

INJURY BULLETIN

Queensland Injury Surveillance Unit

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QISU collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals represent three distinct areas of Queensland.

QISU publications and data are available on request for research, prevention and education activities.

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Non-Medicinal Ingestions in Queensland Children

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Summary

- ☠ Poisoning is one of the most common reasons for paediatric injury presentation to an Emergency Department.
- ☠ Rates are highest in children less than 5 years of age, peaking between 1 and 2 years.
- ☠ Non-medicinal poisonings account for 62% of poisonings in children less than 5 years.
- ☠ A quarter of poisonings in this age group are due to common household cleaners.
- ☠ Many toddlers access these poisons whilst they are in use.
- ☠ Of the 1% of severe poisonings, half were due to alkaline/caustic substances.

Harrison's Story:

Harrison was a healthy inquisitive toddler, when one morning, he opened the kitchen cupboard and reached for the dishwasher powder. Although the product had a child resistant cap, the cap mechanism had not been fully engaged and seconds later his mother heard him gagging. Harrison had swallowed caustic powder, which began burning his oesophagus and upper airway. Harrison presented at the Mater Children's Hospital emergency department vomiting blood and having difficulty breathing. Despite receiving emergency treatment he has been left



Poisoning

with scarring of his oesophagus that will persist for life.

Harrison's story is not unusual. Every day thousands of toddlers explore their environment, running, climbing and tasting. This is a part of their normal learning and development, but it is up to the adults in their world to make their environment safe.

Dishwashing detergent is sold in tablet, liquid, gel and powder forms. All of these compounds are caustic and can burn skin and mucosa on contact. Australian legislation and standards regarding packaging of these compounds is complex. Some products require labelling and child resistant caps, whereas others do not. This issue of the bulletin deals with non-medicinal poisonings in toddlers, and discusses strategies to reduce poisoning in this group.

Introduction:

Poisoning remains a common reason for paediatric presentation to an emergency department. Rates are highest in children under the age of 5 years and poisoning is the most common reason for injury presentation and admission after falls in this age group.



Poisoning can occur through ingestion, inhalation or topical exposure to toxic substances. Typically the substance is ingested but in the case of exposure to volatile substances (such as paint or glue) the substance is inhaled. Few clinically significant poisonings occur due to topical exposure.

Methods:

Emergency Department injury presentations to QISU participating hospitals between 1998 and 2004 were searched to identify paediatric patients aged less than 5 years of age who presented with non-medicinal poisoning. The database was searched for "external cause" and "nature of injury" codes of poisoning with non-medicinal substances. The data set excludes poisoning due to ingestion of prescription or over the counter medicinal compounds (pharmaceutical agents and vitamins intended for ingestion) and non-organic foreign bodies (with the exception of batteries). Statistics on admissions by age group and procedures during admission were obtained from Queensland Health.

Results:

Between 1998 and the end of 2004 there were 1884 children under the age of 5 years who presented to a QISU participating ED for treatment of a non-medicinal poisoning. This group comprised 4.1% of all paediatric injury presentations to participating hospitals. In the same period, presentation due to poisoning with medicinal substances accounted for 2.6% of all paediatric injury presentations. There has been a steady decline in the proportion of injury presentations due to poisoning over the study period from 8% down to 4% for all poisoning and 5% to 2.5% for non-medicinal poisoning. During the same period, admission rates for poisonings in this age group have remained steady at approximately 30%.

Age and Gender:

Almost 2/3 (61%) of the poisoning in this group happen to children between the ages of 12 months and 2 years. Boys and girls presented with similar frequency (53% vs. 47%). (Figure 1)

Place:

In this age group 93% of poisonings took place in the family home and most frequently in the kitchen (22%). The garden and bedrooms were the next most common places (each at 11%).

Agent:

About a quarter of all poisonings in this group were from household cleaners (soap detergents, bleach and other caustic substances) (24%). Dishwasher detergent accounted for 4% of all non-medicinal



poisonings. Other common household chemicals accounted for 21% (rat poison (8%), essential oils (7%), petrol or petrol related products (5%)). Plant/mushroom ingestions accounted for 9% of the presentations in this age group. Mushrooms and toadstools were responsible for 3% and oleander accounted for 1% of ingestions in this group. (Figure 2)

Severity:

From the QISU database, 19 children (1%) required resuscitation on presentation to the emergency department. Substances these 19 children were poisoned with included: pool chlorine or bleach (3), "Drano" or alkaline cleaning substances (3), dishwasher powder or tablets (3), oleander (2), essential oils (2), stain remover (2), vapouriser fluid (2), "Dettol" (1), concrete cleaner (1).

