countermeasures in recent times and there
has been minimal new intervention activity for childhood poisoning. This
contrasts with dramatic changes in the 1970's and 1980's associated with the
introduction of child resistant packaging and changes to medical prescribing.
2) Recommendations of an Australian Health Ministers Advisory Council review of PICs, including a proposed national network and proper national structure, were not funded and not implemented. With regard to PICs, one informant commented that their use is largely limited to middle-class clients, and fewer clients of lower socio-economic status and non-English speaking backgrounds.

The claim that PICs are under-utilized or relatively inaccessible to clients of lower socio-economic status and non-English speaking background needs to be tested in Victoria and would have important implications for targeted awareness raising, if proven (see section 3.2.3 Other key informant specific recommendations).

3) Medical education on child poisoning may be lacking. There is very little undergraduate teaching on child poisoning, and paediatric education may not be conducted in some hospitals. (Note: These concerns were followed-up with Monash and Melbourne University Departments of Paediatrics – Appendix III.)

4) Medical policy and management issues may contribute to poisoning hospitalisation. Financial (WEISS) weightings for overnight hospital stay encourage hospital admissions. Removal of this incentive would potentially reduce the number of unnecessary admissions for child poisons ingestions. This issue was raised by several of the key informants and warrants investigation.

While overall rates of poisoning are increasing in major states, one state reports that if one-day admission data are removed, the rate is static. It was suggested that hospitals may have used one-day admissions as a political lever for funding rather than this representing more conservative management. Emergency departments (ED) may also be ‘pushing for short term facilities’ and hence admission may be a political statement.

Clinicians tend to err on the side of caution, particularly in rural practice, and paediatric admissions occur at a lower threshold than adult cases. The view was
put that the cautious PIC approach is effective. The approximately one hour delay between giving advice and reaching the ED allows time for the effect (if any) for many agents to manifest. This approach prefers seeing the child if there is any possible doubt and clinical judgement can then be applied.

The reasons for the large number of one-day admissions should be investigated in Victoria and in terms of admission policies and best medical practice (see section 3.2.3 Other key informant specific recommendations).

5) Rural admission rates reflect an ethos of admitting less serious problems (higher one day rates) and lower long term stays (serious cases are transferred); geographic distances are a significant issue; and resident officer competency may be poorer. This situation may improve since the availability of protocols is changing and the PIC is often involved prior to parents taking the child to hospital. Nevertheless, poison protocols and PIC recommendations were considered by one specialist to present worst case scenarios and therefore to recommend conservative patient management. The involvement of specifically rural agents in child poisoning was not considered to be common.

6) Best practice guidelines are needed to guide decisions on whether to admit and other medical management issues. Knowledge and guidelines are currently patchy. Putting together a suitable 'writing group', obtaining consensus on some controversial topics and regular ongoing update and review would make this a somewhat complex task. The guidelines need a stamp of approval (e.g. peer group preparation and endorsement of guidelines). Paracetamol, the most common single agent, has a good protocol – but the patient may be admitted (unnecessarily) while waiting for estimation of serum paracetamol level. The protocol requires four hours to elapse from ingestion before testing. These tests can be done at all base hospitals (10,000 plus population towns); smaller towns need to send out samples for serum paracetamol levels.

Best practice guidelines should be prepared and/or endorsed by relevant peer organizations such as medical colleges and pharmacy professional bodies (see section 3.2.3 Other key informant specific recommendations).
The Therapeutic Goods Administration has responsibility for listing drugs for child resistant packaging (CRP) requirements.

There was concern among respondents that market forces prevail over safety considerations. Packaging issues raised by the respondents include deficiencies regarding CRP: the use of mandatory standards differs between countries and by agents. Australia has a limited range of agents in CRPs by comparison. It was argued that Australia is currently reactive, responding after failures rather than taking a proactive approach to safety. In addition, CRP standards are less rigorous for non-reclosable containers (blister and strip packs) and a child panel test is not required. The US Consumer Product Safety Commission *Testing procedure for special packaging* and the British, Canadian and German Standards include child testing for non-reclosable packaging for pharmaceuticals which are required to be in child-resistant packaging.

Australia should be proactive (like the USA) and require all prescription medications to be in child resistant packaging (see section 3.2.2 Key informant major recommendations).

Although there are more medicines packaged in blister and strips than bottles, there is a move towards bottles rather than foil packages (increasing the risk of overdose and CRPs are not necessarily used on the bottle). Failures of child resistant closures on bottles also need to be investigated (for agents where CRP is currently required). Problems with the relevant Australian Standard may relate to the allowable proportion of failures (at panel testing) of 20%, and panel children are often older than the highest “at risk” age group.

Leading edge design of CRP for senior friendliness and for liquids is lacking in Australia and additional specific household products should be included. Furthermore, clinicians report cases of young children removing lids from medication and parents leaving lids off. This requires further investigation.
Standards are inconsistent regarding uniformity of packaging and scheduling of agents. Specific household products, such as dishwasher detergents should be scheduled products. Agents vary in hazard / toxic potential and have inconsistent warnings.

States adopt national decisions of SUSDP (Standards for Uniform Schedule of Drugs and Poisons) for scheduling of products.

One respondent felt that Australia could improve its poisoning prevention performance if it adopted a Code of Practice for Child-Resistant Packaging of Toxic Substances, as New Zealand has done. This warrants further investigation.

8) Misuse and misunderstanding of medications were noted including misapprehension by the public about reasons for using medicines, over-administration, and medicines stored in the fridge unnecessarily. “Peripheral products” (non-pharmaceuticals) are also often associated with lack of knowledge of their toxicity by the public. Decanting of toxic agents is also risky.

9) Agents are frequently left out when in use, thus warranting the development of designs for safe local storage.

The development of new designs for safe local storage of medications when in use should be investigated (see section 3.2.3 Other key informant specific recommendations).

10) Increasing exposure was noted. This is possibly due to increased numbers of agents becoming available in homes, supermarkets and pharmacies. Behavioural factors influence exposure such as parents/carers leaving agents out, children exploring boundaries that parents have not thought of and overload of kids in holidays, raising supervision and safe local storage issues. Agents, particularly household products, may not be generally thought of as
poisonous and the separation of dangerous agents on some farms and businesses may not be working well.

11) The active intervention of parental/caregiver awareness raising and education activities necessarily involve cohorts of new parents, who are just learning parenting skills, and therefore repeated programs are needed for each new cohort of parents. Childcare is often provided by other caregivers, such as grandparents, thus necessitating wider programs.

One respondent felt that countermeasures requiring active intervention by parents are ineffective and they are resource intensive since repeated programs are needed. It was argued that resources are wasted on ineffective countermeasures.

“A national evidence based approach to changing the source of the problem is required rather than attempting to modify parents’ behaviour.” (see section 3.2.3 Other key informant specific recommendations)

12) Poisons Information Centres were described as under-utilized and under-developed. The actual effectiveness of PICs, and other poisons information was considered by some to be unknown and, particularly, no comparison of poisoning management effectiveness and costs has been conducted between Australian PICs and those in the USA, which provide a medically informed call-back service. At the same time, PICs were described as having difficulty in getting and keeping staff for the service, and suffering from a shortage of pharmacists.

13) Medications should be removed from the market when they are used infrequently and/or better products have superseded them (see section 3.2.3 Other key informant specific recommendations).

14) Treatment protocols generally recommend sending children home, or observing them and sending them home – except where the child has symptoms or positive laboratory results. The view was expressed, with regard to paracetamol
(the most common pharmaceutical agent identified in child poisoning incidents), that the recommendation in the literature of 200mg/kg has not been set into clinical practice. The RCH is cautious about this and identifies 150mg/kg of paracetamol as the appropriate level for paracetamol. (This is potentially an area warranting further research, though the respondents did not specifically make this suggestion). Specific local recommendations for tricyclic antidepressants, another contentious issue in the literature, include careful clinical examination. (Due to their 4 hour maximum absorption time, some signs are likely to be present after 2 hours if a toxic dose has been ingested.)

3. Are you or your organisation undertaking any (further) interventions / programs directed at prevention of poisoning or improved medical management?

1) The organisations surveyed are undertaking ongoing prevention and control functions, including statutory functions, quality assurance of pharmaceutical medical management, preparation of clinical practice guidelines, and staff education, particularly on the importance of non-intervention for most poisoning presentations. Funding of PICs by State Governments and their service delivery are also ongoing. PICs accept calls from the public and practitioners regarding the management of exposed cases. NSW PIC offers the only after hours service. Additional ongoing functions are described above in response to question 1.

2) Overall little new action was reported. The key informants' response to this concern is detailed under questions 4-8.

3) Progress is slow where specific problems and solutions have been identified e.g. automatic dishwasher detergent. Re-assessment of the problem was recommended - to be followed-up if necessary by Kidsafe writing to manufacturers to seek a report on progress.
Re-assess child poisoning due to automatic dishwashing detergents and, if the problem persists, ask Kidsafe to seek a report on progress from manufacturers (see section 3.2.3 Other key informant specific recommendations).

4) Farm safety programs address poisoning prevention, though they have not been evaluated for reach or effectiveness.

5) Research in progress was identified with regard to the timing of taking paracetamol levels (since the current 4 hours from ingestion is considered by some respondents as too long for optimal patient management), influencing both the initiation of treatment and the propensity for children to be admitted unnecessarily.

When available, research regarding the timing of taking serum paracetamol levels should be reviewed in the context of best practice guidelines (see section 3.2.3 Other key informant specific recommendations).

6) Information is provided by the PIC by means of a pamphlet distributed to General Practitioners, childcare centres, and Maternal and Child Health Centres. Wall stickers and phone and fridge stickers are provided for parents/carers by the PIC as well as assistance to the RCH Safety Centre for the provision of poisons prevention promotion. There is also a VIPC website at www.rch.org.au/poisons. It has general poisoning prevention and first-aid advice for members of the public.

4. **What are the interventions or programs that you think are having an impact on reducing or limiting poisoning (especially recent interventions, i.e. last 5 years)?**

(See answer following question 5)

5. **Is there evidence to support your views (please specify evaluation results)?**
These two questions are considered together because they are closely related. In fact, the respondents referred to very little supporting evidence, possibly reflecting the survey nature of this study. Successful interventions were considered to be multi-factorial, though it was broadly agreed that, theoretically, prevention should be more successful than it has been and that nothing much had changed in recent years.

Respondents indicated that the current base poisoning prevention functions are important and should continue (see section 3.2.3 Other key informant specific recommendations).

1) CRCs were identified by all key informants as having an important impact in preventing deaths and the escalation of poisoning cases. Evidence for greater effectiveness in the USA is based on a much broader use of CRCs and a lower poisoning rate. CRCs are particularly important since they represent a passive measure, but they should have a greater impact than is currently evident in Victoria. Better design and a wider range of agents in CRCs are needed. Several respondents felt that we should spend more effort on further development of packaging as a poisoning prevention measure.

2) Other passive measures including scheduling and restricted pack sizes were also considered effective and worthy of further investigation.

3) Public education is patchy, but may be important and requires evaluation.

4) The death rate has decreased as a result of improved treatment as well as improved packaging.

6. **What do you think are the most promising areas for any future work to reduce the incidence, severity, or burden of poisoning among young children? (Policy, access, co-ordination, specific interventions, research)**

1) CRCs are under-used. The range of agents in CRCs should be increased.
2) The design of CRCs should be improved and tighter panel test requirements implemented for child resistant packaging, including blister and strip packs.

3) More regulation, including classifying paracetamol as a prescription drug, and reduction of the volume in packs is required. There are currently no incentives to package well (eg. calendar packs). Sachets with the required dose could be a solution for some medications and a soy/Worcestershire sauce type bottle for medications should be considered to limit access.

While a move to “dosettes” (containers which hold the tablets in easily accessible, clearly marked sections for each day and dose period), and similar devices, may be suitable for hospital environments, their use in private homes may be risky.

It was recommended that the Victorian Injury Surveillance and Applied Research System (VISAR) should investigate the involvement of “dosettes” in child poisoning cases (see section 3.2.3 Other key informant specific recommendations).

4) Improvement in hospital medication administration policies. In-hospital poisoning (iatrogenic poisoning) occurs due to medication errors. Systems are needed to prevent errors, including a patient safety committee. An audit function is required that includes pharmacy. The promotion of on-line prescribing would also contribute to reducing iatrogenic poisoning by decreasing opportunities for errors related to mis-reading of handwriting and decimal points. An "intelligent system" could also identify unusual doses and unusual intervals between doses.

A recent international journal publication indicated large errors in dosing children in hospital\textsuperscript{134}.

Iatrogenic poisoning of children in Victorian hospitals should be investigated and systems implemented to prevent these errors (see section 3.2.3 Other key informant specific recommendations).
5) Some respondents recommended education and awareness raising, while others were sceptical about the relative merits compared with regulatory and design changes. Suggestions included:

- encourage population awareness of PICs
- make sure people understand what medications they have (eg. quinine)
- widen the recognition of hazards (eg. puffers / inhalers; household agents)
- implement a campaign targeting the importance of putting lids back on medications and/or alternative packaging designs (possibly through pharmacies)
- educate the public to lock poisons away (eg in locked cabinets)
- improve general parenting skills with training.

A common theme in many childhood poisoning calls to the Poisons Centre is that parents underestimate or overestimate their child's ability, (e.g. 'My son moved the chair and climbed up to get into the medicine cupboard. I didn't know he could do that!'; 'I've told my daughter many times she is not to touch anything in the medicine cupboard, but she still goes there.') This would be an important issue to be addressed in any parenting skills training program.

Grandparents were suggested as the subject of a targeted program. Grandparents are frequent babysitters and may have their medicines easily accessible to children, eg in the handbag (a fairly common circumstance for calls to the Poisons Centre). Also, many of the medicines taken by older people are potentially very toxic to children.

6) Several research areas were recommended for attention

- research is required to determine the circumstances and mechanisms of poisoning - data, problem definition, particularly by means of injury surveillance and call-back (case series) studies
- although it is needed to assess effectiveness, data on the type of packaging contributing to a poisoning event is minimal and warrants investigation
- data on involvement of CRCs in poisoning events is needed
– a research project for non-reclosable packaging (strip, blister packs) using a child panel test protocol is required (note, the Injury Surveillance and Control Unit and Hazardous Substances Section of the Department of Human Services – SA is undertaking a project that includes child-testing of non-reclosable packaging for pharmaceuticals)
– one respondent considered that CATI (computer assisted telephone interview) survey questions are required to determine community awareness of PICs
– another respondent recommended research to establish the most effective strategies to increase awareness.

7) The further development and implementation of protocols (clinical guidelines) including improvements to admission policy is required. An RCH handbook is distributed overseas, suggesting this contains best practice information. Educational programs for regional hospital staff and telephone lines to the PIC at triage desks could assist with triage.

Further emphasis was recommended in medical and nursing under-graduate education (such as a case study in problem based learning curricula), together with re-training opportunities for general practitioners (see section 3.2.3 Other key informant specific recommendations).

8) A number of recommendations were made to reduce the distribution and accessibility of toxic agents in the community including:
– improvements to prescribing habits (e.g. paracetamol currently does not require a prescription and according to some respondents is grossly overused in the community)
– stop outmoded/unnecessary toxic substances from being sold
– sell selected over-the-counter (OTC) medications only in pharmacies (not in supermarkets, etc.) (see section 3.2.3 Other key informant specific recommendations)

The Commonwealth Department of Health and Aged Care was seen as the most appropriate agency for ensuring the safer supply of medications, particularly by
means of scheduling and packaging, to reduce the distribution and accessibility of toxic agents in the community.

9) Problematic drugs and chemicals should be targeted. They should be evaluated case by case for interventions: packaging; information at pharmacy; information at point of sale; and warning labels (see section 3.2.3 Other key informant specific recommendations).

For example, strategies for illicit drugs (eg. pseudoephedrines) could lead to a possible decrease in access for children.

7. **What are the barriers and the potential drivers for these changes? (Policy, regulation, co-ordination and management, resources)**

**Barriers:**

1) The community “needs” agents, thus constraining, to some extent, the range of possible intervention.

2) There was a perception among key informants that leadership is lacking at both Commonwealth and Victorian State Government levels (a theme common to most respondents). A vital co-ordination role for the Victorian Government was identified as necessary and co-ordination and management across states was noted as poor. One respondent stated that the DHS is disinterested in fulfilling an effective role in child poisoning prevention “child poisoning is not a big issue in health departments”. “A champion is needed in a government department (but there are constraints within the bureaucracy).” “There is no driver for child poisoning prevention (or for other aspects of injury prevention in Victoria).” “Little regulation by States and Commonwealth is associated with significant blame on the parents rather than solving the problem.”

3) Market forces and commercial interests prevail and there is a general resistance to change; therefore good data is needed and public exposure to the issue eg stimulate public debate on resistance to increasing the use of CRCs.
4) The politics of poisoning prevention were considered to be complex. For example the Therapeutic Goods Administration (TGA) is largely industry funded and this makes change difficult. Cost arguments are put forward by industry to resist change, though these are not necessarily supported by the available evidence.

5) Scheduling changes require considerable effort. A comprehensive response is required; barriers (commercial interests) exist; lobbying is needed; and leadership and support are essential.

6) Lack of common management protocols; and laboratories need to be on board about not doing inappropriate tests (part of best practice guidelines).

7) Funding for PICs is inadequate and precludes additional functions. A proposal to tax licences to support PICs was resisted.

8) Information overload for parents / carers, suggesting that more effort is required on the passive measures of regulatory and design change.

9) Alcohol is widely available in home settings and is an important agent in acute child poisoning.

Drivers:

Introduction

It was widely considered that DHS and TGA should contribute to a multi-disciplinary program and that each has an important role; TGA with regard to supply and DHS with regard to reach to professionals. However, one respondent suggested “a couple of childhood deaths may be necessary to drive change!”

Respondents called for a broadly collaborative approach to drive child poisoning prevention and a number of specific potential drivers was identified:
1) A strong case based on good data and the way it is presented, including good data on CRC failure from PICs and EDs. This would require resources and research effort.

2) Changes to CRC design and the regulation of additional agents would drive a reduction in child poisoning rates. It was noted that SUSDP provides the mechanism for scheduling of products.

3) Threat of litigation (if information is made known about failure to prevent child poisoning).

4) Consumer advocates and pressure from the Australian Consumers Association.

5) Lobbying and convincing key players (e.g. manufacturers and legislators) for change in management and coordination.

6) Medical Colleges engaging with the issue (and individual champions within Colleges) (e.g. Paediatrics, General Practice).

7) Pharmacy professional bodies.

8) Enlist key paediatricians (individuals named by respondents) who have an interest in reducing overuse of specific agents in the community (e.g. paracetamol to be reduced by half).

9) Resources are needed to implement evidence based change and to effectively reduce the child poisoning rate.

10) Advocacy by Kidsafe, St John first aid, or similar organisations would be important to get action.

Publication of evidence based recommendations from the current study and supply of the results to the Strategic Injury Prevention Partnership (SIPP) and the Public Health Partnership (see section 3.2.3 Other key informant specific recommendations).
8. In your view, which organisation / Department should have the lead role in preventing poisoning among young children? (State, commonwealth, other)

The most common view was that Government, specifically the Commonwealth Health Department, should take a leadership role in facilitation and co-ordination. The Australian Health Ministers Advisory Council (AHMAC) would have the authority but probably not the interest. At the Commonwealth level, health involves many departments. One view expressed was that the TGA is too remote from the community to be interested. State Government Health Departments take an overview of rural and urban issues and have access to parents / children and practitioners. State Health Departments are particularly well placed to resource, co-ordinate and facilitate the many actions identified in this study that can be implemented or initiated at the state level.

A role for Specialist Medical Colleges, such as the RACP College of Paediatrics, the College of Emergency Medicine, and the College of General Practice was identified by several respondents with regard to training and the dissemination of guidelines. The possibility of using Divisions of General Practice to engage with the issue was also suggested.

Greater attention to child poisoning prevention in medical, nursing and in-service training was recommended (see section 3.2.3 Other key informant specific recommendations).

Another common theme was the importance of leaders and champions for child poisoning prevention “one huge deficiency is lacking champions” and “at least one strong individual (based on evidence and outside government) to drive and see through”.
9. **Are there issues that are of particular concern to you / your organisation in relation to poisoning matters that you would like to raise? (Medical management, policy / regulation, resources, co-ordination of effort)**

Issues raised under this question were similar to those raised collectively in response to other questions. For clarity, this information has been grouped with similar responses elsewhere.

10. **Who else should be consulted on these issues?**

Many of the key informants who were recommended for consultation by the respondents were, in fact, on the original key informant list developed by the project team. This tended to confirm our selections. It was also recommended that Melbourne and Monash University Medical Schools should be contacted to determine the amount of teaching time allocated to child poisoning prevention. (This recommendation was followed-up and is reported at Appendix III.)

Additional recommendations were made to interview Peter O’Connor (has moved on from the National Injury Surveillance Unit); training program for clinical toxicologists (Andrew Dawson – Mater Hospital, Newcastle); Greg Pallas – Warrnambool Paediatrician and ED trained; Richard Bell – NDPSC, DHS; Professor Roger Nation, Professor of Pharmacy Practice, Victorian College of Pharmacy, Monash University.

The limited project resources available for this part of the study did not allow for these additional interviews to proceed at this time.

3.2.1 **Discussion**

The key informant study design was largely based on the findings of the child poisoning literature review and Victorian child poisoning data patterns and trends. There was considerable consensus that there have been no new effective countermeasures for childhood poisoning in recent times and that there has been little new intervention activity.
It was agreed that the current basic poisoning prevention functions remain important and should be continued.‘

Several major recommendations were compiled from the key informant interviews.

3.2.2 Key informant major recommendations

1. That Commonwealth and State Health Departments take leadership in the facilitation and co-ordination of child poisoning prevention.

2. That the Commonwealth Department of Health and Aged Care adopt a leadership role specifically for the safer supply of medications, particularly by means of scheduling and packaging, to reduce the distribution and accessibility of toxic agents in the community.

3. That child resistant packaging be implemented more widely (to include more agents) including strip packages; that CRC failures be investigated and the design improved; and that child panel testing for child resistant packaging standards be reviewed and enhanced.

4. That Best Practice Clinical Guidelines for the diagnosis and management of child poisoning be implemented throughout Victoria with the involvement of appropriate Medical Colleges and professional bodies and a view to reducing unnecessary hospital admissions.

5. That a strong case be developed for child poisoning prevention based on good quality poisoning data and scientific research evidence to stimulate public debate and government action. Specific research recommendations are listed at question 6(6).

6. That the role of the PIC be reviewed with regard to taking a stronger role in poisoning prevention in addition to their current focus on secondary prevention.

7. That educational programs be considered to raise awareness and knowledge in the community with regard to specific messages, found at question 6(5) and that these be evaluated for effectiveness.
3.2.3 Other specific key informant recommendations

Many other specific recommendations were made by key informants, particularly with reference to packaging, best medical practice, reducing exposure to poisoning, local safe storage, marketing practices, research, and training. These recommendations are cross-linked to this section throughout the text.

The role of poisoning surveillance should be examined as part of a more general review of Victoria's injury surveillance systems.

Respondents noted that engagement with the issue of child poisoning and advocacy to drive action may be required from several sources external to government including Medical Colleges and professional bodies, the Australian Consumers Association, Kidsafe and St John Ambulance. The possibility of litigation may be another potential driver if action is not taken.

Respondents acknowledged that resources would be required to implement their recommendations. They also recommended that evidence based recommendations from this study and the broader collaborative child poisoning prevention project should be published and referred also to relevant injury prevention committees.

Implementation

While some of the research findings require national action, and therefore possibly a less direct role for Victoria, many should be considered for implementation in Victoria. The advantages of undertaking structural changes compared with behavioural changes are well documented in the injury prevention literature (passive versus active approaches), and this point was made strongly by most of the informants. For some important actions required at the national level, such as issues related to child resistant packaging, Victoria could initiate progress by putting these on the agenda and lobbying for action, particularly through relevant national committees including SIPP. Victoria could address the key research issues and initiate action on many of the major and more specific recommendations made in this report.
3.2.4 **Strengths and limitations of the study**

The study was limited to nine key informants, plus two interviews focussed specifically on medical education. The cross section of respondents from a wide range of relevant organisations provided rich insights into the poisoning problem and its persistence and there was a great deal of consensus in their views. However, if the view was expressed by only one of the key informants, it is duly noted in the text.

The open-ended questions in the structured interview reduced the risk of interviewer bias. In addition, direct quotations from respondents are used where appropriate in this report to make clear the intended meaning of responses. Prompts available to the interviewers are shown on the structured interview protocol (Appendix II).

By its nature, the key informant study provides a “big picture” response to the DHS focus on improving the uptake of safety practices for child poisoning prevention in light of the specific study research questions.

The key informant interviews, together with the literature review, recommended that educational messages should focus at many levels, particularly with regard to the implementation of best practice treatment guidelines. Although there were differing views among the key informants regarding the effectiveness of education at the community level, all agreed that evaluated educational interventions with specific identified messages should be considered among other recommendations.

While it was almost universally agreed that Commonwealth and State Governments should take leadership roles in preventing child poisoning, the view was also expressed that, because of the spread of responsibilities, one lead organisation is not possible. *For this reason, the author of this report suggests that the establishment of an expert task force may be warranted to assist government with this function.*
3.2.5 Conclusion: Key informant interviews

The key informant interviews provided a rich source of strong recommendations applicable at both state and commonwealth levels. Supportive evidence for many of the recommendations is provided by the literature review and Victorian injury data. If implemented, these recommendations have great potential to improve the uptake of safety practices to prevent child unintentional poisoning across many sectors.