Five hundred and twenty four children (28%) of the emergency department presentations for non-medicinal ingestions in this age group were admitted to hospital. Length of stay ranged from 1 to 59 days. Ninety-four percent required only overnight admission but 22 (1.2%) children required admissions of a week or more. Fifteen children required ventilator support during their admission. There were 74 children who required endoscopy to determine the extent of their injuries following an ingestion of a caustic or acidic substance.

Day and Time:

There was no significant pattern associated with the day of the week that children in this age group were more likely to be poisoned. However, the most common time of day for ingestions to occur was between 4 and 6 PM (21%).

Discussion:

In children under 5 years of age, poisoning is frequently the result of an inquisitive child gaining access to common household products or plants. These poisonings are the result of toddlers exploring their environments. Their choice of substance is driven by opportunity and accessibility. They are not deterred by taste, appearance or smell. These poisonings are generally discovered quickly and children frequently present to the emergency department within 30 - 60 minutes of ingestion and before the onset of symptoms. The child has usually only been exposed to one agent and frequently remains asymptomatic.

The spectrum of substances responsible for toddler poisoning is extensive, however of the 1% of severe poisonings, half were due to alkaline/caustic substances. Whilst some prevention strategies are broad and may effect change in all categories (eg. child-resistant packaging), some strategies are more specifically targeted to a particular substance (eg retail restriction on the sale of agricultural pesticides).

The trend towards a lower proportion of injury presentations due to non-medicinal poisoning during the 7-year study period may be accounted for by better

pre-hospital advice given to parents through the Poisons Information Centre. In the last 12 months the Queensland Poisons Information Centre took 27,470 calls about potential poisonings across all ages. Only 12% of these calls were referred to hospital for further management. Forty-one percent of calls (11,263) related to poisonings in children under the age of 5 years. Many non-medicinal poisonings are mild or not clinically significant and can be managed or observed at home. Some reduction in poisoning may also be due to better community awareness. The fact that the admission rate has remained steady would suggest that we may be seeing a true reduction in the poisoning rate.

Rural v Urban:

A previous study¹ identified higher rates of chemical ingestion by children aged 0-4 years in rural Queensland compared to urban areas. This has not been adequately explained. Plant ingestions were also higher for rural toddlers and perhaps some of the difference is accounted for by more at-home care and an outdoor lifestyle.

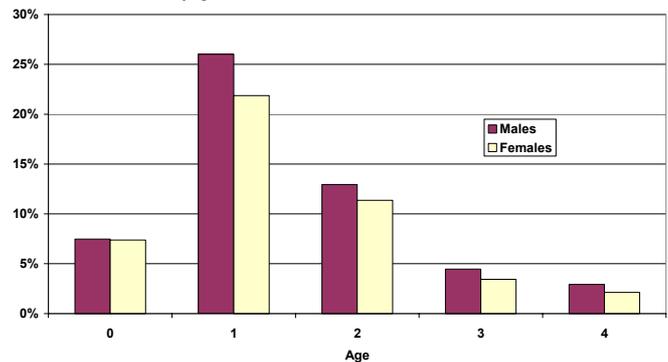
Prevention:

Child resistant packaging:

The introduction of child-resistant packaging in Australia is generally accepted to have reduced the number of toddler poisonings for both pharmaceutical and some non-medicinal substances (chemicals) since their introduction in the late 1970's and early 1980's. The Australian Standard 1928 sets out the requirements for child resistant packaging in Australia². Performance tests are carried out on panels of children and adults to assess the resistance to opening of reclosable containers. The closures are tested for their compliance by demonstrating that not more than 15% of a panel of 200 children between the ages of 42 months and 51 months are **able** to open the closure before it is demonstrated. After the mechanism has been demonstrated, not more than 20% of the same children should be able to gain access to the contents of the container. At the same time not more than 10% of a panel of 100 adults between the ages of 18 and 55 years should be **unable** to open and re-engage the closure after instruction. This is to ensure that adults are able to access contents and re-engage the closure mechanism. The manufacturer must ensure that the closure retains its child resistant properties for the expected life of the poison. Effectively, once this standard is applied a small number of toddlers will still be able to access the products within these containers despite them having a compliant child resistant closure in place. For these toddlers the child resistant cap/closure functions more to delay than prevent access and no closure can be considered to be 'child proof'.

There are some dishwasher powders available on the market where the container appears to be child resistant but the cap has a '2-click' mechanism that only functions as a child resistant closure if the cap is clicked twice. The majority of these products do not warn consumers that the second click is required

Figure 1: QISU ED presentations for toddler non-pharmaceutical ingestion by age, 1998-2004



to close the container safely. Currently the standard fails to address the issue of caps requiring an additional twist to engage the child resistant mechanism.