3.3 Research findings – Stakeholder focus groups

The health and safety practitioners consulted for this phase of the research expressed surprise when presented with the data on the prevalence of child unintentional poisoning. Many were not aware of its significance as a public health issue, perhaps because the majority of them were rarely involved directly in an incident. Parents seemed to be more likely to access either the Poisons Information Centre or the Emergency Department directly rather than to seek the initial advice of their pharmacist or general practitioner. The Ambulance Service reported that they were only likely to be called if the child was distressed in some way or was in an altered state of consciousness. Cases that did come directly to the pharmacist or doctor were either reassured or referred to the local Emergency Department, as appropriate. Service providers also consulted the Poisons Information Centre if they needed to clarify any poison information before advising parents.

Representatives of safety organisations and children’s services reported that while there is a community awareness about poison safety measures, there are barriers and risk factors that impact upon poison safety, such as:

- A delay in introducing measures until the babies ‘reach that stage’
- Young mothers’ limited life experience makes them less aware of the reality of risk
- Older siblings can help younger siblings to access substances
- Substances that are in use are often left in a convenient location
- Substances that have just been purchased are not yet stored safely
- Parents can underestimate the developmental level of the child in terms of ability to access products
• Parents can overestimate the developmental level of the child in terms of ability to understand warnings and follow instructions
• Parents tend to limit safety measures to those products/areas in which the child has demonstrated an interest
• External factors can increase risk, eg. visitor’s handbag
• Medication may be left out in the grandparent’s home so it is not forgotten, reflecting the conflict between safety issues for different life stages
• Generic brands of medicines are often not packaged as safely as brand named products. The cheaper packaging makes them lower cost but also low on safety
• It is sometimes difficult for parents to know how to apply safety information as practical measures in their own homes
• There is low awareness among parents that household products such as eucalyptus oil are toxic
• Medications that need to be refrigerated are more readily accessible to children
• Parents are not recognising the reality of personal risk.

Service providers suggested that for safety conscious families a poisoning incident is likely to arise from an unusual scenario that causes a change in the home environment. Other common scenarios noted were children eating tablets thinking they were lollies, and carers inadvertently administering the wrong medicine or the wrong amount of the right medicine. It was suggested that unintentional poisoning incidents in lower socio-economic families are likely to arise from failure to implement appropriate safety measures because these families often have competing lifestyle pressures, limited storage options, limited finances to purchase safety products and sometimes, particularly for very young parents, undeveloped living/coping skills.

CALD communities were identified as being at greater risk in terms of child unintentional poisoning because of language and literacy barriers to understanding labels and medical instructions. They were also identified as being at greater risk in terms of the management of child unintentional poisoning because they don’t utilise the Poisons Information Centre and tend to rely on advice from the extended family rather than seeking professional advice. It emerged that presentations at ED are very rare for certain CALD communities despite the fact that those communities regularly access the ED for other issues. This highlights the need for cross-cultural research to investigate this phenomenon. It is possible
that risk factors in relation to management of child unintentional poisoning will be identified and will inform community specific interventions. Alternatively, research into this topic may identify community specific protective factors that help prevent child unintentional poisoning and potentially have cross-cultural applications.

Different perceptions of what constitutes adequate supervision were also raised by key informants as a critical factor impacting on child safety. As views about appropriate levels of supervision seem to arise from different cultural and family backgrounds they are difficult to address and warrant further examination of the impact these may have on outcomes. A similar issue has arisen in other sectors in relation to water safety. The concept of active parental supervision was tackled in the “Play it safe by the water” campaign conducted by Sport and Recreation Victoria.

It was noted that the chemicals and other toxic products present in a farm environment are not usually readily accessible but nor are they being locked away. The FarmSafe representative noted that the level of risk in a farm setting has increased over time and yet many farms have not been set up to manage this risk. He suggested that farmers are not always conscious of the increased risk or the fact that community expectations about safety have changed over time. This may have contributed to the higher poisoning admission rates in rural areas compared with metropolitan centres.\textsuperscript{12,46} However, it was also suggested that young children are usually kept separate from the areas where those substances are kept.

The coordinator of Family Day Care Services noted that carer training and regular safety checks of family day care home environments are conducted to ensure safety standards are met.

The issues raised by key informants as socio-environmental factors impacting upon poison safety in the home, were supported by the findings of the qualitative phase of the research (see section 4.7: Research findings – qualitative phase).
3.3.1 Stakeholder proposals

The key informants proposed a range of measures to reduce the incidence of child unintentional poisoning. These proposals have been categorised as environmental, legislative or behavioural measures.

3.3.1a Environmental

- Warning labels and CRCs for all toxic products
- Every house have a lockable, high poisons cupboard
- Target manufacturers to encourage them to package products in a way that is not attractive to children, to use smaller amounts in packaging to minimise exposure, and to consider establishing a single colour for all toxic products so that they are readily identifiable. This is supported by a study analysing the impact of drug prescription patterns and changes to product appearance and packaging on child poisoning admissions^{135} (see section 2.3.6: Common agents)
- Establish a high recognition symbol, a generic safety warning, similar in concept to the red circle with the line through it. This possibility is explored in the literature review, see section 2.6.3h: Stickers/warning labels
- Place warning labels on any poisonous plants available for sale
- Re-institute the practice of fitting public housing with a lockable poisons cupboard (using an elbow lock)
- Introduce farm-safe commercial penalties for failure to follow safety guidelines in relation to storage of toxic products on farms, similar to the program that was designed to minimise the treating of grain with products that emitted dangerous fumes.

3.3.1b Education – parents

- Maternal and Child Health (MCH) Nurses conduct a house safety audit at birth and 12 months
- Parent education about poison safety
- Use interactive techniques to educate about risk, similar to the water safety mapping technique used in the Farmsafe campaign, and the Strike Zone campaign used in America for injury prevention in the home
- Encourage active supervision
- Translate safety learning into appropriate action in the home environment.

It was noted that parents who are safety conscious tend to access various sources of safety information whereas innovative strategies are needed to get the safety message to ‘hard-to-reach’ parents.

- Develop a combined campaign with a consistent message being promoted across various sectors, similar to the ‘Play it Safe’ water safety campaign
- Media coverage – there is an opportunity to mimic the strategy of issuing fire safety messages alongside media coverage of fires in homes (there was some debate about whether families would be uncomfortable with the publicity or would appreciate the opportunity to spread the safety message to protect others from the same experience)
- Develop a poison safety segment to screen on closed circuit televisions displayed in medical waiting rooms
- Conduct a TV campaign incorporating a community announcement, inclusion of poison storyline in a drama serial, and/or a segment on a chat show, SBS coverage
- Include a poison safety segment in the program for the next Ballarat Children’s Health Night
- Recruit local ‘champions’ for promotion of safety message in rural districts
- Develop a poison safety module for inclusion in first aid courses, including those run by Ambulance Victoria (contact person: Mr Rick Jackson, Marketing Manager, Metropolitan Ambulance Service, ph 9840 3629, rick.jackson@mas.vic.gov.au)
- Recruit pharmacists and ambulance officers to take a role in the safety campaign
- Suggested target points for information and education initiatives:
  - Posters displayed where mothers congregate to pick up kids from school
  - Primary school councils
  - Check-out areas at supermarkets
  - GP waiting rooms – posters, pamphlets, closed circuit TV
  - Caution – target the person who actually makes the decisions in the house, don’t use an indirect approach, e.g. targeting kids.
3.3.2 Conclusion: Stakeholder focus groups

These recommendations will be considered in the context of the literature review and the qualitative and applied findings to develop recommendations about future research and interventions to reduce the incidence of child unintentional poisoning and improve the management of poisoning incidents.
Chapter Four: Qualitative phase

This section will detail the research activities and findings for the qualitative phase of this project, consisting of a series of in-depth, semi-structured interviews and focus group discussions. The aim of this part of the research was to gain an increased understanding of the factors influencing parental uptake of child poisoning safety measures.

4.1 Grounded theory

A grounded theory approach was utilised for the qualitative phase of this study. Grounded theory was collaboratively developed by Glaser and Strauss and is based on the idea that a theory should be formed through the collection and analysis of research data. It should not be developed in isolation and then data collected to prove or disprove it\textsuperscript{136}. Glaser and Strauss claimed that inductive development from social research is essential to the generation of a useful theory:

One does not begin with a theory, then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge\textsuperscript{137}.

This generation of a theory is a dynamic process and occurs throughout the research - both arising from the research process and directing the research process. The research process consists of the collection of data through social research in conjunction with the coding of data into categories and the analysis of the categorised data. The analysis of the data involves making constant comparisons and asking questions to refine concepts and explore connections\textsuperscript{137}. This allows the development of an understanding ‘grounded in’ the data to emerge.

In summary, grounded theory emphasises the development of theory through a data driven, inductive process that occurs in interaction with the collection and analysis of data.
4.2 Using the data sensitively

The inclusion of a significant number of quotes in this report and the use of a label that indicated the family status of the speaker, eg Mother of 18 month old girl and 3 year old son, were strategies that were deliberately employed as a humanising element to highlight the reality of personal risk – an issue identified as a barrier to uptake of safety measures (see section 4.7.11: Awareness of risk). Names were changed to protect the anonymity of the family but the ages of the children were included where known because of the link between parental safety measures and the perceived developmental level of the child (see sections 4.7.4: Reliance on child following instructions and section 4.7.5: Reliance on child’s consistent behaviour).

Some repetitive speech mannerisms and interviewer comments were left out to avoid obscuring the essential information. Clarifying statements were occasionally added in brackets.

4.3 Recruitment of participants

The qualitative phase of this research project consisted of 23 interviews and 7 focus group discussions involving a total of 65 parents. The parents were recruited from three different sources: Victorian Poisons Information Line, Royal Children’s Hospital Emergency Department, and community playgroups (further details provided in sections 4.3.1, 4.3.2, and 4.3.3). Recruitment was restricted to parents of a child under 5.

Purposive sampling was used to ensure that information was gathered about agents that were commonly involved in child unintentional poisoning. In the Emergency Department five poisoning agents are responsible for approximately one third of both emergency department presentations and hospital admissions. These agents were paracetamol, cough and cold preparations, benzodiazepines, anti-histamines, and cardiovascular drugs. It was agreed that at least one interview should be conducted for each of these agents. However, recruitment was limited by the actual incidents occurring in the recruitment period. See Table 3 for details of the agents represented in the research sample.
Table 3: Poisoning agents represented in interviews and focus groups

<table>
<thead>
<tr>
<th>Recruitment source</th>
<th>Agents involved in poisoning incidents discussed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Department</td>
<td>Paracetamol, thyroid medicine, cough and cold medicine, migraine medicine, selective serotonin re-uptake inhibitor (SSRI) antidepressant, benzodiazepine, antihistamine, essential oil, corticosteroid</td>
</tr>
<tr>
<td>VPIC</td>
<td>Toilet freshener, antacid, oral contraceptive, essential oil, cough suppressant, bath oil, bubble bath, bath preparations, miscellaneous medicine, mineral turpentine, disinfectant, calcium supplement, paracetamol</td>
</tr>
<tr>
<td>Community playgroups</td>
<td>Ethanol (non-beverage), topical antiseptic bleach, detergent, laundry, paracetamol, cough and cold medicine, detergent, automatic dishwasher, vitamins compound without iron, sedative/hypnotic, other/unknown, cleaner, all purpose/hard surface, nonsteroidal anti-inflammatory drug, oral contraceptive, cleaner, miscellaneous, polish, furniture, petrol, toilet freshener</td>
</tr>
</tbody>
</table>

The agents that generate the most calls to VPIC are paracetamol, benzodiazepines, cough and cold preparations, and selective serotonin re-uptake inhibitors, as well as cleaning products, silica gel, and bleach. Spider bites are also a common cause for calls but did not fall within the parameters of this project. Other agents that could also be included were: household products such as hard surface cleaning agents, bleach, essential oils; or outdoor/gardening products such as rodenticides or plants.
Table 3 shows that all of the agents commonly involved in presentations to the Emergency Department and calls to VPIC were included in the sample, except for cardiovascular drugs. This agent was not evident in the cases that arose during the recruitment period.

Maximum variation sampling was also used in the recruitment process to ensure that a range of socio-demographic factors were represented in the sample. This was consistent with the social constructionist approach being used in this study which acknowledges the interacting influences of social determinants on safety behaviours. Listed below are details of the socio-demographic spread achieved in the research sample:

- Parent participant age ranged from 17 – 42 years
- Families were housed in privately owned, rental, public, high rise and grandparent homes
- Families were located in inner city, suburban, outer suburban, rural town, rural remote and rural property
- A range of CALD communities were represented including Chinese, Middle East, Somali, East Timorese, Turkish, Singaporean, English and South American.

See section 4.6: Research limitations for a discussion about the collection of demographic information.

The parent who contacted VPIC, arrived at ED, or participated in the playgroup was invited to participate in the study. In 97% of cases this was the mother. This gender weighting reflects the predominance of females as the primary caregiver in Australian society\(^{139}\).

### 4.3.1 Victorian Poisons Information Line

Nineteen parents were recruited when they contacted the Victorian Poisons Information Centre (VPIC) following an unintentional poisoning incident involving a child under five years old. Three of these parents withdrew when contacted by the Project Officer and a further three were sent a letter to notify them that their name had been withdrawn from the study because of difficulties in reaching them. Thirteen of the parents were subsequently interviewed by phone. One of the parents did not return the consent form even after
receiving a follow-up request. The results from that interview were subsequently withdrawn from the study.

The following interview protocol was used to guide the semi-structured interviews:

- Can you please describe the event that led to you contacting the Poisons Information Line? (Explore factors contributing to unintentional poisoning).
- What was your response when this happened? (Explore awareness of Poisons Information Line).
- Discuss safety measures being used in the home and influences on choices.
- Discuss toxicity of products (explore awareness).
- Discuss child resistant containers (CRCs) (explore perceptions and behaviours in relation to CRCs).
- Has there been any change in the safety measures you are using since the incident?

The information collected in the phone interviews was written down by the interviewer and stored initially in a Word file.

4.3.2 Royal Children’s Hospital Emergency Department

Two nurses, Milli McLeish and Naomi Oborne, from the Emergency Department (ED) at the Royal Children’s Hospital were recruited as interviewers and trained for this phase of the project by the Project Manager (LG). They were responsible for conducting a keyword search of ED patient files each week to identify cases that fit the recruitment parameters. They then contacted the presenting parent to invite them to participate in the research study. All ten of the parents contacted agreed to participate in the study. The nurses conducted the individual semi-structured interviews with each of the participants, in their home. These interviews were guided by the interview protocol adopted for the VPIC interviews. One of the ED interviews was conducted by phone because of practical difficulties in arranging a home visit. The interviews were recorded on audio-tape (except for the phone interview which was written down) and transcribed. The tape recording was unsuccessful in one interview so the interviewer wrote down her recollection of the interview discussion that afternoon. This became the record of the interview.
4.3.3 Community playgroups

Community playgroups were selected by the Project Officer, in consultation with the Advisory Committee, to meet the requirements for a range of socio-demographic factors. Subsequently, 7 focus group discussions were held with a total of 42 parents in playgroups as follows (specific details about group location will not be provided to protect the anonymity of the research participants):

- inner city x 3
- south-east suburban
- outer suburban
- rural teenage mothers
- rural remote.

The focus group discussions were recorded on audio-tape and transcribed.

An additional phone interview was held with a dairy farmer to capture the experience of parents living and working in a farm environment.

The group discussions and the phone interview were guided by the following interview protocol:

- What safety measures do you have in your home to reduce the risk of child unintentional poisoning?
  - Explore safety measures in all parts of home environment (including outdoor and work areas) and discuss in relation to common agents.
  - Explore influences on choices in relation to uptake of safety measures.
  - Explore awareness of toxicity of various products in home environment (including outdoor and work areas).
  - Explore storage options and perceptions of safety products.
  - Explore perceptions and behaviours in relation to CRCs.
- Have you had an experience of a child unintentional poisoning or do you know of anyone who has?
  - Explore factors contributing to incident.
- What was your response?
- Explore awareness of VPIC
- Explore changes in safety behaviours following incident.

In summary, the focus of the interviews and discussions was on the safety behaviours employed by parents within the home and motivations for changed behaviours. Details of any poisoning incidents and parents’ response to those incidents was also collected. The aim of this phase of the study was to build a profile of current applications of safety practices in the home and factors contributing to child poisoning events, and to develop an understanding of motivators and barriers to parental uptake of poison safety measures.

4.4 Analysis of the data

The transcripts and interview records were entered into N-Vivo qualitative software and analysed using grounded theory approach. The data was coded according to the simple, concrete issues emerging from the interviews and then organised into these categories and studied to identify commonalities and variations. Further coding for processes, actions, assumptions and concepts was also carried out\(^{140}\). The patterns that emerged as a result of the coding and analysis of the first set of interviews were organised into preliminary findings which informed a discussion with the Advisory Committee and DHS about potential poison safety interventions. Development of the findings for the writing of the final report enabled further refinement of the categories and the development of a conceptual framework.

4.5 Triangulation techniques

Triangulation techniques are utilised in research using a grounded theory approach to achieve research quality and demonstrate methodological rigour. It involves the use of different data sources, different methods and sometimes multiple investigators\(^{141}\). The triangulation techniques used in this study were the use of different:

- Methodologies, i.e. consultative, qualitative and applied
- Recruitment sources, i.e. key informants, VPIC, ED, playgroups
- Interviewers, i.e. CCCH, MUARC, RCH ED
- Research agencies, i.e. CCCH, MUARC
And comparison with related research findings.

### 4.6 Research Limitations

There are a number of possible limitations to this research study as follows:

- Demographic information was collected initially from all interview participants but was not collected systematically from focus group participants for the following reasons: the focus groups were arranged via the playgroup coordinators and parents were recruited on arrival therefore detailed demographic information could not be collected from individuals before the discussion took place; the play group setting made it difficult for parents to complete written forms; asking parents to supply demographic information verbally as part of the focus group discussion would have impinged on their right to privacy; in addition, it was clear that some participants, particularly new immigrants and those from socially disadvantaged families, were concerned about revealing identifying information that may make them vulnerable to judgements about their parenting and safety standards.

- Interview participants were asked to nominate country of birth as an indication of CALD representation. This is clearly an inadequate measure as it does not necessarily reflect cultural identity. CALD representation among parents in focus groups arose informally through self-identification or through information provided by playgroup coordinators about the cultural groups represented among the playgroup families that participated in the research.

- It was not possible within this project to achieve a detailed understanding of socio-cultural differences in parental approaches to poison safety because the maximum variation sampling technique provided representation of a range of social groups rather than detailed input from a particular group. This allowed the identification of commonalities in behaviours and attitudes towards poison safety across social groupings, supporting the goal of the project to develop statewide intervention strategies rather than community specific initiatives. Therefore, it was accepted as a limitation of the research methodology.
• One of the agents commonly involved in unintentional child poisoning, cardiovascular drugs, was not represented in this research study because it did not feature in the child poisoning incidents that presented to VPIC or ED during the recruitment period. This may mean that important risk factors relating to that agent has not been identified. However, both the interviews and focus group discussions did provide an opportunity to explore parents’ attitudes and behaviours to a range of household and pharmaceutical products and to poison safety measures generally. A separate study linked incidences involving cardiovascular drugs to grandparent carers (see section 2.3.9: Other social factors). The role of grandparents in child unintentional poisoning was identified in this study (see section 4.7.10: Risk factors).

4.7 Research findings – Qualitative phase

Parents were generally unaware of the public health significance of the risk of child unintentional poisoning “Because I haven’t known anyone to be sick with poisons, anyone’s kids.” This translated into a difficulty for many parents to recognise the reality of personal risk from child unintentional poisoning. As a result, the over-riding themes emerging from this phase of the study was the tendency for parents to have inadequate poisoning prevention measures in place due to: inconsistent or incomplete application of safety practices; underestimation of the developmental level of the child; or over-estimation of the developmental level of the child. The most significant motivator for increased poison safety behaviour was personal or vicarious exposure to a near or actual unintentional child poisoning incident.

4.7.1 Safety measures commonly used in the home

The most common safety procedure being used by parents was storage of products, especially medicines, in an overhead cupboard that was out of reach of children. There was little evidence of these cupboards being locked despite the fact that the main message for poison safety is to store toxic products in a locked cupboard or cabinet. This has been noted in previous unpublished Victorian research where it was found that parents were not implementing this safety practice in the home.
It was not unusual for parents not to have an overhead cupboard in the bathroom or laundry, making it difficult to store toxic household products safely. Public housing tends to be particularly limited in providing storage options, with high-rise accommodation providing a shared laundry facility, resulting in laundry products being kept in a bucket in the bathroom:

But in my bath no cupboard. All I put in the bucket, plastic bucket. I put all my washers and I put in the bucket, that’s it. But it’s safe. Yeah, yeah I close the door. I close the door but not lock it, only like this one [points to internal door in playgroup room with standard round door handle]. No key. But now he bring that chair, there’s a chair.

*Mother of two and four year old boys*

This mother’s comments show how she tried to keep her child safe from the cleaning products by using the door to prevent unsupervised access. However, the limitations of the facilities were undermining her safety efforts. Later in the discussion she described how she had overcome the lack of appropriate storage areas in her kitchen by contacting the maintenance service for the high rise public housing she was living in and asking if locks could be put on some cupboard doors at the same time as her front door lock was being fixed.

I asked them. Then they come to my house but only for the kitchen, she said only for the kitchen…They did one for my latch [front door] and one for the kitchen too.

*Mother of two and four year old boys*

The ability of parents to implement safety features in the home was often restricted by whether they owned their home or not. Parents spoke of the difficulties of introducing poison safety measures in rental or public housing where there was often limited storage options or they were not supposed to change home features. This difficulty is also consistent with previous unpublished Victorian research findings where two child unintentional poisoning incidents were reported where children in public housing managed to access agents because maintenance on the storage area had not been carried out\(^{37}\). An intervention that aimed to ensure that all homes have a lockable poisons cupboard in the
kitchen and the laundry/bathroom would help parents to maintain safety standards in the home.

This mother describes the difficulty of maintaining safety standards when moving house:

I’ve been in 3 different houses since I’ve had Jane, my first baby, and so every time, we’ve rented twice and we’ve had our own house twice, so every time we’ve got to, every 12 months basically we’ve moved so we’ve had to fix things. And when it’s not your own home there’s not a great deal you can do. You can’t go and put big locks on the cupboards, that’s why the hair ties come into it.

Mother of 18 month old boy and 3 year old girl

Parents’ awareness of the need for poison safety was reflected in this family’s use of elastic hair ties around cupboard door handles. Elastic bands were commonly used as a makeshift measure to try to prevent children from accessing the contents of cupboards and drawers. They were often adopted as an alternative to safety locks, particularly if the safety products were not compatible with the cupboard design.

Young parents who still lived with their own parents were also limited in their ability to change the safety environment in the house. They spoke of moving into their own home as the point when they would be able to introduce poison safety measures for their child.

Parents who moved house sometimes failed to implement the safety measures that they had been using previously.

In my old house, child proofed every door and every cupboard. Everything. Because my oldest son, he was just into everything and then when we moved to the house that we’re in now I said to my husband, well we’re going to have to get safety things but Ryan who’s two at the end of the week, he doesn’t get into anything …whereas my other son he was into everything. … So in this house no we haven’t and Sean is three and a half and he’s just at that age where he doesn’t do that any more either.

Mother of 3½ year old and 2 year old boys
The shift from one house to another clearly acted as a barrier to ongoing use of safety practices. The mother’s comments also demonstrate how decisions about safety measures are strongly influenced by the activity level of the child (see section 4.7.3: Inconsistent or incomplete application of safety measures).

Parents were using safety products such as cupboard and drawer locks, gates, and fridge locks to prevent access to storage areas however, these products were often abandoned when children were able to break them or bypass them. This seemed to be a common experience, highlighting the need for testing standards to be introduced for safety products. These testing standards would need to assess: the ability of children aged under 5 years to break or bypass them; compatibility with a range of cupboard and drawer designs; and ease of use of parents. Safety locks were seen by some as an inconvenience, resulting in some family members bypassing the product. This demonstrates the importance of designing effective safety products that allow easy access for older children and adults.

This mother described how children in her house had managed to get past the safety locks:

…my nephew came over yesterday. He got into the child proof lock, he’s one, just turned one, opened my glass cupboard, the only cupboard that’s got a child proof lock on it and smashed a coffee mug and if I’d been trying to keep poisons away from him in that cupboard he would have got into them in 5 seconds. … Yeah my two year old child taught my four year old child how to open them.

_Mother of two children_

Another measure used by parents to protect children was to shift any dangerous contents to cupboards out of reach of children:

All of our drawers that are low, we’ve had to remodel everything that’s in the drawers. They’re all child-friendly. She can get everything out, she can have anything that’s below shelf height. If she can get it open it’s all safe.

_Mother of 3 year old girl_

This mother preferred to rearrange cupboards and drawers as a safety measure rather than rely on safety locks. This approach is only possible in homes with adequate overhead storage options.
In summary, there was good awareness among parents of the need to protect children from toxic products in the home environment. A range of measures were being employed to achieve this. However, as discussed in the following sections, these measures were not being implemented comprehensively for a variety of reasons. Before discussing barriers to uptake of safety practices, the next section explores the important role of CRCs as a protective measure.

### 4.7.2 Child resistant containers

Child resistant containers (CRCs) were widely supported by parents as an important mechanism for protecting children from toxic products.

> It is awkward with one hand to try and open a safety lid while you’ve got a screaming baby in the other hand but I’d rather put up with that than have the kids be able to open the bottles with ease.

*Mother of 8 month old boy*

There was also widespread belief that CRCs and warning labels should apply more widely. There was a perception that we live in a protective society and an assumption that toxic products would be packaged accordingly. Therefore, many parents were surprised to discover that products without warning labels or CRCs could be dangerous for children:

> I find with the obvious stuff you put that away and all that but when you buy those dishwasher tablets, they’re not in anything child proof and they’re about one of the most dangerous things in your kitchen you can get and Jack actually nibbled on one a few years ago … I really thought later, I don’t think that was sufficient warning on a product like that, that is so dangerous and not in anything child proof and it’s something you usually keep readily available. … I nearly died, especially when I found out how toxic they were.