Scheduling:

Potential poisons are required under law to carry very specific labelling, but some loopholes exist and not all potentially dangerous products are included. For example, in 1987 the NHMRC recommended that gel and liquid dishwasher detergents with a pH of more than 11.5 be included in schedule 5 of the standard. (They are required to be fitted with child resistant closures and a label that includes the signal heading: **CAUTION:** and the cautionary statement **KEEP OUT OF REACH OF CHILDREN**. Other labelling details are also mandated by the standard and are very specific. In contrast, powders with a pH of over 11.5 are only required to have the cautionary label and are exempt from child resistant closure requirements³. If the pH of the dishwashing powder is lower than 11.5 there is no legal requirement for specific packaging or labelling as these substances are not scheduled.

Access:

Many poisonings in this age group occur when the substance is in use, out of the original packaging or the cap has not effectively been secured. A recent study in Australia showed that children frequently accessed the poison while the parent was present but distracted by normal day-to-day activities. The poisons were just purchased, packed to use for the day or being used at the time. Children had to climb to access the poison in a number of cases⁴.

Child gates, drawer and cupboard closures and locks will effectively reduce access to potential poisons for most children under the age of 5 years. However, some children are persistent and inventive in their efforts to gain access to off limit areas and these strategies will need to be combined with safe packaging and storage. Poisons should never be stored in any container other than that which it was purchased in.

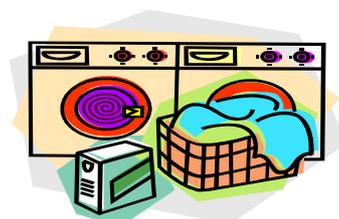
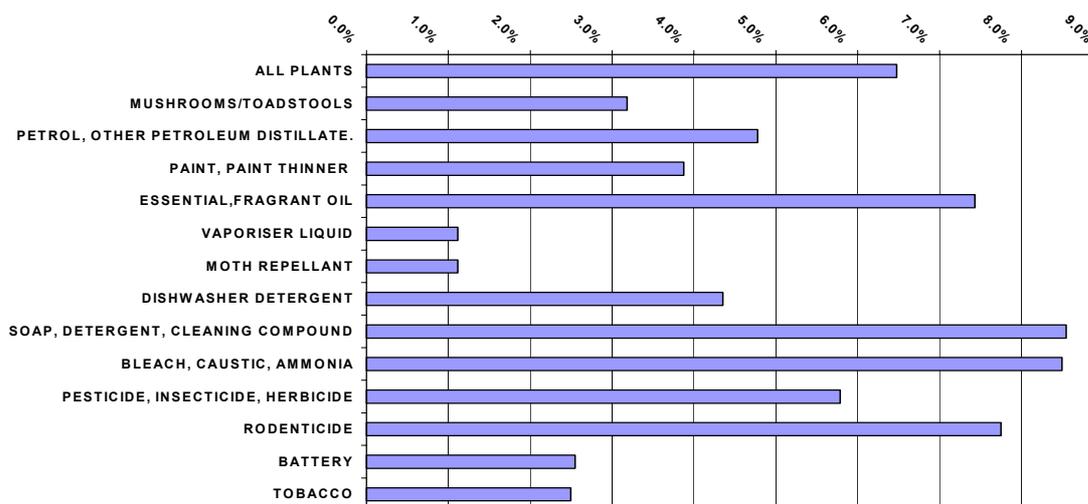


Figure 2: QISU ED presentations for toddler non-pharmaceutical ingestion by agent, 1998-2004



Some poisons need to be placed where they can be accessed by pests (rats, cockroaches). Such poisons should be placed in bait stations secured in positions that cannot be accessed by toddlers. Rodenticides should be distributed as bait blocks secured within locked boxes (only accessible to the rodent). Baits that are placed loosely in the ceiling can be carried out by rats, and pellet forms are often scattered and easily picked up by children.

Poisonous plants (eg. oleander, angel's trumpet, arum lily, and deadly nightshade) are best excluded from back yards and children's play areas. There have been cases where a child has died from stirring "billy" tea with an oleander sapling. When choosing plants for landscaping check with nurseries to ensure they are safe around children. A list of regional poisonous plants can be obtained from the Queensland Poisons Information Centre website.

Summary:

Preventing toddler poisoning:

- ☠ Toddlers are inquisitive and persistent and not deterred by taste or smell.
- ☠ Supervision is important but it is best to also modify the environment to minimise potential for poisoning to occur.
- ☠ Carefully read the warning labels on products.
- ☠ Minimise access by storing potentially poisonous products in locked cupboards.
- ☠ Leave product in original containers and return to secure area after each use.
- ☠ Use cupboard and drawer locks to keep toddlers from accessing contents.
- ☠ Don't plant poisonous plants in the garden and remove poisonous weeds.
- ☠ Keep the Poisons Information phone number 13 11 26 listed with other emergency numbers.

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RESOURCES:

Queensland Poisons Information Centre Ph 13 11 26
<http://www.health.qld.gov.au/PoisonsInformationCentre/homepage.htm>
 KIDSAFE
<http://www.kidsafewa.com.au>

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