*Mother of three children*

Things like the essential oils they should have a warning label on them.

*Mother of three children*
These comments reflect the expectation among parents that toxic products should at least have a warning label on them and preferably be packaged in a CRC. Therefore, awareness of toxicity was strongly linked to the packaging of the product.

Unfortunately, the support for CRCs was often based on the notion that they were child proof rather than child resistant:

I know he’s there. I’m on telephone and I don’t think he open it because of safety lid ... but he open it [bleach].

*Mother of 1 year old boy*

This mother was not alone in letting her child play with a dangerous product, believing it was safe because of the CRC.

Some parents were also more likely to store products unsafely if they were in CRCs:

I’m probably a little bit more lax with something with a safety cap than something without. Something without I would always put it away after I’d used it but like today when I took the bleach out, I left it on the bench where I could grab it because it had a safety lid on it. … If I’ve got any products down low I make sure they’ve got a safety cap and if they haven’t I put them up high, so I still don’t take the risk.

*Mother of 3½ year old and 2 year old boys*

This mother’s comments show that she was safety conscious and felt that her storage decisions about products with and without safety caps were consistent with poison safety standards. This attitude to storage of products in CRCs was supported in another study. However, it contradicts a study by Wiseman et al (1987) who found no difference in storage patterns for products in CRCs and those in non-child resistant packages. As the introduction of CRCs has been found to have a significant effect on child unintentional poisoning, any indication of a false sense of security in parents should be addressed through education programs not through reduction in the use of CRCs.
Some parents had learnt through experience that children can bypass CRCs and were more likely to treat them with caution:

They’re adult safety caps. The kids find them a breeze but I struggle.

*Mother of two children*

It was not uncommon for parents to joke about the fact that the children were more adept at opening CRCs than adults. This shows the need for CRC testing standards to be reviewed.

Parents reported that they were diligent about re-securing CRCs after use. It is possible that they were reluctant to admit leaving caps off or loose from a concern about being seen as ‘irresponsible’. There were poisoning incidents explored in the research where children had been able to access a product in a CRC. In some cases the lid had been left off or loose. In others, parents were unsure if they had put the lid on securely or not, perhaps because they could not believe their child could have opened a ‘child proof’ container\(^37\).

### 4.7.3 Inconsistent or incomplete application of safety measures

Although poison safety measures were commonly used by parents, they were not being used consistently throughout the home. The selection of appropriate safety measures was very commonly guided by the products or areas the child had tried to access previously:

I haven’t in the laundry [installed safety locks]. I’ve just put things in the cupboard down below, so she can easily access that but she hasn’t yet.

*Mother of 2½ year old daughter*

There are more dangerous things in the laundry but they’ve never really taken an interest in the laundry stuff.

*Mother of 3 year old boy and 5 year old daughter*

My kids just don’t touch stuff so I just, like I mean Maddy’s 3 and a half now, Ben’s 8 months so he’s not into any of that stuff. I don’t think to move anything until he’s been in it.

*Mother of 3 year old girl and 8 month old boy*
This ‘customised’ approach to safety measures is tailored to the perceived skill and mobility of the child but often does not account for rapid changes in ability. This approach to safety clearly places the child at risk as soon as they explore a new area or product, and also places visiting children at risk because safety standards have not been comprehensively addressed.

Unless the child was a regular ‘climber’, parents’ storage of dangerous products often did not account for the possibility of the child climbing to access it:

I never thought I would need to lock the cupboard. I never thought he would get up so high.

*Mother of 3 yr old boy - multivitamins*

Parents whose child did tend to climb were more conscious of the likelihood of them accessing products but often did not know how to prevent them from getting at them. Safety locks were often dismissed as an option because their child had broken them or bypassed them in the past. Standard key locks were generally not considered perhaps because they are not a standard feature on kitchen and laundry cupboards and drawers. Sometimes there was a sense of resignation, that there was nothing they could do:

I just attract away from him with the things that interest but sometimes nothing you can do.

*Mother of 4 year old and 2 year old boys*

One parent had adopted an innovative approach to the problem of her child using chairs to climb and access products.

I used to tie my chairs up. He was a worry but he doesn’t do it any more. I was just lucky, my chairs you can tie them up but some peoples’ chairs you can’t, but I have to.

*Mother of two children*
This mother demonstrated a particularly high level of commitment to safety, and a
determination to overcome the difficulties of a child’s exploratory nature. She came from a
lower socio-economic background and was living in public housing, supporting the fact
that in this study, while socio-economic influences represented an environmental risk factor
in terms of storage options and affordability of safety products, they were not identified as
behavioural risk factors.

Safety measures were more likely to be applied in the kitchen than the laundry or
bathroom, and more commonly inside the house than in external laundries, gardens or
sheds. For example, the garden area was often a potential area to access substances such as
weed control, lawn mower fuel and pet food or droppings. However, pets could also act as
a protective factor in a home environment by reducing the likelihood of toxic products
being used on the garden and also by reducing the likelihood of children being left
unsupervised in the outdoor area.

4.7.4 Reliance on child following instructions

Some parents were committed to educating their child about not touching toxic products
and keeping out of areas containing dangerous products to encourage them to be self-
regulating. In some cases this was equated with ‘good behaviour’:

I hope he’s behaved enough not to [have to put medicines out of reach] but I’m not
going to be that lucky. I can just see it. So yeah I probably will have to. There are
certain things. You can get away with leaving a few bits and pieces down but things
like that [medicine] you’re better off to put up anyway.

Mother of 5 month old boy

This mother’s comments suggest that she believes a well behaved child will leave toxic
products alone and that poison safety measures are only a ‘back-up’ option if your child is
not well-behaved.

An educational approach to poison safety was undertaken by some parents to ensure the
child would recognise the danger both in the home and in different circumstances and
therefore the protection would be more wide-reaching:
Because I worry about, like you say, she’s going to other places. If we lock them from my home it doesn’t mean lock them away from other places so if she still found interesting things she’s never seen before that would be dangerous.

Mother of two year old girl

This mother implemented this approach thoroughly with repeated messages and observing her child’s subsequent behaviour. She was committed to this approach to child safety because of her circumstances. She was a single mother in a one-bedroom rented flat that provided very few storage options. She felt that the only way she could protect her child from the various dangerous products accessible in the home was to educate her thoroughly and to convince her that the dangerous things were uninteresting.

I not telling her what’s this and keep it away, she would try really hard to get it but if I tell her that’s boring, not interesting and she just leave it alone. So I try to not keep things away from her but buy things more careful like what looks very poison and I try not use that product. Like the bleach, poisoning, so I try to use lemon and bicarb soda, something. That kind of thing. But I try to open the whole pack with her. Everything she can touch it. I try for one week to see what she touch and what she not.

This mother used a combination of techniques. She limited the amount of toxic products in the home where possible, purchased products in uninteresting packaging, and she tried to reduce her child’s interest in the product by presenting it as something boring. Other mothers used similar techniques to influence their child’s perception of products such as medication:

And the other thing that I always do is never take it in front of her. Because I don’t want her to know that you can open it, get a tablet and take it and that’s what you do because she copies everything.

Mother of 1 daughter

This mother tried to reduce the potential for the child to develop interest in the medication and to mimic the mother’s behaviour, by being careful not to use it in front of her child.
The difficulty with the self-regulatory approach was that parents often seemed to overestimate the ability of very young children to remember instructions, their ability and inclination to apply them consistently, and their ability to relate them to changed circumstances.

She’s usually pretty good. You tell her no a few times and she usually stays away.

*Mother of 19 month old girl*

All our farm chemicals are locked away in the shed up high, the kids can’t get into those but as in the house stuff – no. The kids just know they’re not allowed into the cupboards … And I think once they’re four or three they pretty much know they’re not allowed to touch. I think it’s two and under, where you’re still teaching them, it’s like ‘don’t touch’ but they’re still trying…

*Mother of two children*

While these parents acknowledged that young ones may still try to access forbidden items occasionally, they were still relying on the ability and willingness of the child to adhere to the safety rules. There were no safety practices in place, other than supervision, to protect the child if they failed to follow their parents’ instructions.

### 4.7.5 Reliance on child’s consistent behaviour

The most common reason for not storing products safely was parents’ failure to recognise risk, usually because their child had not shown any interest in the products, and therefore parents believed they weren’t likely to. Yet, the fact that different agents are associated with unintentional poisoning for different age groups shows that children’s behavioural patterns do change. Even parents who recognised that possibility sometimes did not take action because their child was ‘not at that stage yet’, often underestimating the developmental stage of the child. Recognition of the developmental stage of the child requires constant adjustment by new parents and also parents with older children who have to ‘go back’ to that stage again:
And as they get older you just start to bring things down again and then you have another one so it’s got to go up again. You just sort of forget until they get into it and you think, ‘oh, got to move that again’.

*Mother of 18 month old boy and 3 year old girl*

This mother’s comments not only illustrate the need to reassess safety standards for younger children. They also indicate that the initiative for this mother to take action is the child’s access to dangerous substances, with the mother apparently unaware of the potentially lethal consequences of this happening. This attitude to poison safety is discussed further in 4.7.10: *Awareness of risk*.

Some parents also believed children would be more likely to mimic using a product rather than ingesting it if they did access it:

In general with the kids if it’s something that they see you using all the time, they’re not likely to drink it, they’re likely to mimic you and use it for what it is but when they come across something that you don’t use very often, or they don’t see used very often like the dishwasher tablets, or medicines or something, like they see you take them, but they’re more likely to take some of that stuff. Like the dishwashing detergents they know that’s for washing the dishes, they’re not likely to eat it.

*Mother of 2 year old and 4 year old*

This perception among some parents is not supported by the data which shows that cleaning products, bleach, essential oils and gardening products are commonly involved in cases recorded by VPIC138.

### 4.7.6 The role of siblings

Parents often did not recognise the potential role of siblings in child unintentional poisoning. Siblings were often responsible for young children accessing products37. Older siblings were more likely to leave doors open or leave products out. Children under 5 were more likely to help their younger sibling to access a product or to bypass a safety feature12. This also raises the possibility of more than one child ingesting a product. Strategies targeting older siblings may be an intervention option. Studies aimed at older children have
reported success in increasing children’s awareness of poisons and poison safety behaviours\textsuperscript{123} but change in the incidence of poisoning incidents has not been evaluated.

4.7.7 Convenience

Convenience is also a factor in the storage of products particularly relating to contraceptives, medications in use, dishwashing powder and products used for home-based businesses. Some parents felt that if they were too diligent about safe storage of products, to the point that it was inconvenient to access them, then they would be more likely to leave them on the bench on the basis that they would “get to that later”.

Well yeah for something that you want to keep handy and use all the time, you’re not going to go and lock it in a bloody cupboard are you? You’re going to use it and you’re gonna go, ‘yeah I’ll put that away later’ and it’s more likely to sit there because it’s something you’re using frequently.

*Mother of five children*

The issue of convenience is a clear barrier to safe storage and is reflected in the high incidence of children accessing products while they are ‘in use’ (see section 4.7.10: Risk factors). It is an essential consideration in the development of intervention strategies as established in studies reporting the greater efficacy of interventions with passive parent involvement\textsuperscript{106}.

Parents who re-packaged products in spare containers did not see it as risky if they were stored in a location consistent with their use such as the outdoor shed or the poisons cupboard. Labelling was not always seen as important because “he [child] can’t read anyway”. Repackaging could also be done for positive reasons – to place it in uninteresting packaging that wouldn’t attract the child’s interest.

Combined home and work environments such as home businesses or a farming environment meant that additional toxic products were potentially accessible to children at a time when parents were focussed on work activities\textsuperscript{37}. Parents’ attitudes to this hazard varied. Some parents focused on safety first and others expected that their children should adjust to these features of the home environment. Apart from occupational health and
safety regulations, additional safety regulations apply to particular work environments. For example, dairy farms are required to meet safety standards relating to the storage of toxic products such as drenches to ensure milk care standards are met. However, these standards do not extend to the storage of vat cleaning products, some of which are strongly alkaline and can cause severe burns. Other products commonly used on the farm such as animal vaccines require refrigeration and may be stored in an internal fridge. However, they are vacuum sealed and require a syringe to be drawn out of the packaging. A significant risk in this combined work/home environment is that children are often left unsupervised either in the work environment or in the house while work is being carried out.

### 4.7.8 Home design

There were particular home design features in addition to overhead cupboards that impacted on the ability of parents to restrict children’s access to toxic products. Homes which allowed areas to be shut off allowed parents to confine children to safe sections of the house. However, as children grew and managed to reach door handles this became ineffective in separating children from toxic agents. Smaller apartments and open plan homes made it easier for parents to actively supervise their children because they were in view of each other most of the time. In another study it was found that double-storey homes were a risk factor for two reasons: because supervision was difficult if the child and parent were on two different levels; and because medications that were stored downstairs were often left upstairs for easier access when they were being used. Significantly, in the qualitative phase of this study and in Cornish, Parson and Dobbin’s study of access to dishwasher detergent, it was found that when the parent was present in the same room as the child it was not always enough to protect the child from an unintentional poisoning. Parents often assumed that their child was playing safely or eating food or drinking water when in fact he/she was ingesting a toxic product.

### 4.7.9 Indirect safety factors

As mentioned previously (see section 4.7.4: Reliance on child following instructions), an additional strategy being used by some parents was to limit the purchase of toxic products for the home and to look for products in uninteresting packaging. Sometimes minimal use
of toxic products was adopted for environmental reasons but nevertheless acted as an indirect safety measure. Additional indirect safety factors included:

- round door handles that were harder for children to open
- doors and drawers in older homes that tended to stick and were difficult for children to open, although this could also mean they were left open for ease of access
- fridges that are positioned on top of freezers, therefore making it harder for children to reach contents (such as refrigerated medicine)
- lack of dishwasher, garden, or change table which meant that the toxic products generally stored for these purposes were not needed
- safety measures introduced to prevent children from creating a mess or damaging items of value to parents:

  We had the door knob one on the bathroom so they couldn’t even get into the bathroom. I got sick of going in and having my bathroom flooded because they’d be up there playing in the sink, I mean it was more for my benefit than their’s.

  *Mother of two children*

  … if any other kids come I’ll lock the garage because we’ve got a boat and fishing rods which I don’t want wrecked as well but I don’t want them getting into the petrol for the mower and the whippersnapper and stuff like that.

  *Mother of 3 children*

The benefits of indirect safety factors demonstrate the potential for a combined safety campaign as proposed by the Kidsafe representative (see section 3.3.3: Key informant recommendations) although interventions are generally more effective if they are focussed on a single issue.

4.7.10 Risk factors

A contributory factor to child unintentional poisoning events, identified in both the qualitative and consultative phases of the research, was a change in the home environment that impacted on existing safety measures. This could occur in various ways such as:
• Home renovations that caused a shift in the child’s living or sleeping area and could also result in toxic substances such as turpentine being left in accessible areas.

• Visits to or from grandparents can result in increased exposure to medicine that the grandparent keeps handy to ensure they do not forget to take it. This could be exacerbated by repackaging of medicine into a container that is easier for old, stiff hands (and children) to open. Testing methods of CRCs in the US address the needs of both the elderly and children.

Identification of grandparents as a risk factor is supported by Wezorek et al’s study showing an over-representation of cardiovascular drug poisoning when grandparents were caretaker rather than parents30.

• A sick child often resulted in medicine being left out by parents in an accessible location:

  Well I always had them up high but I’d given one of the children the Panadol and I just left it on the bench and then the next one came along and started to open it. I just couldn’t believe it.

  *Mother of three children*

  This shows that safety messages to parents need to address both normal storage and ‘in use’ storage options for medication37. Recent administration of medicine to a child seemed to heighten the child’s awareness of the product. If children felt sick they might drink the medicine to feel better.

  “Make me better Nanna!”

  *15 month old boy after drinking some cough/cold mixture*

  They might also drink it because they remembered it tasted good, or it looked like it might taste good because it resembled a sweet drink or lollies, or to mimic their parent’s actions, as demonstrated by parents’ comments in a study by Jolly37:
......if he sees medicine going he will always ask for some. It is a Catch 22. If it doesn’t taste any good you can’t get them to take it and if it does taste good they want it all the time.

......he had taken a couple of pills and he came running out to me and said, ‘mummy I can swallow pills’ and I said, what? Susan (older sibling) came in saying, ‘he can, he can’....... He was quite proud of the fact that he could swallow them.

Administration of too much medicine or the wrong type of medicine to children also occurred when parents misunderstood or misread instructions, or in the middle of the night when the parent was affected by lack of sleep and dim lighting.

- ‘In use’ access to non-medicinal products also emerged as a risk factor, rather than when they were in storage:

I had an incident a few weeks ago where I was cleaning the furniture and I left the cleaning product in the corner of our bedroom. I was going to come and do some more. Then she went into the bedroom and then I went into the bedroom and I thought, ‘Oh my goodness’. She was just near the product. She was lying down on the ground and I just didn’t know if she had inhaled any of it or not. And I said to Lily did you? And she said no. And I just wasn’t sure so I rang the Poisons Information you know the one in the Maternal and Child Health thing and gave them the details about the product which they said was okay.

Mother of two year old girl

The risk of access to ‘in-use’ household products is supported by quantitative studies investigating access to leading poisoning agents\(^{36}\) and dishwashing detergent in particular\(^{34}\). While the authors of these studies concluded that it would not be appropriate for interventions to target storage and supervision issues, it is clear that parental behaviour in relation to placement and supervision of products while in use needs to be targeted.
• A variation on the potential for children to access products while in use was the potential for them to access them in the handbag in the car, or from the shopping before it is put away, or when a parent has been interrupted while using a product and has left it unattended for a short time:

I always worry because once when he was little we come home from shopping and I had all the shopping bags out and he got into the washing powder and I didn’t even see him but he only had like a little bit. I just brought it in so it was just there and then I turned around, yeah I didn’t realise I just thought he was grabbing a banana or somethin’ like that. I didn’t take much notice then I turned around and the washing powder was everywhere.

_Mother of two children_

• Visits to or from friends. Safety measures were generally based on the interest and perceived ability of the child in the home. This placed other children at risk when they came into that environment.

My Charlie when he was about two, we’d been to somebody else’s house and got into their garden shed and they had a boy the same age as Charlie. Got into their garden shed and opened the gerry can of petrol … He’d sort of opened it and was lifting it up. I don’t know what he was going to do with it whether he was going to drink it or whether he was going to try and tip it in the motor mower cause he knows that’s what it’s for. And then at the same time I was a bit annoyed with the lady whose house I had gone round to, thinking, ‘Oh you should have that put away’, but then at the same time I sort of felt awful because it’s something her child never would attempt to do. She said, ‘Oh he would never go into the shed’… And I thought, Charlie would be into everything. The first sign of something being left out, Charlie would be there.

_Mother of two boys_

This incident shows the danger of customising safety measures according to the perceived interests of the resident child.
4.7.11 Awareness of risk

Several studies investigating children’s access to poisonous agents reported that parents were generally aware of the toxicity of many household products and the dangers associated with ingesting them\(^{25,34,35}\). This was generally consistent with the findings from the qualitative phase of this study. The most significant barrier to the uptake of safety practices was that parents often did not recognise the reality of risk within their own home environment, adopting an attitude of ‘it won’t happen to me’. This was supported by a study of non-compliance with recommended safety measures which showed that parents’ perception of the seriousness of the threat was linked to levels of compliance\(^{69}\).

The dominant factor likely to shift parents’ recognition of personal risk was exposure to a child poisoning event. This usually occurred when the child accessed a dangerous product or area they had previously shown no interest in or had not been able to access. This alerted the parent to the reality of personal risk and motivated them to increase safety measures within the home. The findings of the qualitative phase also show that vicarious exposure to a child unintentional poisoning incident can increase parents’ awareness of the personal reality of risk and can subsequently act as a catalyst to increased uptake of safety measures in the home. The source of vicarious experiences that was evident in the study was stories shared through personal networks, or profiles of individual incidents reported in the media.

Yeah, I didn’t think until I saw that show [about a baby that died after swallowing baby oil]. As soon as I saw that show I went and got the baby oil because I just used to put it there. I didn’t even think.

*Mother of two children*

The show being referred to by this mother was a segment on the Oprah Winfrey show that profiled the story of a baby that had ingested baby oil and had died two weeks later. The story was raised by parents in several of the focus group discussions. The impact of this media story on parents’ awareness of risk was further evidenced by a review of calls to VPIC about child unintentional poisonings involving baby oil.
<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003 (to 26/11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of calls</td>
<td>24</td>
<td>18</td>
<td>17</td>
<td>40</td>
</tr>
</tbody>
</table>

Monthly breakdown of 2003 calls:

- January: 1
- February: 0
- March: 1
- April: 1
- May: 4
- June: 6
- July: 4
- August: 4
- September: 3
- October: 9
- November (to 26/11): 7

**TOTAL (to 26/11): 40**

Peaks are evident in the middle and end of the year when the show was aired.

Promoting poison safety in the period following exposure to a poisoning incident provides an opportunity to capitalise on carers’ heightened awareness. It is particularly critical for those who have had personal experience of a poisoning episode because research shows that children who have been involved in a poisoning episode are at increased risk of a repeat episode and are twice as likely to open a safety package. There is very little information in the injury prevention literature regarding interventions to prevent repeat exposures, and the studies that have been conducted are inconclusive. Woolf et al (1992) found that parents who received a poisoning prevention package after a poisoning incident were significantly more likely to engage in some but not all of the recommended preventative measures. The authors recommended a poison-centre based intervention as an effective measure in changing parental uptake of safety practices.
In a few parents there was evidence of a casual attitude to poisoning events, indicating that they were unaware of the potential consequences of poisoning:

Metho’s not poisonous, trust me, my kids have drunk it!

Mother of three children

This response to a poisoning incident may have been an act of bravado by the mother to minimise any reflection on her parenting. However, there had been more than one unintentional poisoning incident in her family. Therefore, this attitude could indicate a contributory factor to repeat poisoning incidents. In some cases, positive outcomes to unintentional poisonings could actually reinforce parents’ tendency to minimise the seriousness of risk rather than the episode being seen as a ‘near-miss’ experience that alerts them to the reality of risk and the need for improved safety practices.

The Victorian Poisons Information Centre is well-placed to be involved in an intervention targeting parents who have contacted the Centre about a child unintentional poisoning incident. The parent has selected them as a credible source of information about poisoning at a time when they have been confronted with the reality of risk. Compliance with poison management advice provided by Poison Information Centres has been shown to be high 100. The ED would also be an appropriate intervention point to prevent repeat poisonings, for the same reasons. However, the nature of an intervention of this type would need to be developed carefully to ensure it reflected parental motivations and offset barriers to parental uptake of safety practices.

4.7.12 Sources of poison safety information

The Maternal and Child Health (MCH) Service was found in this study to be an important source of information and education for parents about poison safety, contrary to the findings in another, unpublished study 37. In Victoria, MCH nurses currently aim to conduct a home visit to all parents in the period following the birth of a child. Home visits have been shown to be an effective injury prevention intervention 92,119-122. Therefore, the MCH service would be well-placed to conduct a targeted, evidence-based intervention involving home visits when the child is aged 6-12 months. We acknowledge the costliness of this
proposal however there are a range of other benefits and outcomes for maternal and child wellbeing that could be attained through this strategy.

Other resources for poison safety information identified in this study were the MCH yellow booklet\textsuperscript{37}, maternity hospital information packages, ambulance safety training, and the RCH Safety Centre. The study by Jolly also noted that parents accessed information via women’s magazines and daily newspapers\textsuperscript{37}. Key informants for this study noted that safety conscious parents are likely to access a range of information sources whereas ‘hard-to-reach’ parents are likely to miss out altogether (see section 3.3.1: \textit{Recommendations}).

Most parents were aware of the Poisons Information Line and had the number handy if a poisoning incident did occur. This was generally provided by the MCH nurse, the maternity hospital, the RCH Safety Centre, or was contained in the MCH yellow book. However, if parents did not have the number, they were not aware that they could find it at the front of the phone book. Pre-paid mobile phones prevent access to VPIC if the phone is not paid up. This may be an issue for young parents. Dialling 112 will connect mobile phone callers with Emergency Services regardless of whether the phone is in credit or not. However, this option needs to be more widely publicised to ensure parents are aware that it is available. Poisoning intervention strategies also need to promote the role of Poison Information Centres due to their demonstrated effectiveness in influencing parental management of poisoning\textsuperscript{100}, reducing the need for hospital attendance\textsuperscript{101}, and subsequently achieving savings in treatment costs\textsuperscript{64}.

4.7.13 Conclusion: Qualitative phase

The qualitative phase of the project showed that while poison safety practices have been widely adopted by parents they are not being applied comprehensively in the home due to a tendency to tailor safety measures to the perceived interests and abilities of the resident children and a tendency to alter safe storage behaviours while products are in use. This makes children vulnerable to changed circumstances in the home environment and to changes in their own behaviour and developmental ability.

The dominant motivator for increased uptake of safety behaviours was vicarious or personal exposure to a poisoning incident. This exposure heightened parents’ awareness of
risk and initiated a reassessment of the adequacy of safety standards in the home. In some cases, a positive outcome to a poisoning incident reinforced parents’ perception that poisoning was low risk rather than encouraged them to increase their safety behaviours.
Chapter Five: Applied phase

This section will detail the research activities and findings for the applied phase of this project, consisting of a pilot intervention using community information pathways to increase parents’ awareness of the reality of risk of child unintentional poisoning.

The findings of the qualitative phase show that personal or vicarious exposure to a child unintentional poisoning incident can increase parents’ awareness of the personal reality of risk and can subsequently act as a catalyst to increased uptake of safety measures in the home. The source of vicarious experiences that was evident in the study was stories shared through personal networks, or profiles of individual incidents reported in the media. The Maternal and Child Health Service was identified as an important source of information about poison safety.

A social marketing intervention approach was proposed as a means of increasing parents’ awareness of risk. This approach utilises the information pathways currently being used by parents, i.e. the media, the MCH nurse and parent peers. It also matches the delivery style used by parents, i.e. storytelling using real-life incidents.

As this style of intervention is not evidence-based, a pilot was proposed to evaluate its effectiveness and to compare the cost-effectiveness of the three different information pathways.

5.1 Aim

Provide parents with vicarious exposure to a child poisoning incident through three targeted interventions:

1. Release of a story of an individual poisoning incident via a parent ‘networker’.

2. Release of a story of an individual poisoning incident via a MCH Nurse.

3. Media release of a story of an individual poisoning incident.
5.2 Method

Different strategies needed to be employed for the three different interventions.

5.2.1 Parent networker strategy

Actual stories from the research data were used for the intervention which promoted the safety message via a ‘parent networker’. A Maternal and Child Health Nurse in an outer suburban area was asked to identify a parent in her area who was an effective networker among the parents of young children. The MCH Nurse readily identified a mother who had organised two of the current playgroups using the MCH Centre. This mother was contacted by the project manager and agreed to be involved. She was provided with the details of two child unintentional poisoning incidents and subsequently shared the stories as ‘hearsay’ in conversation with playgroup members. She did not mention the research project in these conversations. Names and identifying details were changed to protect the anonymity of the families. (The stories have not been attached in this report because of an undertaking given to research participants not to include details of individual stories in any published reports).

5.2.2 Maternal and Child Health Nurse strategy

The MCH Nurse strategy was similar to the approach used for the parent networker intervention. Two actual stories (the same stories as those provided to the parent networker) were provided to a rural MCH Nurse and she was asked to relay these stories conversationally during consultations with parents. It was explained that the aim was to use an informal approach, i.e. to share an incident ‘she had heard about’ rather than formal information provision about poison safety. She agreed to adopt this strategy over a three week period in consultations with parents of babies aged between six months and two years as she felt it would be most relevant to this group. She included the stories in her discussions with six mothers over this period.
5.2.3 Media strategy

A different approach was needed for the media strategy because it was not possible to release any identifying information about the research participants. The RCH Media Unit advised that the press would not run a story unless identifying information and preferably a photo was available. Various options were explored to address this restriction. It may have been possible to include a child poisoning story without information in an advertorial or in a health feature alongside a poison safety report. However, this would not have matched the style of information sharing that was identified in the research findings where the ability to relate to someone else’s real life experience was the impetus for a reassessment of poison safety practices. As a result an ethics modification was submitted to the RCH Ethics Committee seeking approval to identify any new child poisoning cases attending RCH and using the RCH Media Unit to contact them and seek permission to publicise their story. A decision was made not to recruit via the VPIC because cases not requiring hospital treatment would not be ‘dramatic’ enough to secure media interest. VPIC cases requiring hospital treatment would be accessing hospitals all over Victoria. Only those attending RCH Emergency could be approached by the RCH Media Unit and therefore would be best identified through the Emergency Department patient records. The Emergency Department was able to supply the names of three families in the time left available for the intervention (1 week). Each family was sympathetic to the request but declined. An RCH Pharmacologist was not able to supply any names suitable for the pilot strategy. It was therefore not possible to secure permission to publicise an individual child poisoning incident within the pilot intervention period.

5.2.4 Pilot evaluation

The evaluation of the pilot intervention consisted of a:

- Process evaluation – comparing the different approaches in terms of efficient use of resources.

- Process evaluation - establishing if the message was spread through the target community.
- Impact evaluation - exploring the impact of the message on parental perceptions of personal risk and safety behaviours.

A log of activities and expenses was recorded for the period of the pilot to allow for comparison of resource use between the different strategies. The results of this part of the process evaluation are reported in section 5.3.1: *Comparative efficiencies of the different strategies*.

The second part of the process evaluation was combined with the impact evaluation and was assessed by conducting focus group discussions with the two playgroups involved in the parent networker strategy, three and four weeks respectively following the pilot intervention. It was also intended to conduct focus group discussions with the parents involved in the MCH Nurse strategy. However, after the intervention was complete the MCH Nurse reported that she was not aware of any organised groups at the Centre or elsewhere that the mothers were involved in. A letter was sent to the mothers via the MCH Nurse inviting them to participate in a poison safety focus group being conducted in their area. None of the mothers responded despite expressing interest to the MCH Nurse. The MCH Nurse then phoned each of the mothers to obtain permission for the Project Manager to contact them for a phone interview. Each of them agreed. Five mothers subsequently participated in a phone interview 2-5 weeks after the intervention. However, one of the mothers did not return her consent form so her responses were not included in the evaluation. Phone messages were exchanged with the sixth mother but contact had not been made at the end of the pilot period. A message was left thanking her for her willingness to participate and explaining that the research period had ended.

The protocol used to guide the focus group discussions and the phone interviews is contained in Appendix V.

As the media intervention was not carried out it was not possible to do any process or impact evaluation of this strategy.
5.3 Research Findings – Applied phase

5.3.1 Comparative efficiencies of the different strategies

Table 4 presents the time and additional expenses involved in the implementation and evaluation of the pilot strategies over a six week period. As can be seen, the strategy involving the MCH Nurse involved the least time in development and evaluation. As a rural-based strategy it was anticipated that the evaluation would involve travel and therefore a greater allocation of resources. However, the adjusted approach to evaluation, as described in section 5.2.3: Pilot evaluation, involved less time and cost for the pilot. The media intervention involved the greatest investment of time to develop and yet did not result in an intervention. The considerable investment of time for other hospital staff such as the ethics department, the media unit and the medical staff involved in identifying potential families is not listed in the table but also needs to be taken into account for this strategy. The parent networker strategy required only 90 minutes to implement, the remaining time and expenses were allocated to evaluation.

Table 4: Resource allocation to pilot strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Time – intervention (minutes)</th>
<th>Time – evaluation (minutes)</th>
<th>Additional expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent networker</td>
<td>90</td>
<td>360</td>
<td>$75.00</td>
</tr>
<tr>
<td>MCH Nurse</td>
<td>55</td>
<td>125</td>
<td>0</td>
</tr>
<tr>
<td>Media</td>
<td>130 (does not include time of other hospital staff involved in strategy)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Determination of the relative cost-effectiveness of the different strategies is dependent on the outcome of the respective evaluations as reported below.

5.3.2 Parent networker strategy

The parent networker strategy proved to be very successful as a mechanism for spreading stories about child poisoning incidents and also as a means of heightening awareness of risk.
Appropriate parent networkers appear to be readily identifiable in a given community. As the strategy is designed to match parents’ current method of information sharing, the storytelling technique also appeared to be familiar and comfortable for the parent networker.

All of the mothers who had been present when the parent networker relayed her story of a poisoning incident, subsequently volunteered the story in the focus group when asked if they knew of anyone who had experienced a child poisoning incident. They were able to recall the details of the incident and all noted that it had made them stop and think about their own poison safety procedures in that context.

Straight away you think, have I got them in my bag? How easy it is to overlook things.

What made me think is, I’ve done that, I’ve left Adam with my bag for 5 or 10 minutes. I don’t take medication but there could be something else. It’s not all the time but I’ve thrown headache tablets in there. You can forget they’re there.

These mothers related to the story about a child getting tablets out of his mother’s handbag. Some of the mothers reported a change in their poison safety practices as a result.

I am aware when they get into my handbag now. I used to keep my bag on the back of the door on the door handle, but now I keep it up in the shelf lying more away. I am more vigilant just putting it up there.

Other mothers also reported changed safety behaviour. One had gone home after hearing the story and taken the panadeine tablets out of her bag even though she kept the bag out of reach. Another said it made her conscious of the dangers of others’ bags when they are visiting, particularly the grandparents’ bags as her child liked to go through her grandmother’s bag. This mother had then spoken to the grandmother about making sure the contents were safe and the child was no longer allowed to play with people’s handbags.
One of the mothers also mentioned that she had seen a story on Oprah Winfrey about baby oil, supporting the previous research findings about the impact of personal stories of child poisoning experiences.

The first playgroup consisted of mothers with several children. Only one of the mothers said she had mentioned part of the story in a conversation with someone else. No-one else had shared the story but felt they would if it was relevant to their conversation. The members of the second playgroup were mostly first time mothers. Several of the mothers in this group had shared the story with other mothers in the playgroup and personal friends, and yet the parent networker reported that this group were quiet and didn’t often share information voluntarily.

This evaluation demonstrated that the parent networker strategy was effective in this target group in communicating a story and in heightening parents’ awareness of risk. The awareness was specific to the nature of the incident but did result in changed behaviour when the parents’ reassessment of their safety strategies demonstrated a gap in safety. The strategy appeared to have greatest impact for first time mothers, perhaps because they are less experienced in terms of child safety issues and more open to learning opportunities. These mothers appeared more likely to spread the message further to other mothers of young children.

### 5.3.3 Maternal and Child Health Nurse strategy

The MCH Nurse strategy was found to be unsuccessful in terms of spreading the story of the incident, heightening parents’ awareness of risk, or changing behaviour. None of the parents recalled the story the MCH Nurse had told them when they were asked if they knew of anyone who had experienced a poisoning incident. An additional question was included for the phone interviews to try to prompt some recognition of the stories shared by the MCH Nurse. The mothers were told that the project research had demonstrated that many parents obtain their information about poison safety from their MCH Nurse and asked if that was true for them. Most of the parents disagreed with this statement and still did not recall hearing any poison safety information from their MCH Nurse despite the fact that she had shared the stories in their consultation in the previous 2-5 weeks. One of the parents reported receiving pamphlets and a VPIC sticker, which reinforced her current poison
safety strategies, but she did not mention hearing any stories of child poisoning incidents. Another mother did recall the story after this prompt. She mentioned that the MCH Nurse had read the story from a piece of paper and had given her the paper afterwards. She had not read the story herself afterwards. She noted the incident involved a child accessing medicine when in use even though it had a safety cap. This story made her more conscious of putting medicine straight away after use and also of checking that the CRC is secured correctly. She subsequently mentioned this story to her younger sister and her sister-in-law both of whom have young children.

This suggests that the MCH Nurse had not delivered the stories according to the pilot instructions, demonstrating the difficulty in asking the MCH Nurse to shift from a traditional information provision role to a ‘community messaging’ role. And yet the MCH Nurse reported that she felt comfortable discussing the story with parents whose child was a relevant age. She reported that parents reacted differently to the stories. Some were defensive – “I wouldn’t do that”, whereas others were surprised at how easily it could happen.

The lack of impact on most parents involved in the MCH Nurse intervention suggests that it is not an appropriate strategy for this style of community intervention.

5.3.4 Media strategy

It was not possible to develop and implement the media strategy within the available time frame. Although it is not possible to evaluate the impact of such a strategy, the difficulties experienced in working within the constraints of ethical responsibilities, hospital systems, the pattern of child poisoning presentations, and the reluctance of parents to publicise their experience, demonstrates the difficulty of relying on this strategy as an ongoing safety promotion strategy.

5.3.5 Conclusion: Applied phase

The pilot results clearly demonstrate that the most cost-effective and efficient strategy for heightening parent’s awareness of risk and encouraging them to reassess and, if necessary, improve their poison safety practices is to spread stories of actual child poisoning incidents
via parent networkers. This strategy appeared to have greatest impact among first time mothers who showed a greater propensity to spread the message among family and friends with young children.
Chapter Six: Report conclusions and recommendations

6.1 Final Report conclusions

This project has confirmed that child unintentional poisoning is a significant public health issue. It is the second most common cause of injury hospitalisations for children under the age of five in Victoria. Its status as a national and state priority health issue highlights the need to understand the factors contributing to its continued high incidence and to identify potential interventions to increase the uptake of safety practices.

The consultative phase of this project provided information about possible changes to poisons data collection; measures to ensure consistency of clinical management of poisoning incidents; and legislative, environmental and industry-based measures, and education campaigns that are likely to be cost-effective and achievable in reducing hospitalisations for child unintentional poisoning.

The qualitative phase of this project contributed to an understanding of parental factors influencing uptake of safety measures. In particular, it was found that parents, while generally aware of poison safety issues, were not implementing safety practices comprehensively because of a tendency to underestimate the reality of risk and to tailor safety practices according to parental perceptions of children’s likely activities. This incomplete application of safety measures left children vulnerable to inadequate supervision or changes in the home environment. The dominant factor affecting change in parental uptake of safety practices was personal or vicarious exposure to a poisoning incident resulting in an increased recognition of personal risk. These findings were consistent with key informants’ identification of risk factors and the findings of related studies, providing an informed base for the development of targeted interventions. In addition, several environmental factors requiring passive interventions were identified as critical to a reduction in the rates of child unintentional poisoning. These included wider implementation of warning labels and child resistant packaging, the need for a lockable poisons cupboard in all homes, and the need for testing standards for commercially available safety products.
One of the recommended targeted educational interventions arising from the research findings was a community-based strategy involving the spread of safety information using existing information pathways and styles of information exchange. The applied phase of this project provided an opportunity to pilot this intervention. The pilot results demonstrated the efficacy of using parent networkers to spread safety messages in the form of stories of child poisoning incidents.

In addition, the need for further research in specific areas such as socio-cultural factors, pharmaceutical packaging and storage, and specific elements affecting the incidence and management of child poisoning, was identified to inform prevention of child unintentional poisoning and a reduction in child poisoning hospitalisations.

On the basis of these findings, the following Final Report recommendations are made to support a reduction in the incidence of child unintentional poisoning and child poisoning hospitalisations, to improve consistency in the clinical management of poisoning events when they do occur, and to further research on related issues impacting on poison safety.

**6.2 Final Report recommendations**

The current base poisoning prevention functions are important and should continue. However, additional environmental, educational, clinical management and research strategies are required to reduce the incidence of child unintentional poisoning.

It is recommended that the Commonwealth and State Health Departments increase their role in the facilitation and coordination of child poisoning prevention. This may be best achieved through the establishment of an expert task force to assist government with this function.

It is recommended that the findings and recommendations of this study be published and disseminated to inform the poisoning prevention debate and to encourage the introduction of evidence based interventions.
6.2.1 Prevention of child unintentional poisoning

Environmental strategies

Storage

- Incorporate safety cupboard requirements for new and renovated houses in the Australian Standard ‘Safety in House Design’ which is currently under development. This should include a high, lockable cupboard in both the kitchen and the laundry/bathroom.

- Reintroduce the inclusion of a lockable poisons cupboard in all public housing.

- Introduce testing of commercially available safety products to ensure they meet safety standards for children under five years old.

- Investigate the development of new designs for safe local storage of medications when in use.

Packaging and sale of pharmaceuticals

- The Commonwealth Department of Health and Aged Care adopt a leadership role specifically relating to the safer supply of medications, particularly by means of scheduling and packaging, to reduce the distribution and accessibility of toxic agents in the community.

- Implement child resistant packaging more widely (to include more agents) including strip packages; investigate CRC failures and improve the design; and review and enhance child panel testing for child resistant packaging standards.

- The Victorian Injury Surveillance and Applied Research System (VISAR) investigate the involvement of “dosettes” in child poisoning cases.

- Reduce the distribution and accessibility of toxic agents in the community by:
  - improving prescribing habits
- cease outmoded/unnecessary toxic substances from being sold
- ensuring selected over-the-counter (OTC) medications are sold in pharmacies (not in supermarkets, etc.)

• Target problematic drugs and chemicals and evaluate them case by case for interventions: packaging; information at pharmacy; information at point of sale; and warning labels.

• Investigate the potential for RCH to act in partnership with other paediatric hospitals in influencing safe packaging of pharmaceutical and non-pharmaceutical products through:
  - Endorsement of packaging which minimises risk of children’s access
  - Using purchasing power to influence packaging of toxic products.

*Victorian Poison Information Centre*

• Test the claim that PICs are under-utilized or relatively inaccessible to clients of lower socio-economic status and non-English speaking background and review the need for targeted awareness raising.

• Review the role of the PIC with regard to taking a stronger role in poisoning prevention in addition to their current focus on secondary prevention.

• Support the costs of promoting the Victorian Poisons Information Centre via telephone stickers and pamphlets to ensure community awareness of the role and number of the Centre is maintained.

*Other*

• Re-assess child poisoning due to dishwashing detergents and, if the problem persists, seek a report on progress from manufacturers.
• Implement child resistant packaging and warning labels on non-pharmaceuticals more widely where warranted on public health and toxicity grounds – supported by relevant legislation.

Educational strategies

• Develop a multi-level targeted poison safety campaign incorporating the following elements:
  o Conduct a community-based intervention using a parent networker and a ‘story-telling’ approach (as piloted)
  o Develop an intervention to be implemented by VPIC and ED staff to reduce repeat poisoning episodes by capitalising on parents’ heightened awareness of risk following a poisoning episode
  o Explore the possibility of utilising the Home Medicines Review in interventions designed to reduce repeat poisoning
  o Develop a poison safety module for use in first aid courses
  o Develop a ‘check list’ intervention for use by pharmacists at the point of sale of medications to encourage safe placement of medications while in use
  o Introduce a 12 month home visit safety audit by MCH Nurses for all families
  o Develop a poison safety education program for grandparents for inclusion in grandparent ante-natal classes to address risk factors arising from access to grandparent medication, to acknowledge the role of grandparents as carers, and also to capitalise on the influence of grandparents on parenting behaviour
  o Develop a kindergarten and school-based poison safety program to address the role of siblings in child unintentional poisoning
  o Explore the use of a tailored computer-based program for adult and child education strategies
  o Include a reminder to re-institute safety measures in moving house checklists provided by Australia Post and removalist companies – refer people to the Queensland Poison Information Centre website which provides a ‘house tour’ covering possible poisons around the home: www.health.qld.gov.au/poisonsinformationcentre/homepage.htm
  o Publicise the emergency number (112) for use on mobile phones
Issue poison safety information to be distributed with small business registration material

Distribute VPIC phone stickers, pamphlets and poison websites as part of all information and education activities

Develop a community announcement targeting parent perception of CRCs – i.e. child resistant not child proof

Work in partnership with the Metropolitan Ambulance Service to use a poisoning emergency scenario in their campaign to increase Ambulance membership

Develop a poison safety video segment for screening on closed circuit televisions in medical waiting rooms

Evaluate the efficacy of the above individual and combined strategies to contribute to the evidence-base for poison safety interventions.

**6.2.2 Management of child unintentional poisoning cases**

To support a systematic formal focus on the persisting child poisoning problem in Victoria, it is recommended that a National Taskforce and secretariat be established with representatives from hospitals, universities, pharmacy colleges, poison information centres and research institutions to oversee initiatives targeting the clinical management of child unintentional poisoning, in particular the development of standardised protocols for management of child poisoning cases. Protocol development and systematic implementation could be undertaken, endorsed by appropriate medical colleges and evaluated.

An additional responsibility of the Taskforce would be to oversee a review of data needs for poisoning prevention including identification of specific agents, monitoring, surveillance and evaluation. This Taskforce would also be well-placed to oversee the environmental interventions targeting prevention of child unintentional poisoning outlined above.

Specific recommendations in relation to medical management issues are as follows:
• Investigate the reasons for the large number of one-day admissions in Victoria in terms of admission policies and best medical practice.

• Implement Best Practice Clinical Guidelines for the diagnosis and management of child poisoning throughout Victoria with the involvement of appropriate Medical Colleges and professional bodies and a view to reducing unnecessary hospital admissions.

• Examine the role of poisoning surveillance as part of Victoria's injury surveillance systems.

• Review research regarding the timing of taking serum paracetamol levels in the context of best practice guidelines.

• Further investigate the issue of iatrogenic poisoning of children in hospitals and implement systems to prevent errors if needed. Give greater attention to child poisoning prevention in medical, nursing and in-service training.

• Give greater attention to child poisoning prevention in medical, nursing and in-service training.

6.2.3 Research into child unintentional poisoning

Further research is needed in the following areas to address gaps in current understanding of child unintentional poisoning issues and to stimulate public debate and government action:

• the circumstances and mechanisms of poisoning – data, problem definition, particularly by means of injury surveillance and call-back (case series) studies
• the type of packaging contributing to a poisoning event
• the involvement of CRCs in poisoning events
• non-reclosable packaging (strip, blister packs) using a child panel test protocol
• socio-cultural differences in protective/risk factors
• rural/urban differences in hospitalised poisoning cases
• appropriate pack sizes for pharmaceuticals
• effectiveness of countermeasures
• storage options for agents (pharmaceuticals) when in use and for travelling.

6.2.4 Closing statement

The combined preventative, management and research initiatives outlined above represent a comprehensive, multi-level approach to child unintentional poisoning in Victoria which is based on the research findings and largely supported by the current evidence-base in injury prevention. Partnerships formed in the conduct of this research provide a strong network of organisations committed to the implementation of the above recommendations.
References


49. McFee RB, Caraccio TR, Mofenson HC. Selected tricyclic antidepressant ingestions involving children 6 years old or less. *Academic Emergency Medicine* 2001;8:139-44.


134. *NEJM* 2002;346.


Appendix 1: Breakdown of agency responsibility
### Child Unintentional Poisoning – Draft Task Breakdown

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<th>Task</th>
<th>CCCH (approx person days)</th>
<th>MUARC (approx person days)</th>
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<tr>
<td>Grant application</td>
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<tr>
<td>Ethics application</td>
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<td>2</td>
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<tr>
<td>Advisory Committee Meetings – 5 meetings @ 1 hour each plus 1 hour preparation/travel</td>
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<td>2.5 (2 people to 3 meetings, 1 person to 2)</td>
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Appendix II: Key informants – Structured Interview Protocol
Structured interview: Poisoning prevention & control Children less than 5 years of age

Respondent Name: ________________________
Organisation: ________________________
Contact details: ________________________

1. What is the broad nature of your / your organisation’s interest in poisoning among children under 5 years of age? (policy, regulations, intervention, surveillance, medical management, research)

2. What do you believe to be the explanation for the rate of child poisoning admissions remaining stable over the period 1996-2001 (policy / poor preventive effect / lack education / lack resources / lack co-ordination)?

3. Are you or your organisation undertaking any interventions / programs directed at prevention of poisoning or improved medical management?

4. What are the interventions or programs that you think are having an impact on reducing or limiting poisoning (especially recent interventions, i.e. last 5 years)?

5. Is there evidence to support your views (please specify evaluation results)?
6. What do you think are the most promising areas for any future work to reduce the incidence, severity, or burden of poisoning among young children? (policy, access, co-ordination, specific interventions, research)

7. What are the barriers and the potential drivers for these changes? (policy, regulation, co-ordination and management, resources)

8. In your view, which organisation / Department should have the lead role in preventing poisoning among young children? (state, commonwealth, other)

9. Are there issues that are of particular concern to you / your organisation in relation to poisoning matters that you would like to raise? (medical management, policy / regulation, resources, co-ordination of effort)

10. Who else should be consulted on these issues?
Medical Education

(1) Professor Richard Doherty, Chair of Paediatrics Monash University

Teaching of poisoning prevention in the undergraduate paediatric medical curriculum
(0-18 years)

This topic is covered in two areas

1. Hospital clinical experience with poisoning cases either in ED or as admissions. The student exposure to cases is dependent on presentation and consequently experience may be quite variable with most students unlikely to see a case. Most cases are not a problem, an occasional case is serious.

2. Topic is one of several key areas covered with ED issues in the first week of ED training. Includes principles of acute poisoning management as part of paediatric emergency (Dr P Francis is in charge of this area). Case study of unconscious patient. Poisoning is part of the differential diagnosis. Students present on a topic in the area of poisoning/ drug and alcohol use as part of broader health issues. Not a lot of focus on young children but the topic is raised.

3. The curriculum is under review
Poisons Advisory Service guidelines are fairly consistent across major hospitals in Australia. May vary more in rural areas. Emergency physicians treat all presentations as serious particularly if there is little idea of the dose ingested or a toxic drug has a delayed effect. These uncertainties lead to caution and the possibility of over management.
Teaching of poisoning prevention in the undergraduate paediatric medical curriculum
(0-18 years)

1. Old paediatrics curriculum
One hour lecture on poisoning – principles of prevention, home safety, clinical presentation and syndromes, covers all ages to 18 years with a focus on children under 5 years

Ward and ED exposure to cases of child poisoning. This exposure is adventitious being dependent on child presentations and admissions during the 9 week paediatric course

2. New curriculum for paediatrics
Fewer formal lectures and more small group learning groups

1 hour lecture on poisoning as for the old curriculum

Paediatrics Practice Based Learning tutorials. One of these tutorials is a hospitalised case of a prescription drug ingestion in a child

Option to visit the Child Safety Centre (not obligatory)

Ward and ED experience as for the old curriculum
Appendix IV: Key informant focus group discussion protocol
Key informant focus group discussion protocol

The key informant focus group discussions were guided by the following interview protocol:

- What is your exposure to child unintentional poisoning incidents in your professional role?
- Are you aware of any patterns or common scenarios in child unintentional poisoning incidents, or any risk groups?
- Are parents aware of the toxicity of products in their home?
- Are parents aware of safety measures to minimise the risk of child poisoning?
- What safety measures are being used by parents?
- What safety measures are being bypassed by parents?
- What are possible motivators/barriers to use of safety measures?
- Is supervision a factor in unintentional poisoning?
- What is your role in providing poison safety information?
- What intervention strategies do you feel are needed and are likely to be effective?
Appendix V: Protocol for pilot evaluation focus groups and phone interviews
Protocol for pilot evaluation focus groups and phone interviews

- Discuss poison safety strategies

- Where did you hear about/learn about the need for poison safety and poison safety practices?

- We can learn a lot about how child unintentional poisoning occurs by hearing about incidents that have happened. Have you have had any experiences in your home?

- Have you heard of any other incidents?

- If so, where did you hear about it?

- How did you react to that story?

- Did you share the story with anyone else? If so, who?

Additional question for phone interviews:

- Our research shows that a lot of people receive information about poison safety from their Maternal and Child health Nurse. Did you receive information in this way?